of 85.72 mm = 3.37" by 125 mm = 4.9") on the basis that the proposed new format would be equal to twice the size of the ISO standardized credit card and would therefore be machine readable also for commercial purposes. The Panel, however, saw no particular merit in harmonizing the size of the Passport Card with that of commercial credit cards and therefore decided not to adopt the ISO proposal. Another aimed at a smaller size, known as DIN* A7, used in Germany and some other States but arguments in favour of this format were not sufficiently convincing to Panel Members to decide in favour of a change from the previously agreed format.

22. The Panel did agree, however, to an amendment in the text relating to this item to make it absolutely clear that the overall dimensions agreed upon and mentioned at the outset of para. 21 above referred to the outer limits of the document in question, whether issued in card or book form and that a 2 mm margin must be left alongside each edge before inserting data in clear print or coded form. The Panel then approved the text of Recommendation No. 2 as shown in para. 39 in Part III of this Report. No substantial changes were made in the sections entitled "The Clear Print Zone of the Passport Card" and "Information to be Included".

Explanatory Notes on Various Items

23. Under this heading the meeting undertook to review different country codes which might possibly be recommended for inclusion in the clear-print and machine-readable zones of the Card. They included a) the code developed for that purpose by the last meeting of the Panel, b) the United Nations Code for Road and Motor Transport in the Geneva Convention of 1949, c) the numeric code used for export trade statistics and d) the two-letter ICAO communications code for Location Indicators as contained in Doc 7910/17. Most Members felt that it would be preferable to focus the Panel's attention on a code that has been in existence and become internationally well-known rather than concentrate on the entirely new country code as developed previously by the Panel for the sole purpose of inclusion in passport cards. The Panel therefore discussed at some length the merits and demerits of each of the remaining three codes referred to above. It finally agreed that the United Nations Code for Road and Motor Transport as used in automobile transport throughout the world would seem to be the most suitable code for this purpose, partly because it presented a link between the Passport Card as a travel document on the one hand

*Deutsche Industrie Norm = German Industrial Standard.

and transportation and, thereby, tourism on the other. Although the code may consist of one, two or three letters, depending on the country, no particular problems were foreseen in connexion with its machine-readability. Nevertheless, in order to safeguard against any possible errors in this context, the Panel decided to recommend that, in the case of a country code with less than three letters, the empty spaces should always be filled by a dash.

24. In proceeding to examine further the text of PPC/4-WP/2, the Panel also decided to delete a reference to the cardholder's nationality in coded form within the clear-print zone since no practical purpose appeared to be served with the addition of this code in that zone.

25. Additional space was then provided in the clear-print zone for the column concerning the cardholder's sex since issuing countries with a language other than English or French would presumably wish to insert abbreviations concerning the holder's sex in their language before adding thereafter the letter M or F as either English or French translation.

26. The Panel further agreed to an amendment of the text in PPC/4-WP/2, relating to the place of birth column in the clear-print zone to the effect that the name of the country should be indicated by using the official spelling adopted by the United Nations for the designation of States.

27. As far as the photograph is concerned, it was emphasized that the size of the image is very important for identification purposes and although the Panel was not in a position to recommend exact specifications concerning, e.g. distance between eyes or between eyes and chin, it wished to stress that it should be a recent photograph, the image in the photograph should be well in focus and should fill the entire space reserved for this purpose, i.e. 45 x 35 mm and be in accordance with the specifications existing in the country of issue.

The Embossed Zone

28. At its previous meetings, the Panel had considered the possibility of including embossed data on the Passport Card - a technique that was readily available and appeared attractive at that time. A small majority had felt that imprints to be made from such characters at the time of entry and departure might facilitate cardholders in

clearance controls in those States which would continue to require some form of entry and departure records but would not be prepared to use electronic data equipment for some time to come. The hope was expressed at the time that such imprints would be progressively acceptable to clearance authorities in lieu of E/D Cards and that the latter could thereby be eliminated.

29. The Panel now reviewed the question as to whether it should recommend the inclusion of an embossed zone on the Card in the light of present-day technology and known administrative practices in States. In carefully evaluating the advantages and disadvantages of featuring embossed information in the Card, the meeting was guided by three basic principles which were enumerated during the discussions, namely a) the overall cost factors involved, b) the possible benefit to States and c) security considerations.

30. In relation to the costs involved, it was pointed out that the price of wipe-off equipment was, by itself, very low and the use of embossed information might therefore continue to be attractive to a number of States. When examining more closely the system as a whole, however, it emerged from the discussions that the cost of issuing the card would rise significantly with the insertion of embossed characters thereon. To begin with, a heavier base material would be required, extra machinery for embossing with its related energy use was needed as were increasingly numerous man hours for operational and checking purposes, etc. In countries receiving cardholders with embossed data, the costs of administering the sheets with imprinted data had also to be borne in mind.

31. In connexion with b) above, doubts were expressed as to the actual usefulness of the embossed zone to receiving States. It was pointed out, amongst other things, that sheets of paper with data from the embossed zone did not lend themselves to indexing in the same way as E/D Cards did and acceptability of the embossed information in lieu of that on present E/D Cards may indeed be limited. Certain information items now shown on the international E/D Card (Annex 9, 7th Edition, Appendix 4) were not contemplated for inclusion in the embossed zone nor could some of them ever be included, such as "port of embarkation". In addition, national requirements often called for one or more additional items to be completed on E/D Cards, compounding the problem.

32. In regard to security aspects (cf. c) above), the embossed zone was considered to be the most insecure zone since it was relatively easy to falsify embossed

characters. In the light of technical progress made over the past few years and expected to be made in the years ahead, the use of embossed data on the Card simply seemed to be an out-dated technique. For those and other reasons the Panel decided to refrain from recommending the inclusion of an embossed zone on the Passport Card and consequently deleted all reference thereto in the text of Part III of this Report.

The Machine-Readable Zone of the Document

33. The Panel spent considerable time discussing in great technical detail the machine-readable zone of the document. There were several possibilities from which the Panel had to make a choice: a) OCR (optical character reading), i.e. the machine-reading of the clear-print zone; b) the perforated magnetic tape which could be read either optically or magnetically; c) the magnetic track, discussed at earlier Panel meetings, which could be read with a magnetic head only; related thereto a system of magnetizing the entire inside back page of the document for encoding data; and d) OPR (optical pattern reading) referred to in paras. 12-14 of this Report.

34. It became clear at the outset that the OCR technique, also referred to as optical scanning, must be seen as the ultimate goal, but unfortunately, had to be ruled out as a practical possibility for many years to come because of the continuing high costs of the reader facilities. It was therefore necessary for the Panel to decide on a code system that would be inserted in the document for machine readability, repeating essential personal information contained in the clear-print zone.

35. The meeting thus proceeded to examine the balance of the above techniques and in so doing bore in mind the following criteria: the availability of equipment for producing and reading the machine-readable zone, economic viability, social acceptability, alphanumeric capability, adequacy of space for accommodating desired data and the security of the zone.

36. Looking closely at the perforated tape in the light of the above criteria, it was noted that, although it had been proposed at the Third Meeting of the Panel, the initial proposal had not been followed up by further data for consideration by the Panel, especially those relating to its costs. However, on the basis of studies conducted later by the Panel Member from France, the development of the technique appeared likely to be more costly than, for example, the magnetic track. Some Members had doubts about the

tape's capability of accommodating all the required information and, possibly, additional data if so desired by the issuing State. The meeting was reminded, however, that the Panel had decided upon a limited number of data to be included in the tape for a number of reasons. The meeting was furthermore assured that, on technical grounds, the system was workable and that the technique of coding by way of punched holes had been used, although in a simpler form than proposed (i.e. in perforated paper tape), for a long time all over the world. The problem of invasion of privacy did not arise since it was envisaged that a code key would be issued to the owner along with his document. A number of Members, however, were reluctant to recommend a system which was no doubt technically feasible, but not yet proven through actual operation and whose costs were uncertain.

37. In connexion with the magnetic recording system, the meeting generally agreed that this technique had been well tested over many years in all fields of automation, e.g. on bank cards, credit cards, transportation tickets, etc. It was considered to be one of the least costly, the best known and the most widespread of the machine-readable techniques. The main objection raised against this system was the inability of the holder to verify readily the information encoded on the track. In reply, it was mentioned that the installation of display screens at points of issue or clearance control points may solve this problem, although it was acknowledged that this would, of necessity, raise the cost of the overall system. On the security side, some Members pointed out that much forgery had occurred with magnetic tracks on credit cards, tickets, etc., but others maintained that fraudulent insertion of additional data was restricted by the length of the tape in the document, change of certain information was made difficult through the use of check characters, erasure and re-recording of data required powerful equipment to act through the plastic protection over the track and that copying data from the magnetic track through the application of heat was bound to distort the plastic cover.

38. In the case of OPR, this system had been developed more recently for reading numeric data on a 4-bit code but was expandable to include alphanumeric characters in 7 or 8-bit code. Primarily, it offered a higher degree of security than the perforated tape as well as the magnetic track, since the code was to be embedded right in the security paper of the document. The Panel was informed that the cost of the reading equipment, which was too high for serious consideration by the Panel at its Third Meeting, was now estimated to be comparable with that for magnetic readers, but precise data were not available as yet.

Like the perforated tape, the code was optically readable and presented no problem concerning the holder's privacy since the encoded information could be verified through a code key. From the technical point of view, however, this system was still in a development stage and, therefore, lacked the test of time. Although it appeared promising to some, most Members were hesitant to endorse a coding technique of that nature at this time.

39. There were other points raised and discussed in detail in connexion with one or the other code systems, such as patent rights, the use of standard ISO code, the use of the machine-readable zone for other than governmental purposes, the speed with which automatic equipment could read the various codes, the speed of transmission of data between terminals and central computer, problems associated with issuing coded Cards in decentralized issuing systems, etc. In approaching a decision on the question of which code system is to be used on the Card, the Panel unanimously reaffirmed its opposition to the use of any technique which would entail the payment of royalties. Furthermore, it laid down the principle of reciprocal communication of all information concerning the industrial production of the equipment concerned.

40. Having carefully weighed all aspects, the Panel finally came to a conclusion first on the basic question of optical versus magnetic coding system and decided in favour of recommending a magnetic system. Second, the Panel expressed a preference for the magnetic track over the perforated tape.

41. Having decided to recommend the magnetic track for inclusion in the machine-readable zone of the Passport Card, the Panel realized that the following procedures were desirable to protect the privacy of the individual:

a) the information recorded on the magnetic track should be easily readable by the cardholder with the help of readily available reading equipment;

b) any unused space available on the magnetic track after recording the approved personal information (cf. Recommendation No. 3) will be "frozen" and thus made incapable of being used for the recording of any additional information.

42. The Panel recognized that further research might develop other techniques desinged to protect the privacy of individuals which would make the restrictions concerning "freezing" unnecessary. Therefore, those restrictions should not be interpreted as inhibiting the implementation of machine-readable Passport Cards for use in the immediate future.

43. Due to the lack of time the Panel had to leave aside a technical decision concerning magnetic bit density and the encoding system for passport readability. At least three systems were under consideration: 1) the 210 bpi (bits per inch) International Air Transport Association (IATA) system 2) the 75 plus-minus 3% bpi - American Banking Association (ABA) system and 3) a combination of the IATA and ABA systems. The Panel felt that additional studies of these encoding systems were required. As indicated in paras. 55 and 56 of this Report, the Panel anticipates continued technical liaison between the Members' Technical Advisers; this matter will be given high priority in their considerations and the results will be communicated to ICAO as soon as possible.

The Zone Reserved for Travel Restrictions

44. The Panel approved the text shown under this heading in PPC/4-WP/2 with some minor amendments.

Agenda Item 3: Minimum Security Requirements for the Passport Card

Materials to be used for producing the Passport Card

45. In discussing this aspect, the meeting made some changes to the text presented in WP/2 as a result of its earlier decision to exclude an embossed zone from the Passport Card. In the second introductory sentence, the text was aligned more closely to that of para. 19 as far as the safeguards of the document were concerned and additional examples of safeguards against falsifications were included in the text, referring to certain printing techniques. When considering draft Recommendation No. 5 (renumbered as No. 4 in Part III of this Report), the meeting decided after some discussion to remove the last part dealing with the responsibility of each issuing State for the Card's manufacture, etc., and include the essence of that sentence at the outset of the preceding paragraph. Some amendments were adopted to clause b) of the Recommendation which was concerned with the creation of a counterfeit card in contrast to para. a) dealing with possible alterations of a genuine card. Those amendments were aimed at obtaining wider acceptance by States of this Recommendation and also clarifying its meaning.

List of certain properties of materials applying to the Passport Card as a whole

46. Amendments made to the text in WP/2 under this heading included the deletion of references to polyvinyl chloride and polyvinyl chloride acetate mentioned in connexion with deformation properties. In order to avoid restricting unnecessarily the

choice of materials to be used for producing the Card, the meeting agreed to delete references to inflammability and insensibility to chemical effects and to adjust temperature stability and humidity resistance to somewhat less restrictive ranges. Some amendments were also introduced to the text concerning toxicity and durability.

Listing of certain properties of materials effecting the machine-readability

47. The Panel agreed on the usefulness of a text concerning properties related to optical reading. In this context it referred to OCR, also known as scanning, which might become economically feasible at some future date. The meeting therefore adjusted the text, originally drafted for the reading of optical code, accordingly.

48. In connexion with properties related to magnetic reading, a simplified text was adopted in place of that presented. Subsequently, Recommendation No. 6 (renumbered as No. 5 in Part III) was adopted with some drafting changes.

Agenda Item 4: Procedures and Systems for use in connexion with the Passport Card

Equipment required for production of the Passport Card

49. The Panel examined the draft presented in WP/2 under this heading and agreed to an amendment of the text referring, as an example, to a system which an issuing State might wish to follow whereby personal data for inclusion in the clear-print and magnetic zones of each Card need to be entered into that system only once. The table concerning production operations and corresponding equipment was replaced by an improved version.

Equipment for use at Clearance Control Points

50. Amendments made to the draft text in this section were in consequence of the Panel's earlier decisions to exclude the embossed zone from the Card and to substitute perforated magnetic tape by magnetic tracks. With these amendments, the Panel approved the text in PPC/4-WP/2.

Agenda Item 5: Estimated Cost Figures in connexion with the Production and Use of the Passport Card

Estimation of costs associated with the production and use of the Passport Card

51. In the discussions on this point, differing opinions were expressed on the approach to be taken concerning the presentation of cost figures. Some Members wished to see general text only under this heading in Part III relating to estimated costs, including

a statement indicating the relationship of expected production costs for the Passport Card in comparison with those for producing the conventional passport. Others mentioned that any figures shown, even though they were identified as approximations only, were likely to change in the near future due to inflactionary pressures and would, therefore, be misleading to the reader in a few years hence.

52. Further, it was pointed out that, apart from the figures presented by the French Member in PPC/4-WP/2, other major studies undertaken in Members' States on the Passport Card also included estimates of costs associated with the production and/or use of the Passport Card and might be of equal interest to States when considering the issuance or acceptance of the Passport Card.

53. In the light of the various points made, the Panel finally agreed to maintain only general statements on cost estimates in the body of the Report including a sentence to the effect that the cost of producing the Passport Card would not appear significantly different from that of producing the conventional passport. A reference was also included in this part to the cost estimates in the studies carried out in certain countries, i.e. Canada, Germany, Sweden and the USA with an indication as to where more detailed information may be obtained, if desired.

54. The more specific cost estimates based on research carried out in France were up-dated and transferred to new Appendices 'F' and 'G'. It was decided to present such figures in French Francs only, leaving it to the State concerned to convert these figures into their own currency, if desired and to insert appropriate text so as to indicate clearly the nature of these figures to the reader.

Agenda Item 6: Any Other Business

55. A suggestion was made to the effect that continuing liaison between the Members' Technical Advisers would be considered desirable. It was pointed out in this context that a certain time lag must be expected to occur between the closing of the present Panel meeting and the implementation, after ICAO approval, of the Recommendations contained in the document (Part III). During this time, certain remaining technical questions should be resolved and others might usefully be reviewed in the light of rapidly advancing technology.

56. The Panel agreed that, for this purpose, liaison should be maintained primarily by correspondence and the Panel Member of France accepted a suggestion to act as liaison officer between the various technical advisers while keeping the Panel and the ICAO Secretariat informed in this respect.

Closing formalities

57. The Panel Member of France, supported in turn by each Panel Member, expressed gratitude to the Chairman, Mr. C.F. Woodiss, for the excellent manner in which he had conducted the meeting while the Secretary, Mr. H.A. Seidelmann, was commended for the speed and efficiency with which he had performed his work. In response, the Chairman thanked Panel Members, their Technical Advisers and the Observers for their co-operation and the Secretary for his valuable assistance.

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PART III

A STANDARDIZED PASSPORT CARD

Note: The term Passport Card as used throughout this document includes a passport in card format as well as an improved conventional passport, both possessing machine-readable characteristics.

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INTRODUCTION

Initial action by the Facilitation Division of ICAO

1. The Seventh Session of ICAO's Facilitation Division, held in Montreal in May 1968, was deeply concerned over the FAL implications of ever-increasing volumes of passenger traffic, particularly in the light of the impending introduction on many international routes of high-capacity aircraft. The Division recognized that new ways and means had to be found in order to process such growing passenger volumes through governmental clearance controls at a faster pace and thus keep delays on the ground to a minimum. One proposal aimed in this direction concerned the possible development and introduction of a Passport Card which might eventually replace the conventional passport and which was expected to accelerate individual clearance through passport controls either by using the Card as an electronically readable document or, where the volume of traffic did not warrant the installation of electronic data processing equipment, faster visual inspection than would be possible with a conventional passport.

2. Since time limitations did not permit the Division to go deeper into this subject, it adopted a Recommendation (Rec. No. B-2) calling for the establishment of a small Panel of suitably qualified experts to study this matter.

Action by the Air Transport Committee and Council of ICAO

3. The Council subsequently approved this Recommendation (cf. Supplement No. 1 to the Division's Report, Doc 8750-FAL/564), thereby deciding that the Air Transport Committee should set up such a Panel for the purpose indicated above. The Panel's terms of reference as approved by the Air Transport Committee were as follows:

"To study and make recommendations to the Air Transport Committee on the following:

a) The establishment of an appropriate document such as a passport card, a normal passport or an identity document with electronically or mechanically readable (as well as visually readable) inscriptions that meet the requirements for document control;

b) To determine the best types of procedures, systems (electronic or mechanical) and types of equipment for use with the above documents that are within the resources and capability of Member States;

c) Determine the feasibility of standardizing the requisite control information and methods of providing this information through automated processes, provided that these processes will meet the requirements of security, speed of handling and economy of operation.

In carrying out the above objectives, the Panel should note the various solutions suggested in working papers FAL/7-WPs 37, 56, 83 and 108 and make the necessary evaluation of those proposals along with the consideration of any additional concepts that may be developed."

Panel on Passport Cards

4. The Air Transport Committee established the Panel in November 1968 when approving the nominations it had received from eight Contracting States (Australia, Canada, France, Federal Republic of Germany, India, Kenya, Sweden and the United States) and agreed to invite the International Criminal Police Organization and the International Air Transport Association as Observers on the Panel. In October 1973 the Air Transport Committee approved the addition of a Member to the Panel, nominated by the Union of Soviet Socialist Republics and in March 1974 the addition of a further Member to the Panel, nominated by the United Kingdom.

5. The Panel commenced its work by correspondence and convened its First Meeting in Montreal in June 1969. At this meeting the Panel laid the groundwork for its future studies and research which led to the Second Meeting in Paris in May 1970. Subsequent research studies carried out by various Members and circulated among the group called for a further meeting which was held in Montreal in January 1972. It adopted five Recommendations concerning the production and use of the Card. However, the Panel at that time did not consider its work as being entirely completed since certain technical problems still had to be solved and new techniques were expected to become available in the near future which could result in possible further improvements. It therefore expressed itself in favour of an extension of its work for another year or two.

Completion of the Panel's work and final action thereon

6. In view of the expected convening of the Eighth FAL Division Session in 1973, the Air Transport Committee decided to submit the Panel's Reports on its three meetings to Contracting States for their comments, to be received in time for the Division to review the Panel's work, along with these comments. The Division, held in Dubrovnik in March 1973, did so and adopted Recommendation No. B-5 which, in essence, aimed at conclusion of the Panel's work through a final meeting by mid-1974, publication by ICAO of the results of the study and, thereafter, consideration of the desirability of placing the matter under the auspices of some other appropriate international organization.

7. The Council of ICAO, on 6 June 1973, approved this Recommendation and directed the Secretary General to take appropriate action. As a result, the Panel's Fourth Meeting was held in July 1974 in Montreal at which time the Panel, inter alia, approved the text of the present document in fulfillment of the above FAL Division Recommendation.

8. (TO BE COMPLETED AFTER ACTION BY THE AIR TRANSPORT COMMITTEE.)

SUMMARY

9. The Passport Card described in this document was developed over a five-year period by a Panel of experts in the field of immigration controls, passport issuance, computer science, etc., nominated by ten Contracting States of ICAO and two international organizations.

10. The term Passport Card as used throughout this document includes a passport in card format as well as an improved conventional passport, both possessing machine-readable characteristics.

11. The purpose of developing such a Passport Card was primarily for expediting the clearance at international airports of ever-growing volumes of passengers. At the same time, care was taken to ensure that the Card would be suitable for use at border crossing points in connexion with surface transport.

12. It is expected that the Passport Card would mainly benefit those passengers travelling as temporary visitors as defined in Chapter 1 of Annex 9 to the Chicago Convention and by the United Nations in its Recommendations on International Travel and Tourism (Rome, 1963).

13. The Passport Card contains, on the front side, a clear-print zone which may be read visually and, on the reverse side, a magnetic zone for automatic reading as well as a zone for insertion of travel restrictions, if any.

14. It is expected that Passport Cards will initially be issued and accepted by a limited number of States and that more widespread issuance/acceptance of the Card would probably be progressive and involve a number of years.

15. The use of the Passport Card does not involve any expenses whatsoever, apart from producing it, to a State which does not wish to use automatic readers.

16. All essential personal information to identify the cardholder has been included in the Passport Card. If a Card-issuing State has a need for additional information, it is free to require such additional data on the application forms for Passport Cards which will be kept on file and could be used for tracing any wanted person.

17. States issuing Passport Cards are requested strictly to adhere to the technical specifications and measurements set forth in this document. They are free in their choice of materials for producing the Card, but are invited at the same time to observe certain guidelines so as to ensure that the Card is tamper-proof and has a life-span, under normal use, of at least five years.

18. The production operations and corresponding equipment are outlined in the last part of this document. For those States which are planning to install automatic reader equipment at busy clearance control points, some cost estimates are offered based on research undertaken so far in one State.

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GENERAL OBSERVERSATIONS CONCERNING THE USE OF THE PASSPORT CARD

Objectives of the Passport Card

19. The use of a Passport Card in lieu of a conventional passport was conceived at the 7th Session of ICAO's Facilitation Division in 1968 as a means of accelerating the clearance process of ever-growing passenger volumes at international airports. Since the laws and regulations of States pertaining to travel documents do not normally differentiate between the various types of transport, however, the Card to be developed had to be suitable also for use at border crossing points in connexion with surface transport. Furthermore, the document to be developed had to (a) present safeguards equal to or better than those of conventional passports and (b) satisfy those control requirements already met by conventional passports (and other travel documents) currently in use throughout the world.

20. This was considered essential since it was expected that for some time, a certain number of States may not wish or be in a position to issue the new document or adopt new procedures and/or acquire new equipment for the use of this document for frontier control purposes. Thus it was anticipated that a Passport Card system and convential passport procedures would operate in parallel in the foreseeable future. Once Passport Cards are issued and/or accepted initially by some countries, a more widespread issuance/ acceptance would probably be progressive and involve a number of years.

21. The possibility of countries deciding to issue Passport Cards and/or to introduce automatic reader facilities at their own entry points will be influenced by a number of considerations including capital costs of equipment. It should be emphasized that, apart from production costs, the use of the Passport Card involves no expenses whatever to a State which does not wish to install and operate automatic reader facilities. In cases where the use of automatic reader facilities are contemplated the costs would need to take into account the number of regular entry points and the volumes of entry at those points. This would control the number of reader units and the extent of supporting equipment to be installed (for further details, cf. paras. 88, 89 and Appendix 'G').

22. In developing the Passport Card, the Organization was concerned, first and foremost, with those passengers forming the bulk of all air travellers, i.e. temporary visitors*, who would benefit from simplified clearance control procedures by using the Passport Card while other types of travellers, such as immigrants and seasonal workers, would continue to be subject to more detailed formalities. As far as children are concerned it has been recognized that their inclusion in the father's or mother's Passport Card would be impractical and it is suggested that individual Cards be issued to them. States, of course, are free to admit children, at their discretion, who do not have a Passport Card of their own.

23. A related point made during consideration of this subject was the desirability of standardizing the type of information and its layout in the conventional passport. The United Nations has made considerable efforts over many years towards this end but complete standardization has not been obtained as yet on a worldwide basis. Standardization in conventional passports, it was felt, would also be of assistance to passport control officials in clearing passengers and States which are unable to issue Passport Cards for the time being should be encouraged to include in their conventional passports the control information in the same standard format as in the clear-print zone of the Passport Card (cf. Recommendation No. 1 in para. 34 below).

Advantages of the Passport Card over Conventional Passports

24. Any future travel with passports in card format is expected to provide the holder with increased travel facilitation when travelling to countries which have introduced automatic reader facilities and there is no visa requirement. The facilitation aspects could include:

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*The term is defined in Chapter 1 of Annex 9, 7th Edition as follows:

"Temporary visitor. Any person, without distinction as to race, sex, language or religion, who disembarks and enters the territory of a Contracting State other than that in which that person normally resides; remains there for not more than three months for legitimate non-immigrant purposes, such as touring, recreation, sports, health, family reasons, study, religious pilgrimages, or business; and does not take up any gainful occupation during his stay in the territory visited."

a) the advantage of reducing the time involved in the visual inspection of conventional passports at clearance control points; and

b) the prospect that upon arrival or departure, cardholders will not be required to lodge Embarkation or Disembarkation Cards. It is assumed that countries installing automatic reader equipment would accept the data on the Card as sufficient for their control purposes.

25. If a country with automatic reader facilities requires visas, the facilitation aspects in a) and b) above will still apply. In these cases, however, there will still need to be a visual check to confirm that the visa document (cf. para. 31 below) and the Card relate to the same person. This would affect the advantage under a) above.

26. Where the clearance control system does not involve automatic reader facilities and there are no visa requirements the facilitation aspect under a) above will still apply. Where the control system does not involve automatic reader facilities and there is a visa requirement, the degree of facilitation offered by using the Card may be considerably lower.

Suggested alternative means of providing Cardholders with visas

27. It is clearly recognized that the requirement for entrance visas is liable to represent one of the major obstacles in the introduction by States of the passport in card format. Since visas can obviously not be endorsed on a Card by traditional methods as on the pages of a conventional passport, elimination of visa requirements by each State for nationals of as many other countries as possible, when travelling as temporary visitors, is therefore an important factor in the success of the card-type concept. ICAO and other international organizations have urged States for many years to take all necessary steps in this direction. Annex 9, 7th Edition to the Chicago Convention on International Civil Aviation contains the following provision:

"3.7 Recommended Practice.- Contracting States should extend to the maximum number of countries the practice of abolishing through bilateral arrangements or unilateral action, entrance visas for temporary visitors.

Note.- As of the end of 1973, fifty-two Contracting States had already eliminated entrance visas in respect of nationals from fifty or more other countries. Seventeen of these States were in the Western Hemisphere, twenty-one were in Europe and the Middle East, nine were in Africa and five were in East and South Asia and the Pacific."

28. The United Nations Conference on International Travel and Tourism, held in Rome in 1963, adopted a similar Recommendation on this subject.

29. As will be seen from the Note under para. 3.7 in ICAO's Annex 9, there are a considerable number of States which have already made appropriate arrangements for visa-free entry of nationals from other States making temporary visits of three months or less. Some States, in fact, are known to have made such arrangements with up to 80 other countries. At present, therefore, a high percentage of air passengers, since they qualify as temporary visitors, no longer need to obtain any visas for many of their journeys.

30. On the other hand, there are States which, so far, have entered into visa abolition agreements with only a few other countries. In such cases, particular efforts are needed to bring national practices and procedures closer in line with the above Annex 9 provision and UN Recommendation as well as the existing worldwide trend towards liberalizing tourist travel.

31. In the case where a temporary visitor wishes to use his passport in card format, issued by his government as a valid travel document, but requires a visa for entry into the country of his destination, there are several possibilities for issuing such a visa, including the following:

a) endorsement of the visa in a visa book to be held in conjunction with the Card and used as the occasion warrants;

b) endorsement of the visa on the reverse side of a photocopy of the Card which the traveller holds;

c) endorsement of the visa on a form supplied by the country requiring the visa. Such a visa form would be identified with the person to whom it was issued.

32. As mentioned earlier, many countries will continue to issue conventional or improved passports for some time and where visas are required, these can be endorsed therein as has been standard practice in the past.

Issuance and acceptance of Passport Cards

33. It follows from the above that the overall objective is a situation whereby an increasing number of countries will enter progressively into the field of issuing Passport Cards to persons travelling abroad and accepting them from nationals of other States for clearance purposes. To this end, the following Recommendation is made:

34. Recommendation No. 1

It is recommended that:

a) those States which are unable to issue Passport Cards for reasons such as financial, security and technological constraints, should examine the possibility of producing uniform conventional passports by showing on the first page of their national passports all control information in the same standard format as in the clear-print zone of the Passport Card - see Appendix 'A';

b) those States which are in a position to issue Passport Cards should do so in accordance with Recommendations Nos. 2 to 6 in this document as soon as possible. They should issue also suitable documents, if this is necessary, to meet the visa requirements of other countries;

c) those States which are in a position to accept Passport Cards for clearance purposes should make appropriate arrangements as soon as possible according to their own possibilities and their control requirements. In cases where any of these States require a visa they should arrange an appropriate system to facilitate the presentation of visas in conjunction with passports when presented in card format;

d) those States which are not yet in a position to accept Passport Cards should continue to do everything possible to facilitate clearance with conventional passports.

FORMAT AND LAYOUT OF THE PASSPORT CARD

Dimensions of the Passport Card, its various zones, etc.

35. The standard format and layout of the Passport Card is shown in Appendices 'A' (front side of the Card) and 'B' (reverse side). Its overall dimensions are: 88.0 mm (3.47") width, 125.0 mm (4.92") length and its thickness is between 0.254 and 0.635 mm (0.010" - 0.025"). The dimensions relating to width and length refer to the outer limits of the document, i.e. from edge to opposite edge, whether issued in card or book form, and a 2 mm margin must be left along each outer edge before inserting data in clear-print or coded form. This size was chosen to allow, on the one hand, for good readability of the items of personal information considered necessary for inclusion in the Card and for sufficient compactness on the other to fit into coat pockets, etc.

36. It will be noted that the front side of the Card contains a clear-print zone which also includes the holder's photo and signature. The lower portion of the front side has been left free in anticipation of further developments in new encoding techniques which might be incorporated therein at some future date. Reference to space allocations for the various items of personal data can be found further below.

37. The reverse side of the Card features an area reserved for the insertion of travel restrictions, if any, on the top part and a zone for inclusion of magnetically encoded information for machine-reading in the center. Space between the area reserved for travel restrictions and the magnetic zone as well as the lower portion of the reverse side of the Card has been left free. Exact measurements of the various areas appear in Appendix 'B'.

38. Since standardization of size, layout and the type of information to be included is an important feature of the Passport Card, adherence to the specifications in Appendix 'A' to this document, when issuing Passport Cards, is important. The following Recommendation is therefore made:

39. Recommendation No. 2

It is recommended that when issuing Passport Cards, the sample form shown in Appendix 'A' hereto as the standard format for the Passport Card be strictly followed, including specifications for its overall dimensions, contents and exact space allocations of control information to be shown thereon.

The Clear-print zone of the Passport Card

40. It was considered impossible to include all the information that could conceivably be required strictly from a security point of view. Although the overall number of items of necessity had to be kept to a minimum, it has been possible to include all essential personal information necessary to identify the Cardholder. If a Card-issuing State should have a need for additional information, it is free to require such additional data on the application forms for Passport Cards as is presently done for conventional passports, which would be kept on file in the State of issue and could be used for tracing any wanted person.

41. In selecting the personal information items considered essential as shown below it was also recognized that, although some may be of questionable value to some States, their inclusion might assist in having the Passport Card more readily accepted in other States. Explanatory notes on various of these items will be found in paras. 46 to 53 below.

Information to be included

42. As indicated in Appendix 'A' hereto (cf. Rec. No. 2 above), the following items of personal data are included in the clear-print zone:

a) symbol to identify the Card
b) code of issuing country
c) card (serial) number
d) surname
e) given names
f) nationality of Cardholder
g) date of birth
h) national registration/personal no.
i) sex
j) place of birth
k) date of issue
l) date of expiry

In addition the title "Passport Card" and the name of the issuing country should be included on the upper part of the Card. Furthermore, the holder's signature and the photograph must be included. There is also space for optional use such as the issuing authority's stamp and signature.

43. In issuing Passport Cards, States are requested to indicate, in the clear-print zone only, the type of information shown in each box, apart from completing it with the holder's personal data. In other words, the holder's date of birth, for example, should be preceded by the words "date of birth", etc., as indicated in Appendix 'A'. This is considered necessary at least until the Card has received widespread acceptance and become sufficiently known to control officials.

44. All Passport Cards should contain, in the clear-print zone only, either English or French in addition to the language of the issuing State.

45. In producing the control information in the clear-print zone, OCR-B type characters as shown in Appendix 'C' should be used with 10 characters to the inch. The number of spaces reserved in each box for the information to be inserted can be gleaned from Appendix 'A' and also from column I of Appendix 'D' hereto.

Explanatory Notes on various items

46. The symbol to identify the Card as a Passport Card is mainly for automatic reading, and has been included in both zones of the Card. As far as the clear-print zone is concerned, its insertion had been agreed upon because of the possibility that optical reading techniques may be further developed in the future which could make such machine-reading of this zone economically feasible. Since a multiplicity of different documents would presumably be read in such a system to make it economically viable, the existence of an identification symbol in this zone was considered essential. For this purpose the letter 'P' has been designated and should always be inserted in the box entitled "Type".

47. Similarly, the country code to be found in the clear-print and machine-readable zones was included for automatic reading as it would add greatly to the computer's capability of distinguishing between different cardholders who may have in common certain other data in the machine-readable zones. Inclusion of that code in the clear-print zone is of considerable assistance in those instances where the control information for the magnetic zone is prepared as a by-product of the clear-print zone data.

The respective code to be used by each State when issuing Passport Cards is that developed by the United Nations Conference on Road and Motor Transport (Geneva, August/September 1949) consisting of up to three letters. However, in the case where a country's code contains less than three letters, the empty spaces must be filled by dashes.

48. It has been recognized that the insertion of names on the Passport Card could present difficulties, owing to the many different ways in which names are used in the various areas of the world and the space limitations on the Card. In cases where composite surnames cannot be shown in full due to space limitations, the predominant one as used by the Cardholder should be inserted.

49. Information concerning nationality was included on the Card even though the Card would presumably be issued in most cases to a national of the issuing State. However, information concerning nationality is usually a basic control item for the State into which the cardholder is seeking entry and a number of States might issue Passport Cards also to other nationals, residing in their respective territories.

50. In furnishing dates on the Passport Card, e.g. date of birth, the Gregorian calendar should be used and the information should be shown in the following standard manner:

a) All days should be shown by a two-digit number, i.e. the dates from one to nine should be preceded by a zero; this number to be followed by one empty space;

b) The month should be shown in an abbreviated fashion not exceeding four letters, followed by an oblique character (/);

c) The translation of the month should follow its original version, again up to a maximum of four letters with an empty space thereafter;

d) The year should be shown in a two-digit number only.

As an example, the indication of birth dates on the Card issued in the Italian language with French translation would appear as follows:

1	2	Δ	L	U	G		/	J	U	I	L	Δ	4	2

51. The box concerning the cardholder's sex has been included since first names do not always give a ready indication and appearances from the photograph may be misleading in this respect. It should be completed by the initials commonly used in the language of the country of issue, for which 3 spaces have been reserved, followed by a dash and this in turn followed by the letter M or F in the case where a translation of data into English or French is necessary. In cases where only the letter M or F needs to be shown, it should be inserted in the fifth space in this column for the purpose of possible future optical scanning techniques.

52. In cases where the Passport Card is being issued to a person whose place of birth was outside the country issuing the Card, the information should be supplemented by the country of birth. The name of the country should be indicated by using the official spelling adopted by the United Nations for designation of States.

53. As far as the photograph is concerned, it should be left optional for applicants to submit either colour or black and white photos. Although a "profile" picture might be preferable strictly from a security point of view it might be difficult, for psychological reasons, to insist on this and has been left to the discretion of issuing States. In any event, the photo on a Passport Card should be a recent photograph of high quality, the image on the photo should be well in focus, should fill the entire space reserved on the Passport Card for the purpose, i.e. 45 x 35 mm, and be in accordance with the specifications existing in the country of issue.

The Magnetic Zone of the Passport Card

54. On the reverse side of the Card, a zone (cf. Appendix 'B') has been reserved for inclusion of a magnetic tape for machine-reading by EDP system, repeating most of the personal data shown in the clear-print zone. Each alphabetical or numerical character on this tape is represented by magnetic coding. When an improved machine-readable passport is issued, the magnetic zone should be placed on the inside of the back cover. The holder of the document or the clearance control officer can check that the information recorded in the magnetic zone and spelled-out in the clear-print zone is the same, by means of a system providing screen display of the data recorded in the magnetic zone. This system could be installed in the offices of the authority issuing the document and also at clearance control points.

55. The support of this tape could be in polyester and for the magnetic coating an acicular iron oxide base could be used. The code used is shown in Appendix 'E'.

Items to be included in the Magnetic Tape

56. For automatic reading it is indispensable to standardize the type of information to be included in the magnetic zone, the exact placing of these data in that zone and the exact position of the magnetic zone on the Passport Card. States issuing the document are therefore invited to adhere strictly to the specifications of the following Recommendation:

57. Recommendation No. 3

It is recommended that the magnetic zone (cf. Appendix 'B') be used for encoding and machine-reading of the following control information:

a) symbol to identify the Card as a Passport Card;
b) code of issuing country (cf. para. 47 above);
c) card (serial) number;
d) name (surname and all other names as space permits);
e) nationality of cardholder (cf. para. 47 above);
f) date of birth;
g) national registration/personal number;
h) sex (initials M or F);
i) date of expiry.

Space allocation of characters reflecting the above control data will be governed by the specifications listed in column II of Appendix 'D'.

The Zone reserved for Travel Restrictions

58. In the case of a country issuing the passport in card format and imposing any travel restrictions, it may endorse them in clear-print in the zone on the reverse side of the Card (cf. Appendix 'B') reserved for this purpose. Such endorsement may consist, for example, of the names of States to which travel by the cardholder is prohibited. A State issuing the improved machine-readable passport will wish to endorse such restrictions, if any, in the same place as is isually done in the conventional passport.

MINIMUM SECURITY REQUIREMENTS FOR THE PASSPORT CARD AS A WHOLE

Materials to be used for producing the Passport Card

59. In producing the Passport Card described in the preceding Chapters, careful consideration should be given to the materials to be used for this purpose. As indicated in para. 19, the Card should incorporate safeguards equal to or better than the conventional passport both in terms of the medium as well as the entire system of operation (e.g. issuance, etc.). A Card produced by using security paper as a base which, after completion, is to be laminated, might have to be protected against falsification by the incorporation in such paper of active or inactive isotopes or watermarks or the use of printing techniques such as the guilloche method or intaglio printing whereas Cards in which information is embedded directly in the plastic material by a photographic process might need to be protected through other means, e.g. insertion of fibres having certain optical properties.

60. Each State should determine the security features required to achieve a satisfactory standard. Nevertheless, the following guidelines should be observed in producing the Passport Card:

61. Recommendation No. 4

It is recommended that the Passport Card be produced so that:

a) any attempt to alter a genuine document in any way would result in its virtual destruction or render such alteration clearly manifest to the eye; it might also be detectable by the mechanical or automated processes entailed in the use of the Card;

b) the creation of a counterfeit Card that would be visually acceptable and able to survive automated inspection processes would entail the acquisition of production equipment or materials so difficult to acquire illegally for this purpose that it would be unattractive to potential criminal elements.

62. While each State is left free to decide what kind of basic material it wishes to use in connexion with the Card, certain minimum characteristics, however, should be inherent in whatever material is selected. In addition, it will be necessary for all States issuing the Card to adhere to certain standards, for example, of the thickness of the lamination to ensure that, in automatic reading, a sufficiently strong signal is obtained. Details of these requirements are listed hereunder.

Listing of certain properties of materials applying to the Passport Card as a whole

63. Deformation Properties - The Card should be of such nature that plastic deformation due to normal use (bends, not creases) can be reduced elastically to flatness by the reading device, without impairing the usage of the Card or the functioning of the reader.

64. Hazards - The Card must present no toxic or other hazards in the course of normal usage.

65. Temperature Stability - The Card should be reliably readable either visually or by machine at various operating temperatures, ranging for example from -10°C to +50°C. The Card should not lose its reliability after being stored at very low and very high temperatures, for example from -35°C to +80°C.

66. Humidity Resistance - The Card should be reliable in operation at a relative air humidity of 5% to 95% with a maximum wet bulb temperature of 25°C. The Card should not lose its reliability of use when stored at a relative air humidity of 0% to 100%.

67. Durability - The Passport Card should maintain its reliability during normal use throughout a lifespan of at least five years.

Listing of certain properties of materials effecting the machine-readability

68. Properties related to OCR (Optical Character Reading)* - In the event that the OCR technique might become economically feasible at some future date, the effective contrast must be satisfactory according to standards normally applied for optical technique. This not only applies to the base material but also the covering and includes the effects of use during the whole lifespan of the Card.

*Also referred to as optical scanning technique.

69. Properties related to Magnetic Reading - The surface of the magnetic medium must be homogeneous. Magnetization will be achieved by saturation of the coating. The protective outer layer must not be magnetized and this layer must cause no significant perturbation of the magnetic field.

70. Regading the thickness of the covering, it must not exceed 0.25 mm.

71. Having thus enumerated certain properties of materials applying to the Card as a whole and effecting its machine-readability, the following Recommendation is made to issuing States:

72. Recommendation No. 5

While recognizing that issuing States have the freedom of choice of materials for producing the Passport Card, it is recommended that the selected materials contain the properties referred to in paras. 63 to 70 above. The card thus produced should aim at a lifespan of at least five years.

PROCEDURES AND SYSTEMS FOR USE IN CONNEXION WITH THE PASSPORT CARD

Equipment required for production of the Passport Card

73. For the production of the Passport Card, it is in the interest of the Card-issuing State to devise a system, in which the different production phases are well co-ordinated with each other and the Card can be produced with maximum efficiency. For example, in order to ensure efficient production and minimize clerical errors, the issuing State might consider using a system whereby personal data for inclusion in the clear-print and magnetic zones of each Card need to be entered into that system only once.

74. By way of an illustration, the different phases of production with the corresponding equipment needed for each step have been outlined in the table on the opposite page assuming that the issuing State has selected security paper (banknote type) as the basis of the Card, unto which personal data are to be typed in the clear-print zone, the photograph and magnetic tape are to be glued in their appropriate places and a plastic cover, having the properties listed in paras. 63 to 69 above, be applied to both sides of the Card. Comments on cost estimates for the various types of equipment required and production processes used will be found in paras. 84 to 86 below.

Process for manufacturing a card comprising (general layout)

- Clear-print zone on recto
- Recording zone on magnetic stripes on verso

The Card has three basic components, namely:

- Security paper
- Plastic protective layer for recto
- Plastic support for magnetic stripes and a protective layer for stripes, all in one block

Process A	Process B	Process C	Process D
So-called "start-process printing" machine controls two separate simultaneous operations: - printing the information in the clear-print zone of the security paper - recording on magnetic stripes	(same as A) - printing of information in clear on security paper - recording on magnetic tape	All information in clear, including the photograph, the signature and authentication are fixed on the security paper covered by a photo-sensitive layer by a photographic process.	The information in clear is typed directly on the security paper by the operator.
The photograph and signature are reproduced on film the size the security paper and this film is stuck on the recto of the security paper.	(same as Process A)		(same as Process A)
The security paper is located between the plastic protective layer on the verso and the plastic support of the security stripes. The result is compressed either warm or cold.	(same as Process A)	(same as Process A)	(same as Process A)
	A machine controlled by the magnetic tape recorded at the beginning undertakes the recording on the magnetic stripes.	A magnetic tape with the identity information is produced by a keyboard. This tape controls the recording on the magnetic stripes (same as Process B)	An operator records the information on the magnetic stripes by means of a keyboard.

Equipment for use at Clearance Control Points

75. With reference to equipment required at clearance control points and the procedures to be followed, it must be borne in mind that they will have to be designed to meet the requirements of the receiving country. These requirements will reflect the legislative provisions and the administrative policies of that country.

76. The requirements will differ considerably from country to country. For example, some countries may wish to record the inward and outward movements of all categories of travellers; some countries may wish to record the inward and outward movements of some categories only; and others may be concerned only with partial controls for specific groups.

77. For these reasons, it is unlikely that there will be uniformity in the inspection procedures followed by the various countries. The units of equipment which comprise the total system may not all be found in the systems of a particular country because of the different inspection procedures involved. However, there could be certain elements of equipment, e.g. Passport Card readers, which would, of necessity, have to be of a standard character although not necessarily of the same manufacture.

78. Each country, in considering the adoption of the standardized Passport Card with machine-readable capacities, must relate the facilities offered by the Card to its own objectives in admission control and decide on the nature and composition of the equipment needed to achieve these objectives either for recording, checking or other purposes.

79. As mentioned earlier, the Card, when issued in accordance with the specifications in the foregoing sections offers utilization at clearance control points in two different ways (or combination thereof): it may be read visually (clear-print zone), or automatically through the magnetic zone. Obviously, no equipment is needed for the first of these alternatives.

80. For automatic reading, it will be necessary to design and manufacture machines which are specially adapted for Passport Cards. However, given the advanced state of knowledge of recording and reading techniques for magnetic track systems, the development and production should prove simple and cheap.

81. Automatic readers, once installed at clearance control points, may be connected to:

- a modulator-demodulator which allows transmitting the data to a computer by telephone wire; or
- a display screen on which the data read on the magnetic tape may be shown; or
- both a modulator-demodulator and a screen. In this case, the computer's reply can be seen on the screen.

When several readers are connected to a computer by the same telephone line, it will be necessary to inter-connect a concentrator.

82. If there is a need for copying the data read automatically, it could be accomplished either by using a tape unit or a mini-cassette recorder reader. Alternatively, a conventional-type printer could be used for recording the data on paper in cases where a small number of Passport Cards are to be copied or a high-speed printer for large-volume copying.

83. Depending on the clearance procedures in effect and on the equipment, if any, used in checking the Passport Card, the clearance control official may thus carry out an immediate check by entering the Card into an automatic reader connected to a computer or a deferred check through reference to a tape unit.

ESTIMATION OF COSTS ASSOCIATED WITH THE PRODUCTION AND USE OF THE PASSPORT CARD

Estimating the costs of producing the Passport Card

84. In an effort to determine the cost of producing Passport Cards, a Card-issuing State will need to take into account a variety of factors. These seem to fall into three distinct categories: first, there is the cost of the materials to be used for the Card such as security paper, magnetic tape and plastic covering. Second, and more significant from the cost angle, are the different types of production machines. Third, the cost of personnel required for the various production phases will have to be taken into account.

85. It will be readily appreciated that the cost of producing the Card could vary significantly between different States. Amongst the determining factors, to name only a few, are the availability of some or all of the basic materials or equipment on the local market or alternatively the need to import them, the local wage scales prevailing in the issuing State, the degree of sophistication of the production equipment selected, the number of Cards produced each year, the degree of security built into the product, the degree of centralization or decentralization of production, etc.

86. For those and other reasons, it is difficult if not impossible, to present a global cost estimate which would have as much validity in one country as in the next. Nevertheless, an effort has been made to compile, for the guidance of Card-issuing States, a summary of certain cost figures which were available at the time of writing from research carried out in France during 1974. This summary has been reproduced in Appendix 'F' to this document. It must be clearly understood, however, that the figures shown therein are based on prices prevailing in 1974 and can be taken only as a general

guide. Extensive research in connexion with the Passport Card has also been carried out in other countries, notably in Canada, Germany, Sweden and the USA, including their estimated costs of producing the Card. Additional information, if required, concerning the cost estimates presented in Appendix'F',based on research carried out in France, or on estimated cost figures based on research in Canada, Germany, Sweden and USA, may be obtained by writing to the addresses shown in the Note below.

87. As a general observation, it would appear that the cost of producing the Passport Card is not significantly different from that of producing the conventional passport.

Estimated costs of Automatic Reading of the Passport Card

88. Reference was made in para. 79 to the two different ways in which the Passport Card may be used in clearance controls. Visual inspection by clearance control officials requires no equipment and no additional costs therefore arise.

Note: If detailed information is required, please write to:

Mr. R.J. Sutherland
Chief Passport Officer
Department of External Affairs
48 Besserer Street
Ottawa, Ontario K1A 0G2
CANADA

Dr. J. Hertel
Federal Ministry of the Interior
D53 Bonn
Rheindorfer St. 198
FEDERAL REPUBLIC OF GERMANY

Mr. J. Maily
Administrateur Civil
Direction de la Réglementation
Ministère de l'Intérieur
75008 Paris
FRANCE

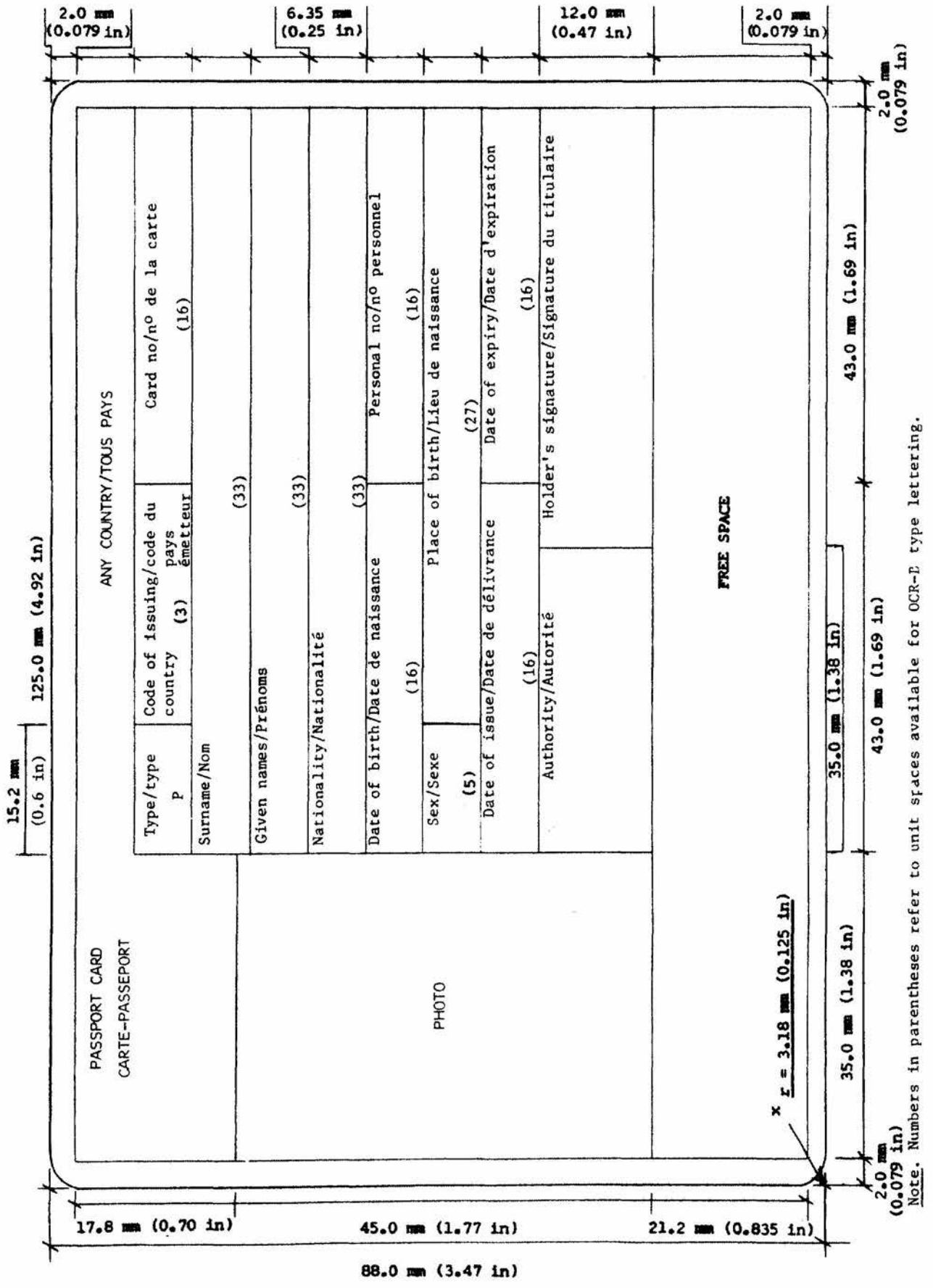
Mr. B. Rydén
National Swedish Police Board
St. Eriksgatan 20
Box 12256
S-10226 Stocholm
SWEDEN

Miss Frances G. Knight
Director
U.S. Passport Office
Room 600, McPherson Building
1425 "K" Street, N.W.
Washington, D.C. 20524
USA

89. As in the case of production equipment, the cost of automatic reading equipment may vary significantly, between different States, depending, inter alia, on place of manufacture, number of readers put into operation, types of readers utilized, etc. Here again, the aforementioned research may offer some guidance to States in estimating the costs involved in furnishing clearance control points with automatic readers. Appropriate information has been included to this end in Appendix 'G', again on the understanding that the figures are approximations and are to be used as a general guide only.

APPENDIX 'A'

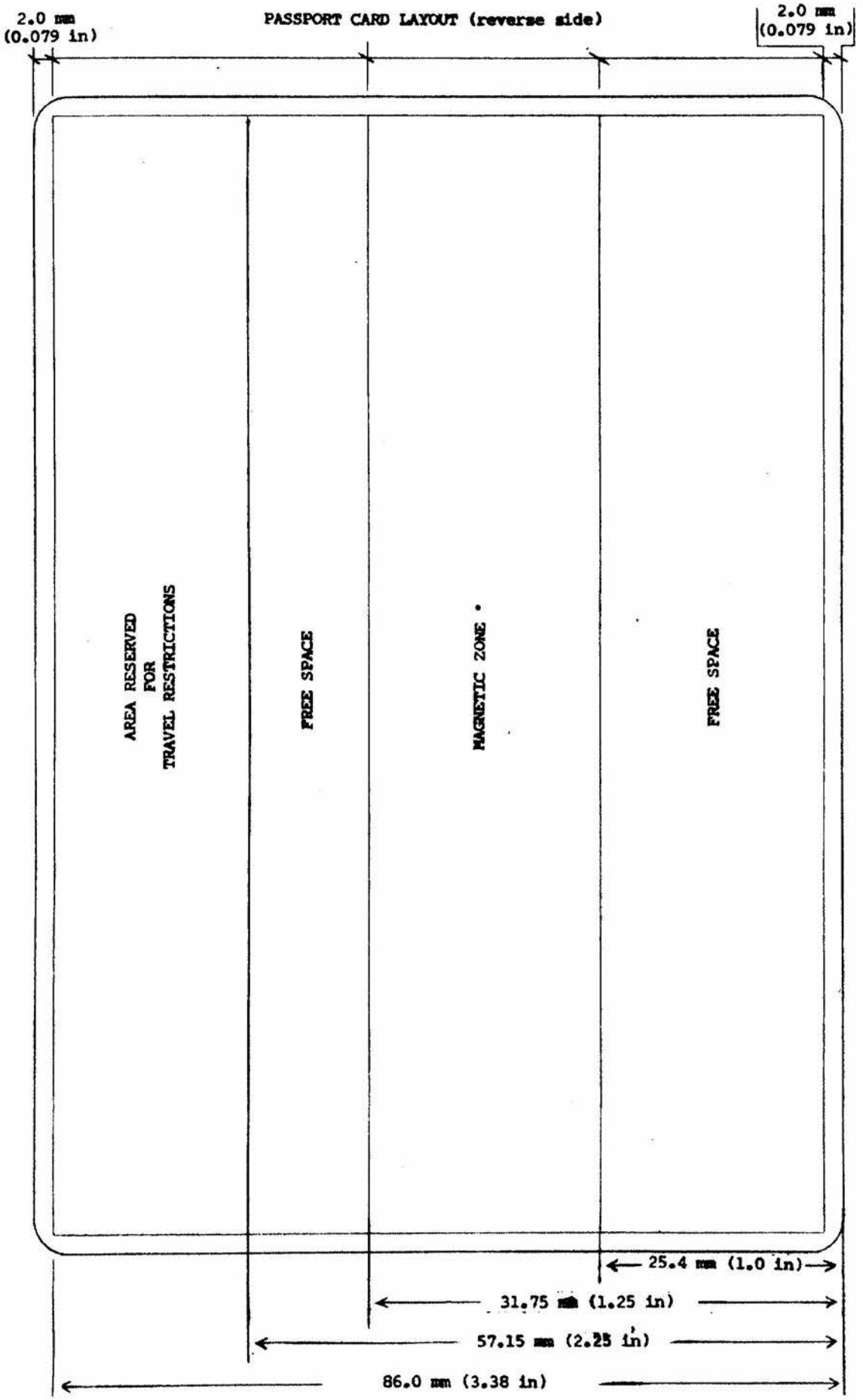
PASSPORT CARD LAYOUT (front side)



Note. Numbers in parentheses refer to unit spaces available for OCR-B type lettering.

APPENDIX 'B'

PASSPORT CARD LAYOUT (reverse side)



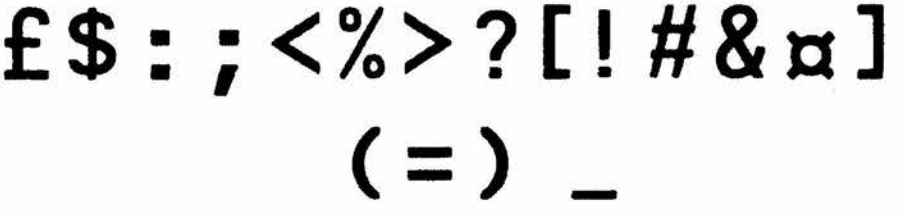
* Note: The organization of the magnetic zone shall be according to ISO Standard developed by ISO/TC 95/SC17.

APPENDIX 'C'
EXCERPT FROM ISO RECOMMENDATION R 1831
CONCERNING OCR-B CHARACTERS

Y.4.2 Illustration of OCR-B characters (complete set according to ISO Recommendation R 1073) scale 5:1.

Y.4.2.1 Characters of OCR-B having a strokewidth of 0.35 mm (0.014 in) for sizes I and II and of 0.38 mm (0.015 in) for size III.

Y.4.2.2 Character of OCR-B having a strokewidth of 0.31 mm (0.012 in) for sizes I and II and of 0.34 mm (0.013 in) for size III, which are considered in clause 4.5.



Y.4.2.3 Characters of OCR-B having a strokewidth of 0.31 mm (0.012 in) for sizes I and II and of 0.34 mm (0.013 in) for size III, which are considered in clause Y.2.9.

APPENDIX 'D'

SPACE ALLOCATION OF CHARACTERS IN THE TWO ZONES OF THE PASSPORT CARD

Item	I Clear-Print Zone	II Magnetic Zone	
	No. of spaces	Characters	No. of spaces
Starting Code	0	1 =	1
Card type	1	1 =	1
Country of issue	11	3 =	3
Card number	16	9 + Ø =	10
Names, surname, first name	33+33 = 66	38 + SU =	39
Nationality	33	3 =	3
Date of birth	16	8 =	8
National Reg. No.	16	15 + Ø =	16
Sex	5	1 =	1
Place of birth	27	none =	0
Date of issue	16	none =	0
Date of expiry	16	8 =	8
Holder's signature	50mm x 12mm area	none =	0
Authority	optional	none =	0
Ending Code	0	2 =	2
TOTAL	223		92

Explanations

Ø = check character (for checking validity of characters and number of characters used within a given space; see Note on next page)

SU = separation unit

Note: In the Magnetic Zone, dates are to be shown by two digits each for day, month and year, in that sequence.

APPENDIX 'D' (cont'd.)

Note concerning check characters

Use checking system on the basis of ten's (EVONS).

Modulus 10, weighting 2, 1, 2, 1, 2, 1 with the formation of the product 10 = 1 + 0 in two-digit products.

Determination of check digit:

a) The decimal digits of the basic figure are to be multiplied with the weighted factors.

basic figure 3 4 5 6 7 (reserve weighting 1 for the check digit)

7 x 2 = 14, i.e. 1 + 4 = 5

6 x 1 = 6 = 6

5 x 2 = 10, i.e. 1 + 0 = 1

4 x 1 = 4 = 4

3 x 2 = 6 :10 = 2 remainder 2

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b) The sum of these products is to be divided by the modulus.

c) The remainder is to be deducted from the Modulus and the difference represents the check digit 10 - 2 = 8.

d) The basic figure will be supplemented by the check digit 345678.

- - - - -

APPENDIX 'E'

Table of Codes for seven Elements of Information in the Magnetic Zone

- TO BE COMPLETED LATER -

APPENDIX 'F'

Estimating the costs of producing the Passport Card based on research carried out in France*

In general, accurate estimates were difficult to make because the existing equipment must be adapted to the implementation of the project. Nevertheless, only slight alterations need to be made to convert existing equipment and the recording technology on magnetic tapes is well known throughout the world. This comment applies both to production and operation. With regard to production, equipment costs for recording on tape range between 32,000 French Francs and 55,000 FFRS. Total investment for a small centre (400 cards/day) would be approximately 121,000 FFRS, whereas for a medium-sized centre (1400 cards/day maximum) this would be about 249,000 FFRS. Operating costs should allow production at a unit price from 2.90 FFRS to 3.50 FFRS per card in a medium-sized centre (300,000 cards per year maximum).

Overleaf is an outline of production operations and related cost estimates at a center producing 1400 Passport Cards per day, involving 10 employees. All estimated cost figures are, again, in French Francs.

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* See page 49 if additional information is required.

APPENDIX 'F' (cont'd.)

Card Production Process - Clear-Print Zone and Magnetic Zone

Production: 1,400 cards per day - number of employees: 10

Analysis of Operations	Equipment	Equipment Cost	Remarks
I - Transfer on film of applicant's photo and signature	Conventional photographic equipment (3 employees)	11,600	
II- Printing in clear of information on security paper	Keyboard with control screen		With control and calculating logic circuit
	Printer	(2x90,000)	
III- Magnetic track recording	Magnetic track encoder	180,000	
	Electronic control and calculating logic circuit		Cost included in keyboard and screen costs
			2,400 cards per day
IV - Attachment of photo and signature on security paper	Gluing equipment (2 employees)		
V - Authentication and miscellaneous handling operations	(2 employees)		
VI - Plasticizing by combining: -protective plastic coating -plastic component with magnetic tracks -security paper placed between the two	(1 employee) 1 plastic coating press	40,600	350 cards per day
and trimming	trimming tool	6,700	
	TOTAL:	248,900	
VII - Checking	Magnetic track reader unit		

APPENDIX 'F' (cont'd.)

Production: 1,400 cards per day		
Depreciation: 248,900/5		49,780
Personnel: 10 employees		
1972 estimate of 12 employees:	494,910	
less 2 employees	60,000	434,910
	434,910	
Premises (unchanged in relation to center with stamping equipment)		57,500
Maintenance (10%)		24,890
		567,080

Maximum annual production: 350,000 cards: 1.60 + material 1.24 = 2.84

Average annual production: 250,000 cards: 2.24 + material 1.24 = 3.48

- - - - - - -

APPENDIX 'G'

Estimated costs of automatic reading of the Passport Card

Design costs for a reader would be 925,000 FFRS. The reader itself would cost from 4,000 to 5,000 FFRS; without additional equipment it would enable data to be fed into the computer. If other types of work are carried out, however, (de-coding, calculation of check key) this would raise the cost (15,000 to 17,000 FFRS) on the basis of present estimates; nevertheless, it is thought that a more detailed study would result in a very appreciable reduction of the latter costs. Finally, if a screen is required for each reader so that the data on the magnetic tape can be read, the combined reader and display unit together with small computer would cost a maximum of 28,000 FFRS, although it may be possible to cut this price considerably as well. Everything therefore depends on the size of the equipment with which a country intends to equip checking stations.

Modulators-demodulators which allow messages to be transmitted on telephone lines are believed to cost approximately 6 600 FFRS on an average. The concentrator (a small computer) which brings together the reader messages for transmission to a remote computer and is needed only in locations with a group of readers, is estimated to cost between 62 500 FFRS and 70 000 FFRS. However, more elaborate investigations may lead to the use of less expensive equipment.

If copies of automatically-read data are required, the recording system on mini-cassette costs about 18 000 FFRS while a tape unit would amount to approximately 70 000 FFRS. Copies by way of a print-out could be obtained by a machine costing between 15 000 FFRS to 20 000 FFRS for a slow printer of the teletype kind or 100 000 FFRS for a high-speed printer (100 lines a minute). It should be noted in this connexion that the slow printer is not suitable for the copying of data from a large number of Cards.

It follows from the above that the cost of the concentrator required in places where groups of readers are needed, adds to the cost of each automatic reading device compared to the cost of a single reader at an isolated station. To make a valid overall estimate, however, it must be borne in mind that a group of readers using a concentrator would necessitate fewer telephone lines, i.e. one only between concentrator and computer,

APPENDIX 'G' (cont'd.)

while several isolated readers would each have their own line to a computer. Therefore the calculation of annual operating expenses must take into account the rental fee for the telephone line. It must also make allowances for maintenance of the equipment referred to above which is estimated to be generally in the order of 10% annually of the purchase price. On the other hand it would seem possible to deduct the personnel expenses involved in keeping local files and in manual consultation of these files.

The research does not offer any cost estimates on rental time or outright purchase of the central computer which is no doubt subject to great variations from country to country and depending on the use of the equipment for purposes other than Passport Card reading but which must eventually be included in the estimation of annual operating costs by each State that wishes to introduce equipment for automatic reading of the Passport Card at its international airports and other clearance control points.

- - - - - - - -

INDEX OF RECOMMENDATIONS

- END -

Doc 9303

A PASSPORT WITH MACHINE READABLE CAPABILITY

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Corrigendum No. 1
to Doc 9303

A PASSPORT
WITH MACHINE READABLE
CAPABILITY

(Doc 9303)

CORRIGENDUM NO. 1

Page 6, paragraph 31, 4th line:

Please insert, after the sentence ending with "...shown at Appendix C", the following sentence:

"Only those characters shown in the shaded areas of Appendix C should be used in the machine readable zone."

- END -

A PASSPORT WITH MACHINE READABLE CAPABILITY

Note.— The machine readable passport described herein may either be issued as a separate document or be included in a booklet for endorsements.

FOREWORD

This document contains recommended specifications for a passport with machine readable capability which was developed by a Panel of Experts reporting to ICAO. The purpose of the passport is to accelerate the movement of international passengers through passport clearance controls at airports.

Recognizing the advantages to be gained from the use of standardized documentation of this type, the findings of the Panel of Experts are circulated for the guidance of States.

TABLE OF CONTENTS

INTRODUCTION

Initial Action by the Facilitation Division of ICAO

1. At its Seventh Session, held in Montreal in May 1968, the Facilitation Division was concerned with the implications of ever-increasing volumes of passenger traffic, particularly in the light of the impending introduction on many international routes of high-capacity aircraft. The Division recognized that new ways and means had to be found in order to process such growing passenger volumes through governmental clearance controls at a faster pace and thus keep delays on the ground to a minimum. One proposal put forward concerned the possible development and introduction of a machine readable Passport or Passport Card, which might eventually replace the conventional passport and which could be expected to accelerate individual clearance through passport controls, either by using it as an electronically readable document or, where the volume of traffic did not warrant the installation of electronic data processing equipment, by permitting faster visual inspection than would be possible with a conventional passport. The Division therefore recommended (Rec. No. B-2) the establishment of a small Panel of suitably qualified experts to study this matter.

Action by the Air Transport Committee and Council of ICAO

2. The Council subsequently approved this Recommendation and the Panel's terms of reference were as follows:

"To study and make recommendations to the Air Transport Committee on the following:

a) the establishment of an appropriate document such as a passport card, a normal passport or an identity document with electronically or mechanically readable (as well as visually readable) inscriptions that meet the requirements for document control;
b) to determine the best types of procedures, systems (electronic or mechanical) and types of equipment for use with the above documents that are within the resources and capability of Member States;
c) determine the feasibility of standardizing the requisite control information and methods of providing this information through automated processes, provided that these processes will meet the requirements of security, speed of handling and economy of operation. . . ."

3. The Panel on Passport Cards was established in November 1968 comprising Members from eight Contracting States (Australia, Canada, France, Federal Republic of Germany, India, Kenya, Sweden and the United States). Subsequently, the Air Transport Committee approved nominations received from two additional States (the United Kingdom and the USSR). The International Criminal Police Organization and the International Air Transport Association were invited to participate as Observers. The Panel held five meetings between 1969 and 1978 (the Fifth Meeting being joined also by Observers from Belgium and the Kingdom of the Netherlands) and concluded with the adoption of five Recommendations concerning the production and use of the machine readable Passport. Certain difficulties which arose in technical research for solutions to some specifications laid down in the Panel's Fourth Report, had prevented the Panel from concluding its work earlier.

Action on the Panel's Report

4. The Air Transport Committee of ICAO, in April 1980, completed its consideration of the Panel's Report of its Fifth Meeting, assisted by further observations obtained from Contracting States and Panel Members. The Committee agreed in principle with the content of the Report and the publication of an ICAO document, based upon the material contained in Part III of that Report, with certain amendments, for the guidance of Contracting States.

GENERAL

Aims

5. The use of a machine readable passport (MRP) to replace the conventional passport is a means of accelerating the clearance of an increasing number of passengers at international airports. Since, however, the laws and regulations of States relating to travel documents usually apply uniformly whatever mode of transport is used, the MRP must also be suitable for use at surface transport border crossing points. Furthermore, it needs to offer safeguards equal to, or better than, those of conventional passports and to satisfy those control requirements already met by conventional passports (and other travel documents) currently in use throughout the world.

6. This latter requirement is essential since a certain number of States may not wish, or be in a position, to issue the new document or adopt new procedures and/or acquire new equipment for the use of the document for frontier control purposes, at least for some time. It is expected that a machine readable system and conventional passport procedures would need to operate in parallel for the foreseeable future.

7. The decision of countries to issue MRPs and/or to introduce machine reader facilities at their own entry points will be influenced by a number of considerations including the costs of introduction. Apart from the cost of production of the MRP itself, which may be a minimal additional cost if they are introduced as existing passports expire, the use of MRPs will cause no expense to be incurred by States not wishing to install and operate machine reading facilities. Where the use of machine readers and supporting equipment is contemplated, the costs and benefits will need to be assessed in relation to the number of regular entry points and their volumes of traffic. As the MRP may be introduced, and used with advantage, without the acquisition of any associated equipment or adoption of revised clearance procedures, States will choose to introduce the associated equipment according to local circumstances, where there is a net benefit to be gained.

8. A subsidiary aim under consideration during the development of the MRP was the desirability of standardizing the type of information and its layout in the conventional passport. The United Nations had made considerable efforts over many years towards this end but complete standardization has not been obtained as yet on a world-wide basis. Standardization in conventional passports would also be of assistance to passport control officials in clearing passengers, and States which do not adopt the MRP for the time being are therefore encouraged to include in their conventional passports control information in the same format and layout recommended for the MRP.

Advantages of the MRP over Conventional Passports

9. The MRP is expected to provide the holder with increased travel facilitation, particularly at busy airports which have introduced machine reading facilities. Not only will the use of the MRP

reduce the time otherwise taken for the visual inspection of conventional passports at clearance control points, but there is also the prospect that upon arrival or departure, an MRP holder will not be required to lodge Embarkation or Disembarkation Cards. It is expected that countries installing machine reading equipment would accept the data on the MRP as sufficient for their control purposes.

10. Where the clearance control system does not include machine reading facilities, time and expense will still be saved as the control official will find it easier to read the data which will be found on one page only, always in the same location as a result of standardization, and presented throughout in the characters shown in Appendix C rather than in handwriting as is often the case in conventional passports.

11. As machine readable passports may be expected to be only gradually introduced in years to come, it is essential that conventional passports retain the same status as MRPs for all immigration and security purposes and that States with machine reading facilities at their passport control points maintain adequate facilities, at the same time, for speedy processing of temporary visitors holding conventional passports.

Visas

12. The requirement for entrance visas, where this exists, complicates the issue of the MRP in the form of a separate card. ICAO and other international organizations have urged States for many years to take all necessary steps towards abolition of entrance visas for temporary visitors. Annex 9 to the Convention on International Civil Aviation contains the following provision:

> "3.7 **Recommended Practice.**— *Contracting States should extend to the maximum number of countries the practice of abolishing through bilateral arrangements or unilateral action, entrance visas for temporary visitors.*"

The United Nations Conference on International Travel and Tourism, held in Rome in 1963, adopted a similar Recommendation.

13. A considerable number of States have made appropriate arrangements for visa-free entry of nationals from other States making temporary visits of three months or less. Some States, in fact, are known to have made such arrangements with up to 80 other countries. At present, therefore, a high percentage of air passengers qualifying as temporary visitors no longer need to obtain visas for many of their journeys. On the other hand, there are States which, so far, have entered into visa abolition agreements with only a few other countries.

14. In cases where visas continue to be required it will be quite apparent that the production and use of the MRP in booklet form will facilitate the inspection of both the MRP and the visa because they will be presented in the same document. If, on the other hand, the MRP is produced as a free-standing card the endorsement of the visa would need to be made in a separate document. The disadvantages of this alternative will be obvious and the issue of the MRP in booklet form, allowing visa endorsements to appear in the same booklet, is much to be preferred.

Issue and Scrutiny of MRPs

15. It is essential that a very high degree of uniformity be achieved with regard to the issue and scrutiny of MRPs. Those States which are in a position to issue MRPs are urged to do so as soon as possible in accordance with the specifications contained in this document, and those States which are in a position to read MRPs by machine for clearance purposes should make appropriate

arrangements as soon as possible. Those States which are unable to issue MRPs in the immediate future are strongly encouraged to produce conventional passports with the data page following the recommended format and layout of the MRP.

FORMAT AND LAYOUT OF THE MRP

Dimensions of the MRP, its Various Zones, etc.

16. The MRP is divided into two parts, an upper part designed for visual inspection, which includes personal control information and the holder's photograph, and a lower portion designed for machine reading but which can also be read visually.

17. The following specification for MRPs is in accordance with Standard 2894 (B7 size) of the International Organization for Standardization (ISO) and was chosen to allow, on the one hand, for good readability of the items of personal information considered necessary and, on the other, for sufficient compactness to meet the convenience of the traveller. The overall prescribed dimensions are as follows:

width no less than 87.8 mm (3.46 in) and no more than 88.2 mm (3.47 in);
length no less than 124.8 mm (4.91 in) and no more than 125.2 mm (4.93 in);
thickness (excluding other booklet pages) no less than 0.254 mm (0.010 in) and no more than 0.635 mm (0.025 in).

The specifications for width and length refer to the outer limits of the document to be inserted into the machine. A 2 mm (0.079 in) margin clear of data must be left along each outer edge.

18. Since standardization of size, layout and the type of information to be included is an essential feature of the MRP, the specifications shown in Appendices A and B should be adhered to when producing MRPs.

The Zone for Visual Inspection

19. As indicated in Appendix A hereto, the following items of personal data are included in the visual inspection zone:

a) symbol to identify the MRP
b) code of issuing State
c) (passport) number
d) surname
e) given names
f) nationality of holder
g) date of birth
h) national registration/personal number (optional)
i) sex
j) place of birth
k) date of issue
l) date of expiry

In addition the title "Passport" and the name of the issuing State should appear at the top of the document. Furthermore, the holder's photograph must be included. There is also space for the holder's signature and the issuing authority's stamp and signature.

20. In issuing MRPs, titles identifying spaces where information is to be located should be printed, in addition to the language(s) of the issuing State, in English or French or both. Where a space is not used, no heading need appear.

21. In States where the roman alphabet is used, the characters as shown in Appendix C should be used in the visual zone, with 10 characters to the inch.* The maximum number of characters in each space is indicated by a number in brackets in each information field, as shown in Appendix A and in Column 1 of Appendix D.

Explanatory Notes on Various Items

22. The letter "P" in the space marked "Type" identifies the document as an MRP and is repeated in the machine readable zone to distinguish it from other documents which might be read with the same equipment.

23. Similarly the country code is given in the zone for visual inspection as well as in the machine readable zone. The code letters for use by each State are those contained in ISO Standard 3166, Section TWO, and Amendments thereto, consisting of a three-letter code for the State concerned.

24. Where a composite surname cannot be shown in full on the MRP owing to space limitations, the predominant one used by the holder should be inserted. The insertion of names in the MRP may present some difficulties, owing to the many different ways in which names are used in different parts of the world and the space limitations on the document.

25. Information concerning nationality is included on the MRP even though it will be issued in most cases to a national of the issuing State. Nationality is usually a basic control item for the State into which the holder is seeking temporary entry and a number of States may issue MRPs to other nationals residing in their territories.

26. In furnishing dates on the MRP, e.g. date of birth, the Gregorian calendar should be used and the information should be shown in the following standard manner in the zone for visual inspection**:

a) all days should be shown by a two-digit number, i.e. the dates from one to nine should be preceded by a zero; this number to be followed by a blank space;
b) the month should be shown in an abbreviated fashion not exceeding four letters, followed by an oblique character (/);
c) the translation of the month should follow its original version, again up to a maximum of four letters with a blank space thereafter;
d) the year should be shown in a two-digit number only.

As an example, the indication of birth dates on an MRP, issued in the Italian language with French translation, would appear as follows:

1	2		L	U	G		/	J	U	I	L		4	2

27. Indication of the holder's sex should be made by inclusion of the single initial commonly used in the language of the State of issue, followed by a dash and this in turn followed by the letter M or

* 1 in = 25.4 mm.

** As regards inclusion of dates in the machine readable zone, see Note to Appendix D.

F in the case where a translation of data into English or French is necessary. For the machine readable zone, however, only one space has been set aside and the letter M or F must be shown there.

28. In cases where the MRP is issued to a person whose place of birth was outside the State issuing the document, and it is desired that the country of birth be indicated, this should be done by using the official spelling adopted by the United Nations for designation of States.

29. The photograph of the bearer should meet the requirements of the issuing State but should, in any event, fill the entire space reserved for it, i.e. 45 mm x 35 mm (1.77 in x 1.38 in). It is recommended that the length of the image of the subject's face be between 25 mm and 35 mm (1 in and 1.38 in), measured from chin to crown of head.

The Machine Readable Zone of the MRP

30. It is essential that the data page of the MRP booklet face outwards, with the machine readable zone along the outer edge of the page, i.e. away from the "spine" of the booklet. Should a State issuing the MRP elect to include the machine readable zone on the reverse of the side containing the visual inspection zone, steps should be taken to ensure that its position corresponds exactly to the space specified for the machine readable zone on the front, as difficulties could otherwise arise in the process of machine reading.

31. Most of the data in the visual inspection zone are repeated in the machine readable zone. The method of rendering the document machine readable should be OCR 'B', size 1 (Optical Character Recognition Font B) spaced at 10 characters to the inch, conforming to International Organization for Standardization (ISO) Standard 1073/II. The character set is shown at Appendix C. The print quality and tolerance of character positions must conform to ISO Standard 1831.

32. The data to be machine read should be arranged from left to right in fixed length fields in two lines in the order specified in paragraph 35 below and in Column 2 of Appendix D, and located on the document as defined in Appendix B. Data should be entered in each field beginning with the left-hand character position. The right-hand character position in each numeric field should be occupied by the check digit. Where information does not require all the character positions allowed in the field, the redundant positions should be occupied by the symbol < as shown in Appendix C. The first and last character in each line must be at least 6 mm (0.25 in) from the nearest edge of the document.

33. The machine readable zone must be such that no interference is caused to accurate machine reading. For this purpose the machine readable zone, whatever the constituent materials of the MRP, should meet ANSI* X3.17-1977, paragraphs 4.2.1.3 and 4.2.1.4, or equivalent ISO standard.

34. The final figure in all numeric fields must be a check digit calculated as shown in Appendix E. The final digit in the lower line of the machine readable zone is based on all numeric fields (including their check digits).

Items to be included in the Machine Readable Zone

35. For machine reading it is essential to standardize the presentation of information to be included in the machine readable zone. This includes the exact placing of these data in that zone

* ANSI = American National Standards Institute.

and the exact position of the machine readable zone on the MRP (having regard also to the contents of paragraph 30 above). The machine readable zone should contain the following data in that order:

Upper line

a) letter "P" to identify the document as an MRP;
b) code of issuing State (cf. paragraph 23);
c) name (surname and all other names up to 39 letters);

Lower line

d) passport number and check digit;
e) nationality of holder (cf. paragraph 25);
f) date of birth and check digit;
g) sex (cf. paragraph 27);
h) date of expiry and check digit;
i) national registration/personal number (optional) and check digit;
j) final check digit.

Space allocation of characters providing the above control data will be governed by the specifications listed in Column 2 of Appendix D.

SECURITY CONSIDERATIONS AND PHYSICAL CHARACTERISTICS

Security Considerations

36. Careful consideration should be given to the materials to be used for producing the MRP. As indicated in paragraph 5, it should incorporate safeguards equal to or better than the conventional passport, both in terms of the medium as well as the entire system of operation. An MRP produced by using security paper as a base which, after completion, is to be laminated, might have to be protected against falsification by the incorporation in such paper of watermarks or the use of security printing techniques such as the guilloche method or intaglio printing, whereas those in which information is embedded directly in the plastic material by a photographic process might need to be protected through other means, for example, by the insertion of fibres having certain optical properties.

37. Each State should determine the security features required to achieve a satisfactory standard. Nevertheless, the following guidelines should be observed in producing the MRP so that:

a) any attempt to alter a genuine document in any way would result in its virtual destruction or render such alteration clearly manifest to the eye; such alteration might also be detectable by the mechanical or automated processes entailed in its scrutiny;
b) any attempt to create counterfeit MRPs which would be visually acceptable and able to pass automated inspection, would be unattractive to potential criminal elements; this may be accomplished by making it most difficult to acquire production equipment and materials illegally and by involving a high degree of technical expertise in the production of MRPs; and
c) any security feature incorporated in the document does not interfere with accurate machine reading.

Physical and Material Characteristics of the MRP

38. While each State is left free to decide what kind of basic material it wishes to use for producing the MRP, the following minimum characteristics should be inherent in whatever material is selected so as to give it a life span of at least five years.

39. The document must be of such nature that deformation due to normal use (bends, not creases) can be reduced to flatness by the reading device without impairing the use of the document or the functioning of the reader.

40. The document must present no toxic or other hazards in the course of normal usage.

41. The print quality should remain up to the standard given in paragraph 31 at operating temperatures ranging from −10°C to +50°C. The document should not lose its reliability after being stored at temperatures ranging from −35°C to +80°C.

42. The document should be reliable in operation at a relative air humidity of 5 per cent to 95 per cent with a maximum wet bulb temperature of 25°C. The document should not lose its reliability when stored at a relative air humidity of 0 per cent to 100 per cent.

43. The document should maintain the above properties during normal use throughout its period of validity.

PROCEDURES AND SYSTEMS FOR USE IN CONNEXION WITH THE MRP

Equipment for use at Clearance Control Points

44. Equipment required at clearance control points and the procedures to be followed will be designed to meet the requirements of the receiving country, reflecting the legislative provisions and the administrative policies of that country.

45. The requirements will differ considerably from country to country. For example, some countries may wish to record the inward and outward movements of all categories of travellers; some countries may wish to record the inward and outward movements of some categories only; and others may be concerned only with partial controls for specific groups.

46. For these reasons, it is unlikely that there will be uniformity in the inspection procedures followed by various countries, nor in the systems comprising various units of equipment. However, certain items of equipment, e.g. MRP readers, would necessarily need to have some standard characteristics and specifications, although they need not be of the same manufacture.

47. Each country adapting the standardized MRP with machine readable capability to its own purposes in admission control, will decide on the nature and composition of the equipment needed to achieve these purposes.

48. As mentioned earlier, the MRP, when issued in accordance with the specifications in this document, may be used at clearance control points in two different ways: it may be read visually or by machine. Obviously, no equipment is needed for the first of these alternatives. Machine readers installed at clearance control points may be connected through an interface to a variety of computing equipment.

COSTS ASSOCIATED WITH THE PRODUCTION AND USE OF THE MRP

Costs of producing the MRP

49. The cost of producing the MRP could vary significantly between States. Amongst the determining factors, to name only a few, are the availability of some or all of the basic materials or equipment on the local market or alternatively the need to import them, the local wage scales prevailing in the issuing State, the degree of complexity of the production equipment selected, the number of MRPs produced each year, the degree of security built into the product, and the degree of centralization or decentralization of production. As a general observation, it would appear that the cost of producing the MRP may not be significantly different from that of producing the conventional passport.

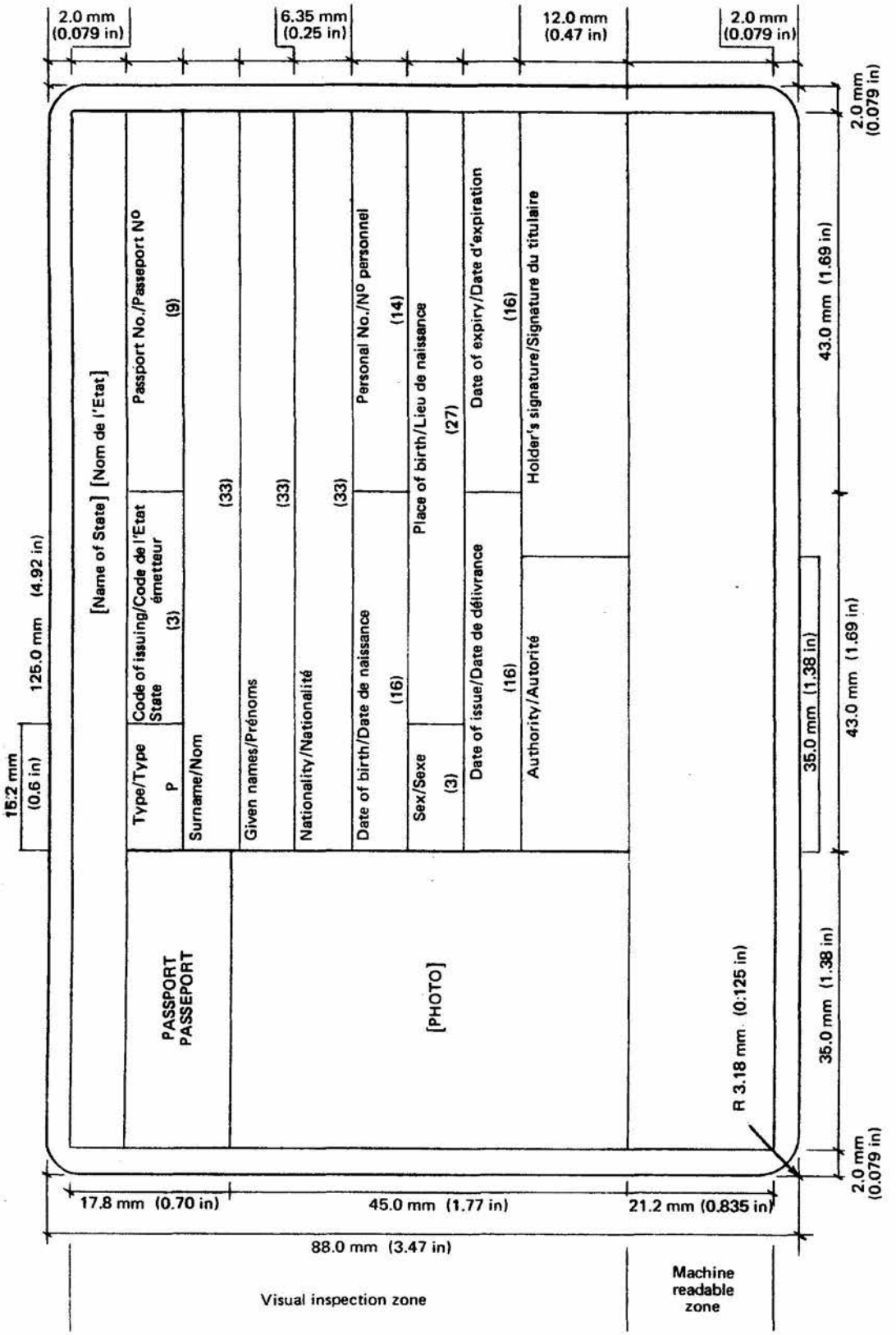
Costs of using the MRP

50. Visual inspection of the MRP by clearance control officials requires no equipment and no variation in operational costs therefore arise.

51. The cost of machine reading of the MRP will vary from one State to another, depending, *inter alia*, on place of manufacture of the equipment, number of readers put into operation, training costs, if any, and the types of readers utilized. When the question of cost was discussed by the Panel of Experts in 1978, it was apparent that the cost of computer equipment, associated with machine reading units at clearance control points, would vary considerably, depending upon the needs of individual States. At that time, the cost of the basic reading unit was estimated to be in the order of U.S.$3 000.00.

APPENDIX A

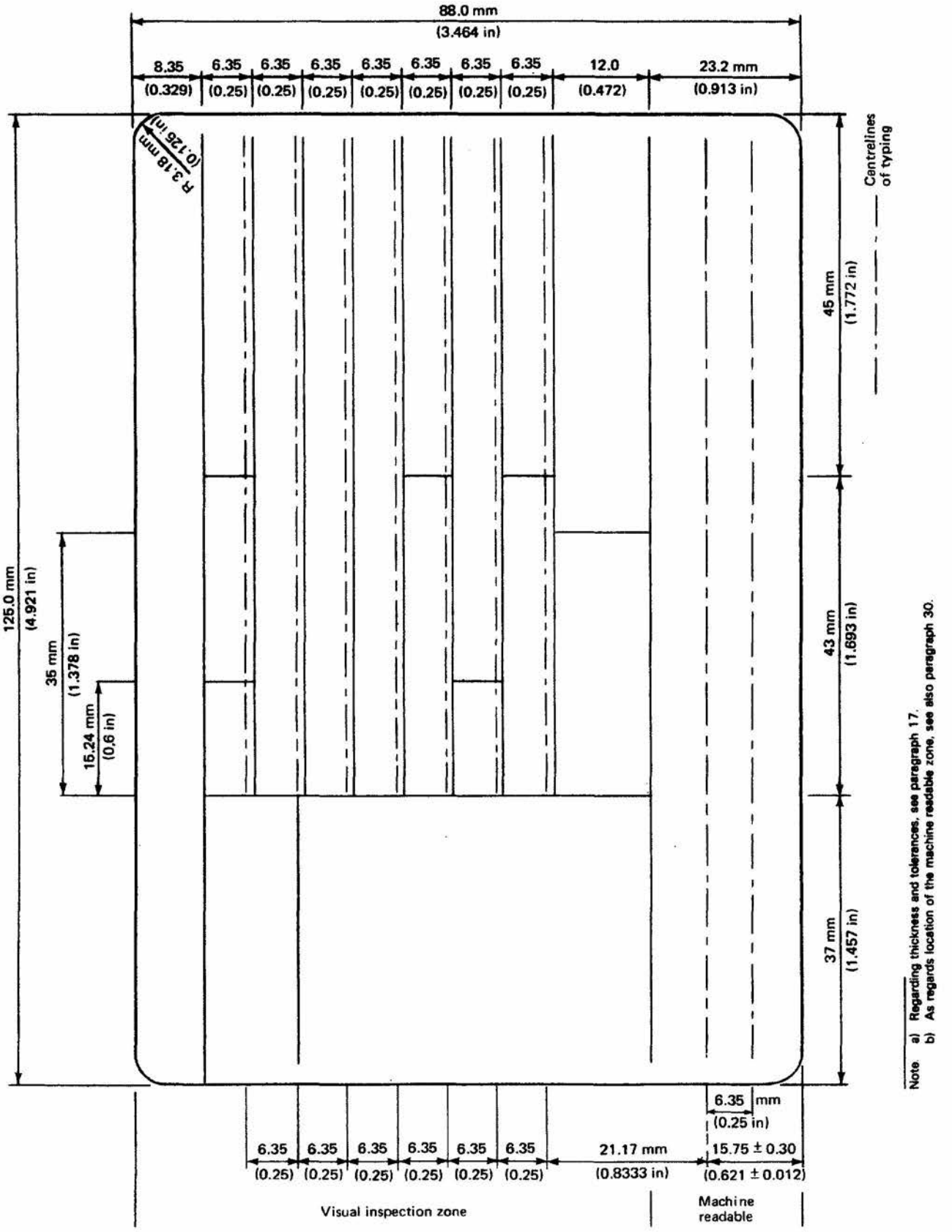
FORMAT AND LAYOUT OF THE DATA PAGE



Note. a) Numbers in parentheses refer to unit spaces available for OCR-B type lettering (see Appendix D).
b) All lines on the document are intended to indicate the location of the respective fields and may be omitted at the discretion of the issuing State.
c) Regarding thickness and tolerances, see paragraph 17.
d) As regards location of the machine readable zone, see also paragraph 30.

APPENDIX B

MEASUREMENTS FOR DATA LOCATION



APPENDIX C

CHARACTER SET OCR-B1
(Complete character set)

SCALE 4 : 1

SCALE 1 : 1

APPENDIX D

SPACE ALLOCATION OF CHARACTERS IN THE TWO ZONES OF THE MRP

Field	Number of Character Positions		
	1 Visual Inspection Zone	2 Machine Readable Zone	
Type	2	2	Upper line
Code of Issuing Country	3	3	Upper line
Surname	33	39	Upper line
Given Names	33		
Passport Number	9	10*	Lower line
Nationality	33	3	Lower line
Date of Birth	16	7*	Lower line
Sex	3	1*	Lower line
Place of Birth	27	—	Lower line
Date of Issue	16	—	Lower line
Date of Expiry	16	7*	Lower line
Holder's Signature	51 mm × 12 mm	—	Lower line
Authority	35 mm × 12 mm	—	Lower line
Personal Number†	14	15*	Lower line
Check Digit+		1	Lower line

* Including check digit
† Optional
\+ Calculated on all numerical fields as defined (see Appendix E)

Note. In the machine readable zone, dates are to be shown by two digits each for year, month and day, in that sequence.

APPENDIX E

CHECK DIGIT CALCULATION

The final figure in all numeric fields shall be a check digit calculated on modulus 10 with a 731731731... etc. weighting in the following manner:

Step 1: multiply each digit of the original number by chosen numbers known as *weightings*

Step 2: add the products of the multiplications

Step 3: divide the sum by a chosen number known as the *modulus*

Step 4: specify the remainder of this division as the *check digit.*

Thus, for a date of birth 27 July 1952, represented as 520727, the calculation would be as follows:

Step 1:

Original number	5	2	0	7	2	7
Weightings	7	3	1	7	3	1
Products	35	6	0	49	6	7

Step 2: $35 + 6 + 0 + 49 + 6 + 7 = 103$

Step 3: $\frac{103}{10} = 10$, remainder 3

Step 4: Check digit is 3

The date of birth in the machine readable zone would therefore be shown as 5207273.

In a field where the number does not occupy all the available spaces and the symbol < is used, the value of zero should be given to the symbol < for the purpose of calculating the check digit.

In calculating the final digit in the lower line the weightings should be applied in the order 731731... to every character position in all the numeric fields from left to right without interruption.

APPENDIX F

RECOMMENDATIONS FORMULATED BY THE PANEL ON PASSPORT CARDS

Recommendation No. 1 — Issue and Scrutiny of Machine Readable Passports (MRPs)

It is recommended that:

a) those States which are in a position to issue MRPs should do so as soon as possible in accordance with Recommendations Nos. 2 to 5;
b) those States which are in a position to read MRPs by machine for clearance purposes should make appropriate arrangements as soon as possible;
c) those States which are unable to issue MRPs at present should examine the possibility of producing conventional passports with the data page following the recommended format and layout of the MRP.

Recommendation No. 2 — Format and Layout of the MRP

It is recommended that when producing MRPs, the specifications shown in Appendices A and B are strictly adhered to.

Recommendation No. 3 — The Machine Readable Zone of the MRP

It is recommended that States adhere strictly to the specifications for the machine readable zone set out in this Report and its appendices and that the machine readable zone contain the following data in that order:

Upper line

a) letter "P" to identify the document as an MRP;
b) code of issuing State (cf. paragraph 24)*;
c) name (surname and all other names up to 39 letters);

Lower line

d) passport number
e) nationality of holder (cf. paragraph 26);
f) date of birth and check digit;
g) sex (cf. paragraph 28);
h) date of expiry and check digit;
i) national registration/personal number (optional) and check digit;
j) final check digit.

* *Note.* Paragraph numbers in this recommendation refer to paragraphs in the Panel's Fifth Report. Paragraph 24 corresponds to paragraph 23 of this document, paragraph 26 to paragraph 25 and paragraph 28 to paragraph 27

Recommendation No. 4 — Security Considerations

It is recommended that the MRP be produced so that:

a) any attempt to alter a genuine document in any way would result in its virtual destruction or render such alteration clearly manifest to the eye; it might also be detectable by the mechanical or automated processes entailed in its scrutiny.
b) any attempt to create counterfeit MRPs which would be visually acceptable and able to pass automated inspection, would be unattractive to potential criminal elements; this may be accomplished by making it most difficult to acquire production equipment and materials illegally and by involving a high degree of technical expertise in the production of MRPs.
c) any security feature incorporated in the document does not interfere with accurate machine reading.

Recommendation No. 5 — Physical and Material Characteristics of the MRP

While recognizing that issuing States have freedom of choice of materials for producing the MRP, it is recommended that the selected materials contain the properties referred to in paragraphs 42 to 46*. The document thus produced should have a lifespan of at least five years.

* *Note.* Paragraphs 42 to 46 in the Panel's Fifth Report correspond to paragraphs 38 to 42 of this document.

— END —

ICAO PUBLICATIONS IN THE AIR TRANSPORT FIELD

The following summary gives the status and also describes in general terms the contents of the various series of publications in the air transport field issued by the International Civil Aviation Organization:

International Standards and Recommended Practices on Facilitation (designated as Annex 9 to the Convention) which are adopted by the Council in accordance with Articles 37, 54 and 90 of the Convention on International Civil Aviation. The uniform observance of the specifications contained in the International Standards on Facilitation is recognized as practicable and as necessary to facilitate and improve some aspect of international air navigation, while the observance of any specification contained in the Recommended Practices is recognized as generally practicable and as highly desirable to facilitate and improve some aspect of international air navigation. Any differences between the national regulations and practices of a State and those established by an International Standard must be notified to the Council in accordance with Article 38 of the Convention. The Council has also invited Contracting States to notify differences from the provisions of the Recommended Practices;

Council Statements on policy relating to air transport questions, such as the economics of airports and en-route air navigation facilities, taxation and aims in the field of facilitation;

Digests of Statistics which are issued on a regular basis, presenting the statistical information received from Contracting States on their civil aviation activities;

Circulars providing specialized information of interest to Contracting States. They include regional studies on the development of international air passenger, freight and mail traffic and specialized studies of a world-wide nature;

Manuals providing information or guidance to Contracting States on such questions as airports and air navigation facility tariffs, air traffic forecasting techniques and air transport statistics.

Also of interest to Contracting States are reports of meetings in the air transport field, such as sessions of the Facilitation Division and the Statistics Division and conferences on the economics of airports and air navigation facilities. Supplements to these reports are issued, indicating the action taken by the Council on the meeting recommendations, many of which are addressed to Contracting States.

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Part 1

2604-5-FP

MACHINE READABLE TRAVEL DOCUMENTS

PART 1

MACHINE READABLE PASSPORTS

FOURTH EDITION — 1999

Published by authority of the Secretary General

cc: G McDonald
R Seguss

INTERNATIONAL CIVIL AVIATION ORGANIZATION

IV. TECHNICAL SPECIFICATIONS UNIQUE TO MACHINE READABLE PASSPORTS

Scope

1. This section defines those specifications which are unique to passports and are necessary for global interoperability. Section IV should be read in conjunction with Section III which defines those specifications for the MRP that are common to all MRTDs. Specifications are included for the discretionary expansion of the machine readable data capacity of the MRP beyond that defined for global interchange, as well as for machine-assisted identity confirmation of the rightful holder and security features. Technical specifications for a passport card are also included, with references to further specifications in Doc 9303, Part 3, for optional use by States and organizations.

Dimensions of the MRP and MRP data page

2. The dimensions shall be as follows.

2.1 *MRP data page nominal dimensions.* The nominal dimensions shall be as specified in ISO/IEC 7810 : 1995 (except thickness) for the ID-3 size card, i.e.:

88.0 mm × 125.0 mm (3.46 in × 4.92 in).

2.2 *MRP data page edge tolerances.* The edges shall be within the area circumscribed by the following concentric rectangles as illustrated in Figure IV-1.

Inner rectangle: 87.25 mm × 124.25 mm (3.43 in × 4.89 in)
Outer rectangle: 88.75 mm × 125.75 mm (3.49 in × 4.95 in)

2.3 *MRP data page margins.* The dimensional specifications refer to the outer limits of the MRP data page. A margin of 2.0 mm (0.08 in) along each outer edge, with the exception of the header zone, must be left clear of data.

2.4 *MRP data page thickness.* The thickness, including any final treatment (e.g. laminate), shall be as follows.

2.4.1 Minimum: 0.25 mm (0.01 in)

2.4.2 Maximum: 0.90 mm (0.035 in)

2.4.3 The thickness of the area within the machine readable zone shall not vary by more than 0.1 mm (0.004 in).

General Note.— The decimal notation used in these specifications conforms to ICAO practice. The ISO practice is to use a decimal point (.) in imperial measurements and a comma (,) in metric measurements.

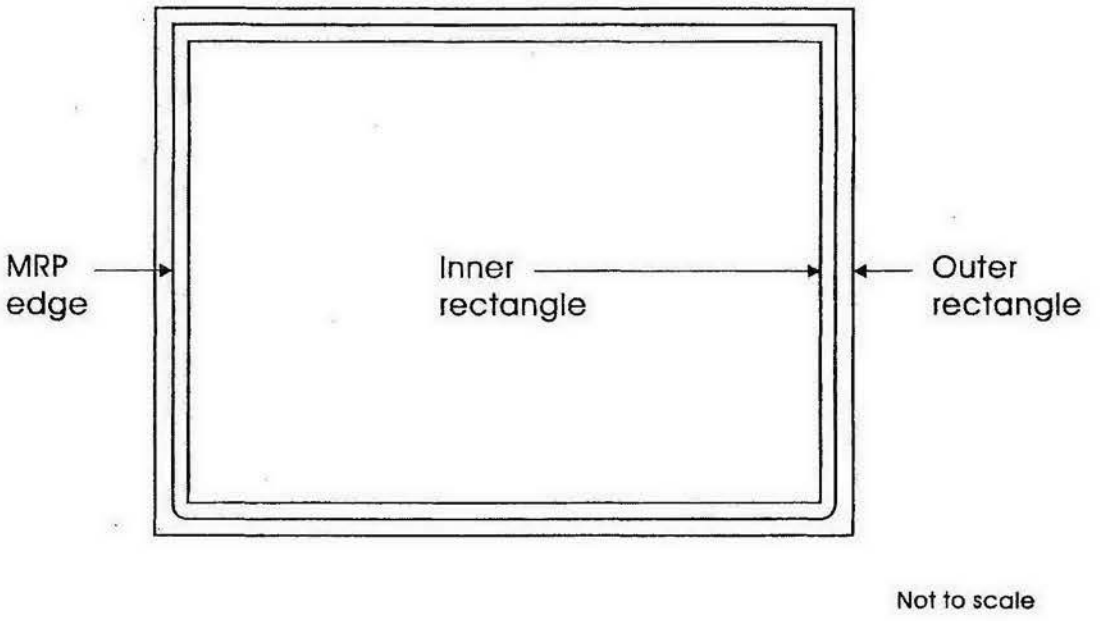

Figure IV-1. MRP data page dimensional illustration

2.5 *MRP dimensions*. The dimensional specifications defined in 2.1 and 2.2 also apply to the MRP. If required for binding purposes, the 88.0 mm (3.46 in) dimension may be increased.

2.6 *Oversize visas*. The dimensions specified for the MRP are smaller than those of early generation non-machine readable passports. As a result, it may no longer be possible to stamp certain large size visas on the reduced size pages of the MRP. In such cases, the visa may be stamped on two adjacent pages of an open passport booklet, ensuring that the booklet is held flat to provide a legible visa impression.

General layout of the MRP data page

3. The MRP data page follows a standardized layout to facilitate reading of data globally by visual and machine readable means.

3.1 The MRP data page should be either an end leaf of the MRP or an inner page in close proximity to an end leaf of the MRP. Where the MRP data page is not constructed as an end leaf, the *recommended practice* is to locate the MRP data page on page 2 or on the penultimate page of the MRP. The MRZ shall be positioned adjacent to the outside edge of the book, parallel to the spine of the book, as illustrated in Appendix 4 to this section.

3.2 To accommodate the various requirements of States' laws and practices and to achieve the maximum standardization within those divergent requirements, the MRP data page is divided into seven zones as follows:

Front of MRP data page

Zone I Mandatory header
Zone II Mandatory and optional personal data elements
Zone III Mandatory and optional document data elements
Zone IV Holder's signature or usual mark, i.e. original or reproduction
Zone V Mandatory identification feature
Zone VII Mandatory machine readable zone (MRZ)

Back of MRP data page, or an adjacent page

Zone VI Optional data elements

3.3 Zones I to V and Zone VII contain mandatory elements in a standard sequence which represent the minimum requirements for the MRP data page. The optional elements in Zones II, III and VI accommodate the diverse requirements of issuing States and organizations, allowing for presentation of additional data at the discretion of the issuing State or organization, while achieving the desired level of standardization. The location of zones and standard sequence for data elements are set out in Appendix 1 to this section. Appendix 2 to this section illustrates the dimensional specifications for the MRP data page. The technical specifications for the printing of data on the MRP data page are defined in Appendix 2 to this section (Diagram 2) and Appendix 3 to this section. Appendix 4 to this section outlines the guidelines for positioning and adjusting the dimensional specifications of Zones I to V to accommodate the flexibility desired by issuing States and organizations. Examples of personalized MRP data pages are shown in Appendix 5 to this section.

3.4 *Zone IV — Location of holder's signature or usual mark.* Field 18, the holder's signature or usual mark, shall normally be placed in Zone IV of the MRP data page (see Appendix 4 to this section). Where the issuing State or organization wishes to locate the holder's signature or usual mark on a page other than the MRP data page, it may, as specified in the data element directory (5.3), locate Field 18 on the page adjacent to the MRP data page. In this case, the size of Field 15 (Authority or issuing office) on the MRP data page may be increased.

3.5 *Zone V — Position of holder's portrait.* Within Zone V, the holder's portrait shall be at least 2 mm (0.08 in) from the left-hand edge of the MRP data page. When using an affixed photograph, it is recommended that this dimension be increased to 6 mm (0.24 in) in an effort to reduce the potential for photograph substitution. Where this recommendation is implemented, a consequent reduction in the width of Fields 03-18 and in the number of character positions of the data elements appearing in Fields 8, 10 and 12 shall occur.

Content and use of zones

4. The data elements to be included in the zones and the treatment of the zones shall be as described hereunder.

4.1 *Mandatory zones*

4.1.1 The MRP data page shall contain Zones I through III, Zone V and Zone VII.

4.1.2 Zone IV shall be present on the data page or on an adjacent page as defined in 3.4 and contain the holder's signature or usual mark; i.e. original or reproduction. Zone V shall include the personal identification features which shall include a portrait solely of the holder. At the discretion of the issuing State or organization, the name fields in Zone II and the holder's signature or usual mark in Zone IV may overlay Zone V provided this does not hinder recognition of the data in any of the three zones.

4.1.3 Data elements shall appear in a standard sequence as defined in Appendix 1 to this section.

4.1.4 If the State practice is to omit mandatory elements 01 and 02 (issuing State or organization, in full, and name of document, in full) from the header (Zone I), these data elements shall appear on an adjacent page.

4.1.5 All MRZ (Zone VII) data elements shall be shown as defined in 6.5 and 6.6.

4.2 *Optional zone.* Zone VI is an optional zone for use at the discretion of the issuing State or organization.

4.3 *Dimensional flexibility of Zones I to V*

4.3.1 Zones I to V may be adjusted in size and shape within the overall dimensional specifications of the MRP data page to accommodate the diverse requirements of issuing States and organizations. All zones, however, shall be bounded by straight lines, and all angles where straight lines join shall be right angles (i.e. 90 degrees). It is recommended that the zone boundaries not be printed on the MRP data page. The nominal position of the zones is shown in Appendix 4 to this section.

4.3.2 When an issuing State or organization chooses to produce an MRP data page that contains a transparent or otherwise unprintable border, this will result in a reduction of the available area within the zones. The full MRP data page dimensions and zone boundaries shall be measured from the outside edge of this border, which is the external edge of the MRP data page.

4.3.3 Zone I shall be located along the top edge of the MRP data page and extend across the full 125.0 ± 0.75 mm (4.92 ± 0.03 in) dimension. (The top edge is the edge coincident with the spine of the MRP.) The issuing State or organization may vary the *vertical* dimension of Zone I, as required, but this dimension shall be sufficient to allow legible interpretation of the data elements in the zone and shall not be greater than 17.9 mm (0.70 in).

4.3.4 Zone V shall be located such that its left edge is coincident with the left edge of the MRP data page.

4.3.5 Zone V may move *vertically* along the left edge of the MRP data page and overlay a portion of Zone I as long as individual details contained in either zone are not obscured.

4.3.6 The upper boundary of Zone II shall be coincident with the lower boundary of Zone I.

4.3.7 When there is a specific requirement for the name fields to extend across the MRP data page, Zone II may extend up to the full 125.0 ± 0.75 mm (4.92 ± 0.03 in) dimension of the MRP data page. In the event the

full dimension is used, Zone II shall overlay a portion of Zone V. In this case, issuing States and organizations shall ensure that data contained in either zone are not obscured.

4.3.8 The lower boundary of Zone II may be positioned at the discretion of the issuing State or organization. Enough space must be left for Zones III and IV below the boundary. This boundary does not need to be straight across the 125.0 ± 0.75 mm (4.92 ± 0.03 in) dimension of the MRP data page.

4.3.9 Zone III should start at the right vertical boundary of Zone V and may extend, at the discretion of the issuing State or organization, to the right edge of the MRP data page.

4.3.10 If Zone IV is placed on the MRP data page, it shall be at the bottom of the VIZ on the front of the MRP data page, its lower boundary coincident with the top edge of the MRZ.

4.3.11 Zone IV may also overlay Zone V. In this case, issuing States and organizations shall ensure that individual details contained in either zone are not obscured.

4.4 The dimensions and boundaries of Zone VII, the machine readable zone, are fixed. Zone VII conforms in height to the MRZ defined for all MRTDs so that the machine readable data lines fall within the effective reading zone (ERZ) specified in 15 and Appendix 4 to Section III.

Detailed layout of the MRP data page

5. *Visual inspection zone (VIZ) (Zones I to VI).* All data in the VIZ shall be clearly legible.

5.1 *Languages/script.* These specifications provide for entered data in the visual inspection zone to appear in Latin alphabet characters (see data element directory, Note a)). When the mandatory elements of Zones I, II and III are in a national language that does not use the Latin alphabet, a transliteration shall also be provided in the case of the name of the holder. In the case of the name of the issuing State, or place of issue or place of birth, the representation in the original language may be accompanied by a translation of the name into English, French or Spanish, when the translated name is more familiar to the international community. It is strongly recommended that issuing States using non-Latin alphabet characters in the optional fields of the VIZ use either English, French or Spanish in these fields as well, in the interests of facilitation. An additional data page may be used for national purposes, and this may be completed entirely in the national script and/or language if so desired by the issuing State.

5.2 *Field names.* Captions shall be used to identify all mandatory data elements in the VIZ except as specified in the directory below and may be in the language of the issuing State or working language of the issuing organization. If the language of the issuing State or working language of the issuing organization used for captions is other than English, French or Spanish, one of these languages should also be used, and the corresponding text should be presented in italics.

5.2.1 *Unused fields.* When a field is not used, the caption shall not appear on the MRP data page.

5.3 *Data element directory.* The data elements in the VIZ are specified as follows.

Visual inspection zone — Data element directory

Field/ zone no.	*Data element*	*Specifications*	*Maximum no. of character positions*	*References and notes**
01/I	Issuing State or organization (in full)	Name of issuing State or organization responsible for issue of the MRP. This should be printed, the type font being selected at the discretion of the issuing State or organization. A translation of the name into one or more languages, one of which should be English, French or Spanish, should be given when the translated name is more familiar to the international community.	Variable	Notes a, c, d, f, g If omitted, shall appear on an adjacent page in the passport.
02/I	Name of the document	The word for "passport" in the language of the issuing State or organization, plus either PASSPORT (English), PASSEPORT (French) or PASAPORTE (Spanish) if the language of the issuing State or organization is not English, French or Spanish, the type font being selected at the discretion of the issuing State or organization.	Variable	Notes a, c, g If omitted, shall appear on an adjacent page in the passport.
03/I	Type of document	Capital letter P to designate an MRP. One additional capital letter may be used, at the discretion of the issuing State or organization, to designate other types of passports such as MRP issued to diplomatic staff, and MRP issued for travel on government business.	2	Notes a, g
04/I	Issuing State or organization (in code)	As abbreviated in three-letter code specified in Appendix 1 to Section III.	3 Fixed	Notes a, f, g
05/I	Passport number	As given by the issuing State or organization.	9	Notes a, b, c, g
06/07/II	Name	The full name of the holder, as identified by the issuing State. The name shall be divided where possible by the issuing State into two parts, the first representing that portion of the name that the issuing State defines as the "primary identifier" for the holder (e.g. surname, maiden name plus married name, family name) and the second representing all remaining components (e.g. given names, initials) of the holder's name, which the issuing State considers as collectively representing a "secondary identifier". The two parts, i.e. primary and secondary identifiers, once integrated, constitute the name of the passport holder. **Where the issuing State determines that the holder's name cannot be divided into the required two parts, as defined above, the full name of the holder shall be defined as the primary identifier.**	Variable	Notes a, c, g, h, k

Field/ zone no.	*Data element*	*Specifications*	*Maximum no. of character positions*	*References and notes**
06/II	Primary identifier	Predominant component(s) of the name of the holder as described above. In cases where the predominant component(s) of the name of the holder (e.g. where this consists of composite names) cannot be shown in full or in the same order, owing to space limitations of Field(s) 06 and/or 07 or national practice, the most important component(s) (as determined by the State or organization) of the primary identifier shall be inserted.	Variable	Notes a, c, g, h, k
07/II	Secondary identifier	Secondary component(s) of the name of the holder as described above. The most important component(s) (as determined by the State or organization) of the secondary identifier of the holder shall be inserted in full, up to the maximum dimensions of the field frame. Other components, where necessary, may be represented by initials. Where the holder's name has only predominant component(s), this data field shall be left blank. A State may optionally utilize the whole zone comprising Fields 06 and 07 as a single field. In such a case, the primary identifier shall be placed first, followed by a comma and a space, followed by the secondary identifier.	Variable	Notes a, c, g, h, k
08/II	Nationality (in full)	Nationality of the holder as recorded by the issuing State, in the language(s) of the State of issue.	Variable	Notes a, c, f, g, h
09/II	Date of birth	Holder's date of birth as recorded by the issuing State or organization. For unknown dates, see 10.1.7 of Section IV.	Variable	Notes a, b, c, g
10/II	Personal number	Field optionally used for personal identification number given to holder by issuing State or organization.	12-14	Notes a, b, c, g, h
11/II	Sex	Sex of holder, to be specified by use of the single initial commonly used in the language of the State where the document is issued and, if translation into English, French or Spanish is necessary, followed by a dash and the capital letter F for female, M for male, or X for unspecified.	3	Notes a, c, g
12/II Optional element in mandatory zone	Place of birth	Field optionally used for city and State of holder's birthplace. A translation of the name into one or more languages, one of which should be English, French or Spanish, should be given when the translated name is more familiar to the international community. At the discretion of the issuing State, the town or suburb of birth may be used. When the MRP is issued to a person whose place of birth was outside the State issuing the document and it is desired that the State or territory of birth be shown, the three-letter code appearing in Appendix 1 to Section III shall be used.	25-27	Notes a, c, f, g, h

Field/ zone no.	*Data element*	*Specifications*	*Maximum no. of character positions*	*References and notes**
13/II Optional element in mandatory zone	Optional personal data elements	Optional personal data elements.	Variable	Notes a, b, c, e, g
14/III	Date of issue	Date of issue of the MRP. See paragraph 10.	Variable	Notes a, b, c, g
15/III	Authority or issuing office	Authority or issuing office for the MRP. This field may be used to indicate both the issuing Authority or issuing office and its location, which shall be printed or stamped within this field. A translation of the name into one or more languages, one of which should be English, French or Spanish, should be given when the translated name is more familiar to the international community.	Variable	Notes a, b, c, f, g, h
16/III	Date of expiry	Date of expiry of the MRP. See paragraph 10.	Variable	Notes a, b, c, g
17/III Optional element in mandatory zone	Optional document data elements	Optional data elements relating to the document.	Variable	Notes a, b, c, e, g
18/IV	Holder's signature or usual mark	Signature of holder or usual mark of holder (original or reproduction), either directly on the data page in this field or on a label to be affixed within this field. Alternatively, at the discretion of the issuing State or organization, the signature or usual mark may be located in Zone VI. The size of the field to be allocated to the signature or usual mark on the adjoining page shall be at the discretion of the issuing State or organization, subject to the overall dimensional limits of the MRP.	Variable	Note j
19/V	Holder's portrait	This field shall contain a portrait of the holder. The portrait shall fill the 45.0 mm × 35.0 mm (1.77 in × 1.38 in) area reserved for it. The head size from chin to crown shall be between 70 and 80 per cent of the vertical dimension of the portrait area. The position of this field shall be aligned to the left of Zones II and III. The portrait may be in black and white, or in colour. At the option of the issuing State or organization, this field may contain a security feature(s) provided this does not obscure the portrait.		

Field/ zone no.	*Data element*	*Specifications*	*Maximum no. of character positions*	*References and notes**
		Where the portrait is a glued-in photograph, the issuing State or organization should make every effort to extend the left margin in Field 19 by moving the portrait 4 mm (0.16 in) to the right (i.e. to a total of 6 mm (0.24 in) from the left-hand edge of the page) to ensure a secure and durable adherence of the laminate to the data page on the left-hand margin. In such cases, Fields 03 through 18 inclusive shall be reduced accordingly, and the number of character positions of the data elements appearing in Fields 08, 10 and 12 shall be reduced by up to two characters.		Note d
20/VI	Optional data elements	Additional optional data elements at the discretion of the issuing State or organization.		Notes a, b, c, e, g

* Notes can be found following 6.6.

6. *Machine readable zone (MRZ) (Zone VII)*

6.1 *MRZ position*. The MRZ is located on the front of the MRP data page. Appendix 3 to this section shows the nominal dimensions and position of the data in the machine readable zone. The 23.2 mm (0.91 in) dimension of the MRZ has a tolerance of ± 1.0 mm (± 0.04 in). Within this overall tolerance, the boundary between the visual inspection zone and the machine readable zone shall not be skewed more than 0.5 mm (0.02 in) over the 125 mm (4.92 in) dimension.

6.2 *Data elements*. The data elements corresponding to Fields 03 to 9, 11, 14 and 16 of the visual inspection zone shall be printed in machine readable form, in the MRZ, beginning with the left most character position in each field in the sequence indicated in the data structure specifications shown below. Appendix 6 to this section indicates the structure of the MRZ.

6.3 *Print specifications*. Machine readable data shall be printed in OCR-B type font, size 1, constant stroke width, as specified in paragraphs 13 through 16 of Section IV.

6.4 *Print position*. The position of the left-hand edge of the first character shall be 6.0 ± 1.0 mm (0.24 ± 0.04 in) from the left-hand edge of the document. Reference centre lines for the OCR lines and the minimum starting position for the first character of each line are shown in Appendix 3 to this section. The positioning of the characters is indicated by those reference lines and by the printing zones for the two code lines.

Data structure of machine readable data for MRP data page

6.5 *Data structure of the upper machine readable line*

MRZ character positions (line 1)	*Field no. in VIZ*	*Data element*	*Specifications*	*Number of characters*	*References and notes**
1 to 2	03	Type of document	Capital letter P to designate an MRP. One additional capital letter may be used, at the discretion of the issuing State or organization, to designate a particular type of MRP. If the second character position is not used for this purpose, it shall be filled by the filler character (<).	2	Notes a, c, d
3 to 5	04	Issuing State or organization	The three-letter code specified in Appendix 1 to Section III shall be used. Spaces shall be replaced by filler characters (<).	3	Notes a, c, d, f
6 to 44	06, 07	Name	The name consists of primary and secondary identifiers which shall be separated by two filler characters (<<). Components within the primary or secondary identifiers shall be separated by a single filler character (<).	39 [Primary identifier(s), secondary identifier(s) and fillers]	Paras. 10.1 and 10.2, Section III; Notes a, c, d
		Punctuation in the name	Representation of punctuation is not permitted in the MRZ.		Para. 10.8, Section III
		Apostrophes in the name	Components of the primary or secondary identifiers separated by apostrophes in the VIZ shall be combined and no filler character (<) shall be inserted. *Example:* VIZ: d'Artagnan MRZ: DARTAGNAN		Para. 10.8, Section III
		Hyphens in the name	Hyphens (-) in the name shall be converted to the filler character (<) (i.e. hyphenated names shall be represented as separate components). *Example:* VIZ: Marie-Elise MRZ: MARIE<ELISE		Para. 10.8, Section III
		Commas	Where a comma is used in the VIZ to separate the primary and secondary identifiers, the comma shall be omitted in the MRZ and the primary and secondary identifiers shall be separated by two filler characters (<<).		Para. 10.8, Section III
			Where a comma is used in the VIZ to separate two name components, it shall be represented in the MRZ by a single filler character (<).		Para. 10.8, Section III

MRZ character positions (line 1)	*Field no. in VIZ*	*Data element*	*Specifications*	*Number of characters*	*References and notes**
		Name prefixes and suffixes	Prefixes and suffixes (such as Jr., Sr., II or III) should not be included in the MRZ.		Para. 10.5, Section III
		Filler	When all components of the primary and secondary identifiers and required separators (filler characters) do not exceed 39 characters in total, all name components shall be included in the MRZ and all unused character positions shall be completed with filler characters (<) repeated up to position 44 as required.		
		Truncation of the name	When the primary and secondary identifiers and required separators (filler characters) exceed the number of character positions available for names (i.e. 39), they shall be truncated as follows: — characters shall be removed from one or more components of the primary identifier until three character positions are freed, and two filler characters (<<) and the first character of the first component of the secondary identifier can be inserted. The last character (position 44) shall be an alphabetic character (A through Z). This indicates that truncation may have occurred. — further truncation of the primary identifier may be carried out to allow characters of the secondary identifier to be included, provided that the name field shall end with an alphabetic character (position 44). This indicates that truncation may have occurred. When the name consists of only a primary identifier, the last character in the name field shall be an alpha character.		Paras. 6.7.1, 6.7.2, 6.7.3, Section IV; Notes a, c, d

* Notes can be found following 6.6.

6.6 *Data structure of the lower machine readable line*

MRZ character positions (line 2)	*Field no. in VIZ*	*Data element*	*Specifications*	*Number of characters*	*References and notes**
1 to 9	05	Passport number	As given by the issuing State or organization to uniquely identify the document. Any special characters or spaces in the passport number as shown in the VIZ shall be replaced by the filler character (<). The number shall be followed by the filler character (<) repeated up to position 9 as required.	9	Notes a, b, c, d
10		Check digit	See paragraph 12.	1	Notes b, d
11 to 13	08	Nationality	As a 3-letter code representing the holder's nationality as listed in Appendix 1 to Section III.	3	Notes a, c, d, f
14 to 19	09	Date of birth	The structure is YYMMDD, where: YY = Year (2 positions) MM = Month (2 positions) DD = Day (2 positions). For unknown dates, see 10.1.7 of Section IV.	6	Notes b, c, d, i
20		Check digit	See paragraph 12.	1	Notes b, d
21	11	Sex	F = Female; M = Male; < = unspecified.	1	Notes a, c, d
22 to 27	16	Date of expiry	Structure is YYMMDD, where: YY = Year (2 positions) MM = Month (2 positions) DD = Day (2 positions).	6	Notes b, c, d, i
28		Check digit	See paragraph 12.	1	Notes b, d
29 to 42	10	Personal number or other optional data elements	Any special characters, including spaces in the personal identification number given to holder by the issuing State or organization, shall be replaced by the filler character (<). The number shall be followed by the filler character (<) repeated up to position 42 as required. When the personal number field is not used, the character positions 29 to 42 in the second MRZ line should be completed with filler characters (<) (see also under "check digit", character position 43 below).	14	Notes a, b, c, d

MRZ character positions (line 2)	*Field no. in VIZ*	*Data element*	*Specifications*	*Number of characters*	*References and notes**
43		Check digit	See paragraph 12. When the personal number field is not used and filler characters (<) are used in positions 29 to 42, the check digit may be zero or the filler character (<) at the option of the issuing State or organization.	1	Notes b, c, d
44		Composite check digit	Check digit for all characters of machine readable data of the lower line in positions 1 to 10, 14 to 20 and 22 to 43. The composite check digit is calculated on the basis of all figures shown on the lower machine readable line, including values for letters that are a part of the number fields and their check digits.	1	Paragraph 12; Notes b, d

** Notes for 5.3, 6.5 and 6.6.*

a) Alphabetic characters (A to Z) as defined in Appendix 2 to Section III. In the MRZ, only those characters specified in Appendix 2 to Section III shall be used.

b) Numeric characters (0 to 9) as defined in Appendix 2 to Section III. In the MRZ, only those characters specified in Appendix 2 to Section III shall be used.

c) Punctuation or other special characters. In the MRZ, only those characters specified in Appendix 2 to Section III shall be used.

d) The field name is not printed on the document.

e) The use of a field name is at the option of the issuing State.

f) In the case of the United Nations Laissez-passer, Field 01 (Issuing State or organization) in the visual inspection zone shall be completed with the words "UNITED NATIONS — NATIONS UNIES". In keeping with the international character of United Nations officials, neither nationality nor place of birth shall be shown. The caption for Field 08 (Nationality) shall read instead: "Official of/Fonctionnaire des" and the words "UNITED NATIONS/NATIONS UNIES" entered instead of nationality. Field 12 (Place of birth) shall be left blank. The codes to be used in Field 04 (Code for issuing State or organization) in the visual inspection zone as well as in character positions 3 to 5 (Issuing State or organization) in the upper line of the machine readable zone and in character positions 11 to 13 (Nationality) in the lower line shall be as specified in Appendix 1 to Section III.

g) Space.

h) With respect to the maximum number of character positions and/or the width of the field for this data element, refer to the specifications given for Field 19, when it is necessary to move the holder's portrait 4 mm (0.16 in) to the right.

i) The method of writing dates is given in paragraph 10.

j) The space reserved for Field 15 may be expanded to include additionally the space for Field 18 when the option is taken of locating the holder's signature or usual mark on the adjacent page. In this instance, the Authority or issuing office may be expressed as two lines of variable numbers of character positions.

k) When the name cannot be accommodated in the space provided for it in the viz, a notation giving the full name may be written on another page of the MRP. Alternatively, a smaller type font may be selected for use in the visual inspection zone only.

6.7 *Examples of name of the holder in the MRZ*

Note.— In the following examples, the document is assumed to be a passport issued by the State of Utopia. The first five characters of the upper machine readable line are P<UTO.

a) Usual representation:

Name: Anna Maria Eriksson
VIZ: ERIKSSON, Anna Maria
MRZ: P<UTOERIKSSON<<ANNA<MARIA<<<<<<<<<<<<<<<<<<<<

b) Central primary identifier:

Name: Deborah Heng Ming Lo
VIZ: HENG, Deborah Ming Lo
MRZ: P<UTOHENG<<DEBORAH<MING<LO<<<<<<<<<<<<<<<<<<

c) Hyphen as part of the name:

Name: Susie Margaret Smith-Jones
VIZ: SMITH-JONES, Susie Margaret
MRZ: P<UTOSMITH<JONES<<SUSIE<MARGARET<<<<<<<<<<<<

d) Apostophe as part of the name:

Name: Enya Siobhan O'Connor
VIZ: O'CONNOR, Enya Siobhan
MRZ: P<UTOOCONNOR<<ENYA<SIOBHAN<<<<<<<<<<<<<<<<<<

e) Multiple name components:

Name: Martin Van Der Muellen
VIZ: VAN DER MUELLEN, Martin
MRZ: P<UTOVAN<DER<MUELLEN<<MARTIN<<<<<<<<<<<<<<<<

f) No secondary identifier:

Name: Arkfreith
VIZ: ARKFREITH
MRZ: P<UTOARKFREITH<<<<<<<<<<<<<<<<<<<<<<<<<<<<

6.7.1 *Truncated names — secondary identifier truncated*

a) One or more name components truncated to initials:

Name: Nilavadhanananda Chayapa Dejthamrong Krasuang
VIZ: NILAVADHANANANDA, Chayapa Dejthamrong Krasuang
MRZ: P<UTONILAVADHANANANDA<<CHAYAPA<DEJTHAMRONG<K

b) One or more name components truncated:

Name: Nilavadhanananda Arnpol Petch Charonguang
VIZ: NILAVADHANANANDA, Arnpol Petch Charonguang
MRZ: P<UTONILAVADHANANANDA<<ARNPOL<PETCH<CHARONGU

6.7.2 *Truncated names — primary identifier truncated*

a) One or more components truncated to initials:

Name: Dingo Potoroo Bennelong Wooloomooloo Warrandyte Warnambool
VIZ: BENNELONG WOOLOOMOOLOO WARRANDYTE WARNAMBOOL, Dingo Potoroo
MRZ: P<UTOBENNELONG<WOOLOOMOOLOO<WARRANDYTE<W<<DI

b) One or more components truncated:

Name: Dingo Potoroo Bennelong Wooloomooloo Warrandyte Warnambool
VIZ: BENNELONG WOOLOOMOOLOO WARRANDYTE WARNAMBOOL, Dingo Potoroo
MRZ: P<UTOBENNELONG<WOOLOOM<WARRAND<WARNAM<<DINGO

c) One or more components truncated to a fixed number of characters:

Name: Dingo Potoroo Bennelong Wooloomooloo Warrandyte Warnambool
VIZ: BENNELONG WOOLOOMOOLOO WARRANDYTE WARNAMBOOL, Dingo Potoroo
MRZ: P<UTOBENNEL<WOOLOO<WARRAN<WARNAM<<DINGO<POTO

6.7.3 *Names that just fit, indicating possible truncation by letter in the last position of the name field, but which are not truncated*

Name: Jonathon Warren Trevor Papandropoulous
VIZ: PAPANDROPOULOUS, Jonathon Warren Trevor
MRZ: P<UTOPAPANDROPOULOUS<<JONATHON<WARREN<TREVOR

Note.— Even though there is an alpha character in the 44th position of this passport upper machine readable line, this name has not been truncated ***but it must be assumed that it has been truncated.***

Representation of issuing State or organization and nationality of holder

7. *Visual inspection zone (VIZ)*

7.1 Where the name of the issuing State and/or the place of issue or place of birth are in a national language that does not use Latin characters, the name shall appear in the national language and also shall be either transliterated into Latin characters or translated into one or more languages (at least one of which must be English, French or Spanish) in which the name may be more commonly known to the international community. The name in the different languages shall be separated by an oblique character (/) followed by at least one blank space.

7.2 Where the name of the issuing State or place of issue or place of birth is in a language that uses the Latin alphabet, but where the name is more familiar to the international community in its translation into another language or languages (particularly English, French or Spanish), the name in the national language should be accompanied by one or more translations of the name. The name in the different languages shall be separated by an oblique character (/) followed by at least one blank space.

7.3 The three-letter codes listed in Appendix 1 to Section III may also be used, at the discretion of the issuing State or organization, to complete the field for the place of birth in the VIZ.

8. *Machine readable zone (MRZ)*

8.1 The three-letter codes listed in Appendix 1 to Section III shall be used to complete the field for the issuing State or organization and the nationality in the MRZ.

9. *Three-letter code use*

9.1 Use of three-letter codes is mandatory in the MRZ and Field 04 in the VIZ. Specific locations are defined in the following table.

	Zone	*Field no.*	*Character position no.*	*Number of character positions*
Issuing State or organization	VIZ	04	—	3
	MRZ (upper line)		3-5	3
Holder's nationality	MRZ (lower line)		11-13	3

Representation of dates

10. Dates shall be written as set forth hereunder.

10.1 *Dates in the VIZ.* Such dates on the MRP data page shall be entered in accordance with the Gregorian calendar as follows.

10.1.1 Days shall be shown by a two-digit number, i.e. the dates from one to nine shall be preceded by a zero; this number shall be followed by a blank space.

10.1.2 The name of the month may be written out in full in the language of the issuing State or organization or abbreviated, using up to four character positions.

10.1.3 Where the language of the issuing State or organization is not English, French or Spanish, the name of the month as defined in 10.1.2 shall be followed by an oblique character (/) and the name of the month or the abbreviation of the month up to four character positions, in one of the three languages, as shown in the table below.

Abbreviations of months in English, French and Spanish

Month	*English*	*French*	*Spanish*
January	Jan	Jan	Ene
February	Feb	Fév	Feb
March	Mar	Mars	Mar
April	Apr	Avr	Abr
May	May	Mai	Mayo
June	Jun	Juin	Jun
July	Jul	Juil	Jul
August	Aug	Août	Ago
September	Sep	Sept	Sept
October	Oct	Oct	Oct
November	Nov	Nov	Nov
December	Dec	Déc	Dic

Note.— Where the language of the issuing State or organization is English, French or Spanish, the issuing State or organization should use one of the other two languages (shown in the table above) following the oblique character (/).

10.1.4 The year will normally be shown by the last two digits and be preceded by a blank space. However, an issuing State or organization may use the four-digit representation of the year in the VIZ.

10.1.5 As an example, a date of 12 July 1942 on an MRP data page issued in Italian with French translation of the month would normally appear as follows:

12*b*LUG*b*/JUILb42

where *b* = a single blank space, i.e. 12 LUG /JUIL 42

10.1.6 The month may, however, be written in numerical form in the visual inspection zone, at the discretion of the issuing State or organization. In this case, following a practice established to facilitate the visual inspection of travel documents, a date would be written DD*b*MM*b*YY, where *b* = a single blank space. For example, a date of 12 July 1942 would appear in the VIZ of the MRP data page as follows: 12 07 42.

10.1.7 *Unknown date of birth.* Where a date of birth is completely unknown, that data element shall appear as XX*b*XXX*b*XX where *b* = a single blank space. If only part of the date of birth is unknown, that part shall be represented by XX if it is the day or year, or by XXX if it is the month.

10.2 *Dates in the MRZ.* Such dates on the MRZ shall, in accordance with the principle set forth in ISO 8601 : 1988, be shown as a six-digit number consisting of the last two digits for the year (YY) immediately followed by two digits for the number of the month (MM) and by two digits for the day (DD). The structure is as follows: YYMMDD.

10.2.1 Following this format, the example given in 10.1.6 will be shown as: 420712.

10.2.2 If all or part of the date of birth is unknown, the relevant character positions shall be completed with filler characters (<).

Check digits in the MRZ

11. The data structure of the lower machine readable line in 6.6 provides for the inclusion of five check digits as follows:

Check digit	*Character positions (lower MRZ line) used to calculate check digit*	*Check digit position (lower MRZ line)*
Passport number	1-9	10
Date of birth	14-19	20
Date of expiry	22-27	28
Personal number	29-42	43
Composite check digits	1-10, 14-20, 22-43 *Note.— Positions 11-13 and 21 are excluded when calculating the composite check digit.*	44

12. Details on calculation of check digits in the MRZ are set out below.

12.1 The position of check digits and the data used in their calculation differ between MRTDs, and a table defining this information is set out in the section(s) specific to the preparation of the different types of MRTDs contained in the applicable part of Doc 9303.

12.2 A special check digit calculation has been adopted for use in MRTDs. The check digits shall be calculated on modulus 10 with a continuously repetitive weighting of 731 731 ..., as follows.

12.3 *Step 1*. Going from left to right, multiply each digit of the pertinent numerical data element by the weighting figure appearing in the corresponding sequential position.

12.4 *Step 2*. Add the products of each multiplication.

12.5 *Step 3*. Divide the sum by 10 (the modulus).

12.6 *Step 4*. The remainder shall be the check digit.

12.7 For data elements in which the number does not occupy all available character positions, the symbol < shall be used to complete vacant positions and shall be given the value of zero for the purpose of calculating the check digit.

12.8 When the check digit calculation is applied to data elements containing alphabetic characters, the characters A to Z shall have the values 10 to 35 consecutively, as follows:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35

12.9 *Example 1 — Application of check digit to date field.* Using 27 July 1952 as an example, with the date in numeric form as specified in ISO 8601 : 1988, the calculation will be:

	Date:	5	2	0	7	2	7					
	Weighting:	7	3	1	7	3	1					
Step 1 (multiplication)	Products:	35	6	0	49	6	7					
Step 2 (sum of products)		35	+ 6	+ 0	+ 49	+ 6	+ 7	= 103				
Step 3 (division by modulus)		$\frac{103}{10}$ = 10, remainder 3										

Step 4. Check digit is the remainder, 3. The date and its check digit shall consequently be written as 5207273.

12.10 *Example 2 — Application of check digit to document number field.* Using the number AB2134 as an example for coding a 9-character, fixed-length field (e.g. passport number), the calculation will be:

Sample data element:		A	B	2	1	3	4	<	<	<			
Assigned numeric values:		10	11	2	1	3	4	0	0	0			
Weighting:		7	3	1	7	3	1	7	3	1			
Step 1 (multiplication)	Products:	70	33	2	7	9	4	0	0	0			
Step 2 (sum of products)		70	+ 33	+ 2	+ 7	+ 9	+ 4	+ 0	+ 0	+ 0	= 125		
Step 3 (division by modulus)		$\frac{125}{10}$ = 12, remainder 5											

Step 4. Check digit is the remainder, 5. The number and its check digit shall consequently be written as AB2134<<<5.

12.11 *Example 3— Application of composite check digit to MRZ.* Using the lower line of MRZ data from an MRP data page that follows as an example for coding the composite check digit, the calculation will be:

Lower machine readable line (character positions 1-43):

HA672242<6UTO5802254M9601086<<<<<<<<<<<<<<08

Sample data element:		H	A	6	7	2	2	4	2	<	6
Assigned numeric values:		17	10	6	7	2	2	4	2	0	6
Weighting:		7	3	1	7	3	1	7	3	1	7
Step 1 (multiplication)	Products:	119	30	6	49	6	2	28	6	0	42

Sample data element:		5	8	0	2	2	5	4	9	6	0
Assigned numeric values:		5	8	0	2	2	5	4	9	6	0
Weighting:		3	1	7	3	1	7	3	1	7	3
Step 1 (multiplication)	Products:	15	8	0	6	2	35	12	9	42	0

Sample data element:		1	0	8	6	<	<	<	<	<	<
Assigned numeric values:		1	0	8	6	0	0	0	0	0	0
Weighting:		1	7	3	1	7	3	1	7	3	1
Step 1 (multiplication)	Products:	1	0	24	6	0	0	0	0	0	0

Sample data element:		<	<	<	<	<	<	<	<	0	
Assigned numeric values:		0	0	0	0	0	0	0	0	0	
Weighting:		7	3	1	7	3	1	7	3	1	
Step 1 (multiplication)	Products:	0	0	0	0	0	0	0	0	0	
Step 2 (sum of products)		119	+ 30	+ 6	+ 49	+ 6	+ 2	+ 28	+ 6	+ 0	+ 42 +
Step 2 (sum of products)		15	+ 8	+ 0	+ 6	+ 2	+ 35	+ 12	+ 9	+ 4	+ 0 +
Step 2 (sum of products)		1	+ 0	+ 24	+ 6	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0 +
Step 2 (sum of products)		0	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0	+
Step 2 (sum of products)		= 448									
Step 3 (division by modulus)		$\frac{448}{10}$ = 44, remainder 8									

Step 4. Check digit is the remainder, 8. The lower line of MRZ data together with its composite check digit may consequently be written as follows:

HA672242<6UTO5802254M9601086<<<<<<<<<<<<<<08

Character sets and fonts

13. The character sets and fonts to be used on the MRP data page shall be as indicated hereunder.

13.1 *Captions*

13.1.1 Captions shall be printed in a clear, linear type font in a size of 1.0 mm to 1.8 mm (0.04 in to 0.07 in).

13.1.2 Captions shall be in the language of the issuing State or organization. When such language uses the Latin alphabet, regular font style should be used to print the captions.

13.1.3 Where the language of the issuing State or organization is not English, French or Spanish, the printed caption as defined in 13.1.2 shall be followed by an oblique character (/) and the equivalent of the caption in English, French or Spanish. An italic font style may be used for the second language.

Note.— Where the language of the issuing State or organization is English, French or Spanish, the issuing State or organization should use one of the other two languages to print the caption following the oblique character (/).

13.2 For additional details, see Section III, 5 through 8.

Portrait

14. *Portrait.* A portrait, representing only the holder of the MRP, shall occupy the rectangular area defined as Zone V as specified in the data element directory (5.3).

14.1 Where an overlaminate is used, the adhesion of the laminate to a glued-in photograph or certain types of digital images may be inadequate. In such cases, the margin between the portrait and the left-hand edge of the MRP data page should be increased by moving the portrait 4 mm (0.16 in) to the right (i.e. a total of 6 mm (0.24 in)) to ensure a secure and durable adherence of the laminate to the data page on the left-hand margin.

14.2 The portrait may have irregular edges. When a digitally printed reproduction is used, the portrait may have the background dropped out in order to provide protection against forgery or substitution.

Characteristics of the machine readable zone

15. Except as otherwise specified herein, the MRP data page shall conform with ISO 1831 : 1980 concerning the following matters:

Optical properties of the substrate to be used.
Optical and dimensional properties of the image patterns forming OCR characters.
Basic requirements related to the relative position of OCR characters on the substrate.

15.1 Machine readable data shall be arranged from left to right in fixed-length fields in two lines (upper and lower) in the order specified in the data structure tables shown in 6.5 and 6.6, respectively, and located on the document as shown in Appendix 3 to this section. Data shall be entered in each field, beginning with the left-hand character position.

15.2 Where the entered data do not occupy all the character positions specified for the relevant field, the symbol < shall be used to complete the redundant positions.

Quality specifications of the machine readable zone

16. In general, the print quality shall conform to ISO 1831 : 1980 Range X, except as otherwise provided herein. All quality specifications set forth hereunder shall apply to the MRP data page after final preparation, except where otherwise noted, and conform to the requirements in Section III, 2.

16.1 *Substrate quality.* Paragraphs 4.3 through 4.3.2 of ISO 1831 : 1980 shall be used for reference only.

16.2 *Substrate opacity.* The substrate used, measured before and after final preparation, shall be within the definition of high or medium opacity (ISO 1831 : 1980, 4.4.1 and 4.4.3).

16.3 *Substrate gloss.* The level of gloss is not specified.

16.4 *Fluorescence.* The reflectance of the substrate in the visible spectrum shall exhibit no visibly detectable fluorescence when irradiated by ultraviolet light, except where this is a predictable fluorescence for security reasons.

16.5 *Alternative substrates.* When a substrate other than paper is chosen, it is recommended that the above specifications be followed.

16.6 *Spectral band.* The OCR print shall be legible visually and shall be black (B425 through B680 as defined in ISO 1831 : 1980). The OCR print shall also absorb in the B900 band as defined in ISO 1831 : 1980 (i.e. near infra-red). Any protective layers must not adversely affect this property.

16.7 *Print contrast signal (PCS).* After final preparation, e.g. after the application of any protective layer, the minimum print contrast signal (PCS/min), when measured as specified in ISO 1831 : 1980, shall be as follows: PCS/min $\geq$ 0.6 at the B900 spectral band.

16.8 *Character stroke width.* The stroke width after final preparation shall be as specified for Range X in ISO 1831 : 1980 (5.3.1).

16.9 *Contrast variation ratio (CVR).* After final preparation, i.e. after the application of any protective layer, the CVR should be as shown for Range X in ISO 1831 : 1980, i.e. CVR < 1.50.

16.10 *Spots and extraneous marks.* ISO Standard 1831 : 1980 (5.4.4.6 and 5.4.5.12) shall apply at the reading surface (see also B. 6 of Annex B and C 5.10 of Annex C to ISO 1831 : 1980).

16.11 *Voids.* The value of "d" as defined in ISO 1831 : 1980 (5.4.5.9) shall be equal to 0.4 at the reading surface.

16.12 *Line separation.* See 6.4 and Appendix 3 to this section.

16.13 *Line spacing.* See 6.4 and Appendix 3 to this section.

16.14 *Position of print within the ERZ.* The two MRZ lines shall appear within the effective reading zone as defined in 15 and Appendix 4 to Section III.

16.15 *Skew.* The provisions relating to skew shall be as follows.

16.15.1 *Skew of MRZ characters.* The skew of individual MRZ characters on the MRP data page shall not exceed 3° measured from the reference edge.

16.15.2 *Skew of the MRZ lines.* The effect of the actual skew of the MRZ lines and the actual skew of the MRZ characters shall not exceed the limit specified in 16.15.1 nor should the skew of MRZ or character misalignment result in the MRZ lines or any part thereof appearing outside the printing zone as defined in Appendix 3 to this section.

16.16 *Differentiation between the letter "O" and the number zero.* The letter O and the number zero shall be as defined in ISO 1073-2 : 1976. Reader software should deduce whether a character is an "O" or a zero based on the field context (numeric, alphabetic or special).

Optional expansion of machine readable data capacity

17. Should a State or organization wish to expand the machine readable data capacity of the MRP beyond that defined for global interchange (see 7, Section III), and intend that data stored in such expanded capacity be readable in other than its own systems, the issuing State or organization shall use the following additional machine readable data technology, as appropriate (see informative Annex B), as specified below.

17.1 *Bar code.* See Annex A for details on the use of bar code(s) to expand the machine readable data capacity of an MRP.

Note.— The data structure and format for such technology are not yet defined. This subject will be addressed in a future amendment to these specifications.

18. Proper *co-existence* of the above optional machine readable data storage technology with the *mandatory OCR technology* is critical to ensure global interoperability of the MRP. Annex B provides informative details on the possible combinations available (scenarios) to assist the issuing State or organization, should it choose to use the above optional technology to expand the machine readable data capacity of the MRP in addition to the mandatory OCR technology.

Optional machine-assisted identity confirmation and document security feature verification using an MRP

19. Should a State or organization wish to provide for machine-assisted identity confirmation and/or machine-assisted document security feature verification with the MRP, the specifications and/or recommendations below should be applied to ensure global interoperability.

19.1 *Machine-assisted identity confirmation.* See Annex C for details.

19.2 *Machine-assisted document security feature verification.* See Annex D for details.

20. Proper *co-existence* of optional machine-assisted identity confirmation and document security feature verification technologies with the mandatory OCR technology and/or optional machine readable data expansion technologies is critical to ensure global interoperability of the MRP. Annex B provides informative details on the possible combinations available (scenarios), should the issuing State or organization choose to use machine-assisted identity confirmation or document security feature verification with the MRP.

Passport card

21. Should a State or organization wish to issue a machine readable passport card specifically for purposes such as facilitating travel to States accepting a passport card without visa for entry (*recognizing that issuing States or organizations must reach specific agreements with such receiving States on acceptance of the passport card*), facilitating identity confirmation of the rightful holder to enhance security or in case of loss/theft of the MRP, and/or *approved* use in automated passenger clearance schemes, the issuing State or organization shall issue an ID-1 size card in accordance with the specifications for a TD-1 in Part 3 of Doc 9303. This card, consistent with its status as a passport, shall be identified as a passport card and conform as follows.

21.1 *General layout.* The passport card shall comply with the specifications governing the general layout of the TD-1 (see Doc 9303, Part 3, Section IV).

21.2 *Detailed layout of VIZ.* The passport card shall comply with the specifications governing layout of the VIZ of the TD-1 (see Doc 9303, Part 3, Section IV) with the following exception.

21.2.1 *Name of document.* The name of the document (Field 01/Zone I) shall be 'PASSPORT CARD'.

21.3 *Detailed layout of the MRZ.* The passport card shall comply with the specifications governing layout of the MRZ for the TD-1 (see Doc 9303, Part 3, Section IV) with the following exception.

21.3.1 *Type of document.* The type of document (Line 1) shall be 'IP'.

ICAO

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AMENDMENTS

Amendments are announced in the supplements to the *Products and Services Catalogue;* the Catalogue and its supplements are available on the ICAO website at www.icao.int. The space below is provided to keep a record of such amendments.

RECORD OF AMENDMENTS AND CORRIGENDA

AMENDMENTS		
No.	Date	Entered by

CORRIGENDA		
No.	Date	Entered by

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of ICAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

TABLE OF CONTENTS

1. FOREWORD

ICAO's work on machine readable travel documents began in 1968 with the establishment, by the Air Transport Committee of the Council, of a Panel on Passport Cards. This Panel was charged with developing recommendations for a standardized passport book or card that would be machine readable, in the interest of accelerating the clearance of passengers through passport controls. The Panel produced a number of recommendations, including the adoption of optical character recognition (OCR) as the machine reading technology of choice due to its maturity, cost-effectiveness and reliability. In 1980, the specifications and guidance material developed by the Panel were published as the first edition of Doc 9303, titled *A Passport with Machine Readable Capability*, which became the basis for the initial issuance of machine readable passports by Australia, Canada and the United States.

In 1984, ICAO established what is now known as the Technical Advisory Group on Machine Readable Travel Documents (TAG/MRTD), comprised of government officials who specialize in the issuance and border inspection of passports and other travel documents, in order to update and enhance the specifications which had been prepared by the Panel. Subsequently, this group's terms of reference were expanded to include, first, the development of specifications for a machine readable visa and, later, specifications for machine readable cards that may be used as official travel documents.

In 1998, the New Technologies Working Group of the TAG/MRTD began work to establish the most effective biometric identification system and associated means of data storage for use in MRTD applications, particularly in relation to document issuance and immigration considerations. The bulk of the work had been completed by the time the events of 11 September 2001 caused States to attach greater importance to the security of a travel document and the identification of its holder. The work was quickly finalized and endorsed by the TAG/MRTD and the Air Transport Committee.

The resulting Technical Reports on the employment of biometrics and contactless chip technology, Logical Data Structure (LDS), and Public Key Infrastructure (PKI) were incorporated into Volume 2 of the Sixth Edition of Doc 9303, Part 1 (*Machine Readable Passports*) in 2006, and Volume 2 of the Third Edition of Doc 9303, Part 3 (*Machine Readable Official Travel Documents*) in 2008.

2. SCOPE

The Seventh Edition of Doc 9303 represents a restructuring of the ICAO specifications for Machine Readable Travel Documents. Without incorporating substantial modifications to the specifications, in this new edition Doc 9303 has been reformatted into a set of specifications for Size 1 Machine Readable Official Travel Documents (TD1), Size 2 Machine Readable Official Travel Documents (TD2), and Size 3 Machine Readable Travel Documents (TD3), as well as visas. This set of specifications consists of various separate documents in which general (applicable to all MRTDs) as well as MRTD form factor specific specifications are grouped. See Section 5.1 "Doc 9303 Composition" for an overview.

These specifications are not intended to be a standard for national identity documents. However, a State whose identity documents are recognized by other States as valid travel documents shall design its identity documents such that they conform to the specifications of Doc 9303-3 and Doc 9303-4, Doc 9303-5 or Doc 9303-6.

Although the specifications in Doc 9303-4 are intended for particular application to the passport, these specifications apply equally to other TD3 size identity documents, for example, the laissez-passer, the seafarer's identity document and refugee travel documents.

The document at hand is Part 1. Part 1 introduces the Doc 9303 specifications. It describes the build-up of the twelve parts of Doc 9303, provides general information on ICAO, and guidance on the terminology and abbreviations used throughout the specifications.

3. GENERAL CONSIDERATIONS

3.1 ICAO's Leadership Role

ICAO's initiative to develop standard specifications for passports and other travel documents followed the tradition established by the League of Nations Passport Conferences of the 1920s and the work of the League's successor, the United Nations Organization. ICAO's mandate to continue in its leadership role stems from the Convention on International Civil Aviation (the "Chicago Convention") which covers the full range of requirements for efficient and orderly civil aviation operations, including provisions for clearance of persons through border controls, i.e.:

a) the requirement for persons travelling by air and aircraft crews to comply with immigration, customs and passport regulations (Article 13);

b) the requirement for States to facilitate border clearance formalities and prevent unnecessary delays (Article 22);

c) the requirement that States collaborate in these matters (Article 23); and

d) the requirement for States to develop and adopt internationally standard procedures for immigration and customs clearance (Article 37 j)).

Under this mandate, ICAO develops and maintains international Standards in Annex 9 — *Facilitation* to the Chicago Convention for implementation by Member States. In the development of such Standards, it is a fundamental precept that if public authorities are to facilitate inspection formalities for the vast majority of air travellers, those authorities must have a satisfactory level of confidence in the reliability of travel documents and in the effectiveness of inspection procedures. The production of standardized specifications for travel documents and the data contained therein is aimed at building that confidence.

In 2004, the Assembly of ICAO affirmed that cooperative work on specifications to strengthen the security and integrity of travel documents should be pursued by the Organization as a matter of high priority. In addition to the International Organization for Standardization (ISO), consultants to the TAG/MRTD include the International Air Transport Association (IATA), the Airports Council International (ACI), and the International Criminal Police Organization (INTERPOL).

In 2005, the then 188 Member States of ICAO approved a new Standard that all States must begin issuing machine readable passports in accordance with Doc 9303 no later than the year 2010. No later than the year 2015 all non-machine readable travel documents must have expired. This Standard is published in the 13th Edition (2011) of Annex 9 — *Facilitation*.

3.2 Relative Costs and Benefits of Machine Readable Travel Documents

Experience with the issuance of machine readable passports, in conformity with the specifications set forth in Doc 9303, indicates that the cost of producing MRTDs may be no greater than that of producing conventional documents, though the cost will be higher when biometric identification and electronic travel documents are implemented. As traffic volumes grow and more States focus on how they can rationalize their clearance processes with the employment of

computerized databases and electronic data interchange, the MRTD plays a pivotal part in modern, enhanced compliance systems. Equipment to read the documents and access the databases may entail a substantial investment, but this can be expected to be returned by the improvements in security, clearance speed and accuracy of verification which such systems provide. Use of MRTDs in automated clearance systems may also make it possible for States to eliminate both the requirement for paper documents, such as passenger manifests and embarkation/disembarkation cards, and the administrative costs associated with the related manual procedures.

3.3 Operations

The basic machine readable travel document, with its OCR readability, is designed for both visual and mechanical reading.

ICAO Member States have recognized that standardization is a necessity and that the benefits of adopting the Doc 9303 standard formats for passports and other travel documents extend beyond the obvious advantages for States that have the machine readers and databases for use in automated clearance systems. In fact, the physical characteristics and data security features of the documents themselves offer strong defence against alteration, forgery or counterfeit. Moreover, adoption of the standardized format for the visual zone of an MRTD facilitates inspection by airline and government officials, with the result that clearance of low-risk traffic is expedited, problem cases are more readily identified, and enforcement is improved. The optional introduction of biometric identification with data stored on a contactless integrated circuit will provide greater security and resistance to fraud and thus make it easier for the legitimate document holder to obtain visas for travel and to be processed through border inspection systems.

Note.— It is recognized that situations will arise where an eMRTD will not interface correctly with a reader at a border. There are several reasons why this might occur, of which a failure of the eMRTD is only one. ICAO emphasizes that an eMRTD which fails to read is nevertheless a valid document. However, a failure to read could be the result of fraudulent attack, and the receiving State should establish its own procedures for dealing with this possibility, which should involve more stringent inspection of the document and its holder but also allow that the failure involves no fraudulent intent.

3.4 Note on the Supplement

ICAO will issue from time to time a "Supplement to Doc 9303". The Supplement will contain information intended to clarify, amplify or elaborate on issues with respect to travel document specifications, as well as to correct errors encountered from implementation experiences. It is intended that the information contained in the Supplement will augment the existing guidance in Doc 9303 as well as in Technical Reports issued by ICAO. The Supplement will be issued on a continuing and consistent basis.

The specifications of Doc 9303 should always be read in conjunction with the additional information set out in the latest release of the Supplement which will be available on the ICAO web site at http://www.icao.int/security/mrtd.

3.5 Endorsement by ISO

The technical specifications sections of Doc 9303 have received the endorsement of the International Organization for Standardization as ISO Standard 7501. Such endorsement is made possible by means of a liaison mechanism through which manufacturers of travel documents, readers and other technologies provide technical and engineering advice to the TAG/MRTD under the auspices of ISO. Through this working relationship, the ICAO specifications have achieved, and are expected to continue to receive, the status of worldwide standards by means of a simplified procedure within ISO.

The liaison mechanism with ISO has been successfully applied not only to the endorsement of new specifications for travel documents as ISO standards but also to the approval of amendments to the specifications. Subsequent revisions to Doc 9303 will therefore be processed for ISO endorsement in the same manner as previously.

4. DEFINITIONS AND REFERENCES

4.1 Acronyms

Acronym	Full form
3DES	Triple DES
AA	Active Authentication
AFS	Anti-Fraud Specialist
AES	Advanced Encryption Standard
AID	Application Identifier
APDU	Application Protocol Data Unit
AO	Authorizing Officer
BAC	Basic Access Control
BER	Basic Encoding Rules
BLOB	Binary Large Object
CA	Certification Authority
CAN	Card Access Number
CBEFF	Common Biometric Exchange Format Framework
CID	Card IDentifier
CRL	Certificate Revocation List
CSCA	Country Signing Certification Authority
DER	Distinguished Encoding Rule
DES	Data Encryption Standard
DH	Diffie Hellmann
DN	Distinguished Name
DO	Data Object
DOVID	Diffractive Optically Variable Image Device
DS	Document Signer
DSA	Digital Signature Algorithm
EAL	Evaluation Assurance Level
ECDH	Elliptic Curve Diffie Hellmann

Acronym	Full form
ECDSA	Elliptic Curve Digital Signature Algorithm
ECKA	Elliptic Curve Key Agreement
EEPROM	Electrically Erasable Programmable Read Only Memory
eMRP	Electronic Machine Readable Passport
eMRTD	Electronic Machine Readable Travel Document
eMROTD	Electronic Machine Readable Official Travel Document
ERZ	Effective Reading Zone
FAR	False Acceptance Rate
FIPS	Federal Information Processing Standard
FRR	False Rejection Rate
IC	Integrated Circuit
ICAO	International Civil Aviation Organization
ICC	Integrated Circuit Card
IFD	InterFace Device
IR	InfraRed light
IS	Inspection System
LDS	Logical Data Structure
MAC	Message Authentication Code
MRP	Machine Readable Passport
MRTD	Machine Readable Travel Document
MROTD	Machine Readable Official Travel Document in the form of a card
MRV-A	Full size (Format A) Machine Readable Visa
MRV-B	Small size (Format B) Machine Readable Visa
MRZ	Machine Readable Zone
NAD	Node ADdress
NIST	National Institute of Standards and Technology
NTWG	New Technologies Working Group
OCR	Optical Character Recognition
OCR-B	Optical Character Recognition font defined in ISO 1073-2
OID	Object IDentifier
OVD	Optically Variable Device
OVF	Optically Variable Feature
PACE	Password Authenticated Connection Establishment

Acronym	Full form
PCD	Proximity Coupling Device
PICC	Proximity Integrated Circuit Card
PIX	Proprietary Identifier eXtension (PIX).
PKD	Public Key Directory
PKI	Public Key Infrastructure
RID	Registered IDentifier (RID)
ROM	Read Only Memory
RSA	Rivest, Shamir and Adleman
SHA	Secure Hash Algorithm
SM	Secure Messaging
SO_D	Document Security Object
SSC	Send Sequence Counter
TAG/MRTD	Technical Advisory Group on Machine Readable Travel Documents
TD1	Size 1 Machine Readable Official Travel Document
TD2	Size 2 Machine Readable Official Travel Document
TD3	Size 3 Machine Readable Travel Document
TLV	Tag Length Value
UID	Unique IDentifier
UV	UltraViolet light
VIZ	Visual Inspection Zone
WSQ	Wavelet Scalar Quantization

4.2 Terms and Definitions

Term	Definition
Algorithm	A specified mathematical process for computation; a set of rules which, if followed, will give a prescribed result.
Anti-scan pattern	An image usually constructed of fine lines at varying angular displacement and embedded in the security background design. When viewed normally, the image cannot be distinguished from the remainder of the background security print but when the original is scanned or photocopied the embedded image becomes visible.
Application Identifier (AID)	Data element that identifies an application. eMRTD applications use a Standard AID that is one of four categories of AID. It consists of a registered application provider identifier (RID) and a proprietary application identifier extension (PIX).
Asymmetric	Different keys needed on each end of a communication link.

Term	Definition
Asymmetric algorithm	This type of cryptographic operation uses one key for encryption of plain text and another key for decryption of associated cipher text. These two keys are related to each other and are called a Key Pair.
Asymmetric keys	A separate but integrated user key pair comprised of one public key and one private key. Each key is one-way, meaning that a key used to encrypt information cannot be used to decrypt the same information.
Authentication	A process that validates the claimed identity of a participant in an electronic transaction.
Authenticity	The ability to confirm that the Logical Data Structure and its components were created by the issuing State or organization.
Authorization	A security process to decide whether a service can be given or not.
Authorized receiving organization	Organization authorized to process an official travel document (e.g. an aircraft operator) and, as such, potentially allowed in the future to record details in the optional capacity expansion technology.
Barcode	A means of storing data as a pattern of lines or dots.
Biographical data (biodata)	The personalized details of the bearer of the document appearing as text in the visual and machine readable zones on the MRTD, or on the chip if present.
Biometric	A measurable, unique, physical characteristic or personal behavioural trait used to recognize the identity, or verify the claimed identity, of a enrollee.
Biometric Data	The information extracted from the biometric and used either to build a reference template (template data) or to compare against a previously created reference template (comparison data).
Biometric Identification	A means of identifying or confirming the identity of the holder of an MRTD by the measurement of one or more properties of the holder's person.
Biometric matching	The process of using an algorithm that compares templates derived from the biometric reference and from the live biometric input, resulting in a determination of match or non-match.
Biometric reference template	A data set which defines a biometric measurement of a person which is used as a basis for comparison against a subsequently submitted biometric sample(s).
Biometric sample	Raw data captured as a discrete, unambiguous, unique and linguistically neutral value representing a biometric characteristic of an enrollee as captured by a biometric system (for example, biometric samples can include the image of a fingerprint as well as its derivative for authentication purposes).
Biometric system	An automated system capable of: 1. capturing a biometric sample from an end user for an MRP; 2. extracting biometric data from that biometric sample; 3. comparing that specific biometric data value(s) with that contained in one or more reference templates; 4. deciding how well the data match, i.e. executing a rule-based matching process specific to the requirements of the unambiguous identification and person authentication of the enrollee with respect to the transaction involved; and

Term	Definition
	5. indicating whether or not an identification or verification of identity has been achieved.
Biometric template	Extracted and compressed data taken from a biometric sample.
Biometric verification	A means of identifying or confirming the identity of the holder of an MRTD by the measurement and validation of one or more unique properties of the holder's person.
Bit	A binary digit. The smallest possible unit of information in a digital code.
Black-line white-line design	A design made up of fine lines often in the form of a guilloche pattern and sometimes used as a border to a security document. The pattern migrates from a positive to a negative image as it progresses across the page.
Block	A string or group of bits that a block algorithm operates on.
Block algorithm	See: block cipher.
Block cipher	Algorithms that operate on plain text in blocks (strings or groups) of bits.
Bootstrapping	A method of testing the reliability of a data set.
Breeder Document	Documentation used as evidence of identity when applying for a travel document.
Brute-force attack	Trying every possible key and checking whether the resulting plain text is meaningful.
Byte	A sequence of eight bits usually operated on as a unit.
Caption	Printed word or phrase to identify a data field. In exceptional circumstances, when multiple different official languages do not fit in the data field, numbers can be used. These numbers must be accompanied by explanatory text at another location in the MRP.
Capture	The method of taking a biometric sample from the end user.
Card	Medium according to ISO/IEC 7810, ISO/IEC 7811, ISO 7812 used to carry information.
Certificate	A digital document which proves the authenticity of a public key.
Certificate Revocation List (CRL)	A list of revoked certificates within a given infrastructure.
Certification Authority (CA)	A trustworthy body that issues digital certificates for PKI.
Chemical sensitizers	Security reagents to guard against tampering by chemical erasure, such that irreversible colours develop when bleach and solvents come into contact with the document.
Cipher	Secret writing based on a key, or set of predetermined rules or symbols.
Collation marks	See: Index marks.
Colour shifting ink	Inks changing their visual characteristic depending on the viewing angle and/or the quality of a stimulating (light) source.
Comparison	The process of comparing a biometric sample with a previously stored reference template or templates. See also "One-to-many" and "One-to-one".

Term	Definition
Contactless integrated circuit	A semi-conductor device which stores MRTD data and which communicates with a reader using radio frequency energy according to ISO/IEC 14443.
Common Biometric Exchange Format Framework (CBEFF)	A common file format that facilitates exchange and interoperability of biometric data.
Control Number	A number assigned to a document at the time of its manufacture for record-keeping and security purposes.
Counterfeit	An unauthorized copy or reproduction of a genuine security document made by whatever means.
Country code	A two- or three-letter code as defined in ISO 3166-1, used to designate a document issuing authority or nationality of the document holder.
Cryptography	Science of transforming information into an enciphered, unintelligible form using an algorithm and a key.
Data Group	A series of related Data Elements grouped together within the Logical Data Structure.
Data Encryption Standard (DES)	A method of data encryption specified in FIPS 46-3.
Data Feature	The incorporation of encoded information into the document data or image structure, usually into the personalization data, especially the portrait.
Data Page	The page of the passport book, preferably the second or penultimate page, which contains the biographical data of the document holder. See "Biographical data".
Decryption	The act of restoring an encrypted file to its original state through the use of a key.
Deviation List	Signed list issued by an issuing State specifying non-conformities in travel documents and/or keys and certificates.
Deviation List Signer	An entity that digitally signs a Deviation List. The Deviation List signer is authorized by its national CSCA to perform this function through the issuance of a Deviation List Signer certificate.
Diffractive Optically Variable Device	A security feature containing a holographic or equivalent image within its construction, the image changing its appearance with angle of viewing or illumination.
Diffractive Optically Variable Image Device (DOVID) Laminate or Overlay	A laminate or overlay containing a DOVID either covering a whole area or located so as to protect key data on the document.
Digital signature	The result of a cryptographic operation enabling the validation of information by electronic means. This is NOT the displayed signature of the MRTD holder in digital form.
Digital Signature Algorithm (DSA)	Asymmetric algorithm published by NIST in FIPS 186. This algorithm only provides digital signature function.
Digital Watermark	See: Steganography.

Term	Definition
Displayed signature	The original written signature or the digitally printed reproduction of the original.
Directory/Public Key Directory (PKD)	A repository for storing information. Typically, a directory for a particular PKI is a repository for the public key encryption certificates issued by that PKI's Certification Authority, along with other client information. The directory also keeps cross-certificates, Certification Revocation Lists, and Authority Revocation Lists.
Document blanks	A document blank is a travel document that does not contain personalized data. Typically, document blanks are the base stock from which personalized travel documents are created.
Document number	A number that uniquely identifies a document. It is recommended that the document number and the control number be identical.
Document signer	A body which issues a biometric document and certifies that the data stored on the document is genuine in a way that will enable detection of fraudulent alteration.
Duplex design	A design made up of an interlocking pattern of small irregular shapes, printed in two or more colours and requiring very close register printing in order to preserve the integrity of the image.
Eavesdropping	The unauthorized interception of data communication.
Effective reading zone (ERZ)	A fixed-dimensional area, common to all MRTDs, in which the machine readable data in the MRZ can be read by document readers.
Electrically Erasable Programmable Read Only Memory (EEPROM)	A non-volatile memory technology where data can be electrically erased and rewritten.
Electronic Machine Readable Passport (eMRP)	A TD3 size MRTD conforming to the specifications of Doc 9303-4, that additionally incorporates a contactless integrated circuit including the capability of biometric identification of the holder. Commonly referred to as "ePassport".
Electronic Machine Readable Travel Document (eMRTD)	An MRTD (passport, visa or card) that has a contactless integrated circuit embedded in it and the capability of being used for biometric identification of the MRTD holder in accordance with the standards specified in the relevant Part of Doc 9303 — *Machine Readable Travel Documents.*
Electronic MROTD	A TD1 or TD2 size MROTD conforming to the specifications of Doc 9303-5 or Doc 9303-6, respectively, that additionally incorporates a contactless integrated circuit including the capability of biometric identification of the holder.
Embedded image	An image or information encoded or concealed within a primary visual image. Also see steganography.
Encryption	The act of disguising information through the use of a key so that it cannot be understood by an unauthorized person.
End user	A person who interacts with a biometric system to enroll or have his[1] identity checked.

1. Throughout this document, the use of the male gender should be understood to include male and female persons.

Term	Definition
Enrollee	A human being, i.e. natural person, assigned an MRTD by an issuing State or organization.
Enrollment	The process of collecting biometric samples from a person and the subsequent preparation and storage of biometric reference templates representing that person's identity.
ePassport	Commonly used name for an eMRP. See Electronic Machine Readable Passport (eMRP).
Extraction	The process of converting a captured biometric sample into biometric data so that it can be compared to a reference template.
Failure to acquire	The failure of a biometric system to obtain the necessary biometric to enroll a person.
Failure to enroll	The failure of a biometric system to enroll a person.
False Acceptance	When a biometric system incorrectly identifies an individual or incorrectly verifies an impostor against a claimed identity.
False Acceptance Rate (FAR)	The probability that a biometric system will incorrectly identify an individual or will fail to reject an impostor. The rate given normally assumes passive impostor attempts. The false acceptance rate may be estimated as FAR = NFA/NIIA or FAR = NFA/NIVA where FAR is the false acceptance rate, NFA is the number of false acceptances, NIIA is the number of impostor identification attempts, and NIVA is the number of impostor verification attempts.
False match rate	Alternative to "false acceptance rate"; used to avoid confusion in applications that reject the claimant if his biometric data matches that of an enrollee. In such applications, the concepts of acceptance and rejection are reversed, thus reversing the meaning of "false acceptance" and "false rejection".
False non-match rate	Alternative to "false rejection rate"; used to avoid confusion in applications that reject the claimant if his biometric data matches that of an enrollee. In such applications, the concepts of acceptance and rejection are reversed, thus reversing the meaning of "false acceptance" and "false rejection".
False rejection	When a biometric system fails to identify an enrollee or fails to verify the legitimate claimed identity of an enrollee.
False rejection rate (FRR)	The probability that a biometric system will fail to identify an enrollee or verify the legitimate claimed identity of an enrollee. The false rejection rate may be estimated as follows: FRR = NFR/NEIA or FRR = NFR/NEVA where FRR is the false rejection rate, NFR is the number of false rejections, NEIA is the number of enrollee identification attempts, and NEVA is the number of enrollee verification attempts. This estimate assumes that the enrollee identification/verification attempts are representative of those for the whole population of enrollees. The false rejection rate normally excludes "failure to acquire" errors.
Fibres	Small, thread-like particles embedded in a substrate during manufacture.
Field	Specified space for an individual data element within a zone.
Fingerprint(s)	One (or more) visual representation(s) of the surface structure of the holder's fingertip(s).

Term	Definition
Fluorescent ink	Ink containing material that glows when exposed to light at a specific wavelength, usually UV.
Forgery	Fraudulent alteration of any part of the genuine document.
Fraudulent Alteration	Involves the alteration of a genuine document in an attempt to enable it to be used for travel by an unauthorized person or to an unauthorized destination. The biographical details of the genuine holder, particularly the portrait, form the prime target for such alteration.
Front-to-back (see-through) register	A design printed on both sides of an inner page of the document which, when the page is viewed by transmitted light, forms an interlocking image.
Full frontal (facial) image	A portrait of the holder of the MRTD produced in accordance with the specifications established in Doc 9303.
Full size (Format-A) machine readable visa (MRV-A)	An MRV conforming with the dimensional specifications contained in Doc 9303-7, sized to completely fill a passport visa page.
Gallery	The database of biometric templates of persons previously enrolled, which may be searched to find a probe.
Ghost Image	See: Shadow Image.
Global interoperability	The capability of inspection systems (either manual or automated) in different States throughout the world to obtain and exchange data, to process data received from systems in other States, and to utilize that data in inspection operations in their respective States. Global interoperability is a major objective of the standardized specifications for placement of both eye readable and machine readable data in all eMRTDs.
Globally Interoperable Biometric	Refers to Face Image as set forth in Doc 9303-9.
Guilloche design	A pattern of continuous fine lines, usually computer generated, and forming a unique image that can only be accurately re-originated by access to the equipment, software and parameters used in creating the original design.
Hash	A mathematical formula that converts a message of any length into a unique fixed-length string of digits known as "message digest" that represents the original message. A hash is a one-way function, that is, it is infeasible to reverse the process to determine the original message. Also, a hash function will not produce the same message digest from two different inputs.
Heat-sealed laminate	A laminate designed to be bonded to the biographical data page of a passport book by the application of heat and pressure.
Holder	A person possessing an MRTD, submitting a biometric sample for verification or identification whilst claiming a legitimate or false identity. A person who interacts with a biometric system to enroll or have his identity checked.

Term	Definition
Identification/Identify	The one-to-many process of comparing a submitted biometric sample against all of the biometric reference templates on file to determine whether it matches any of the templates and, if so, the identity of the eMRTD holder whose template was matched. The biometric system using the one-to-many approach is seeking to find an identity amongst a database rather than verify a claimed identity. Contrast with "Verification".
Identification card (ID-card)	A card used as an identity document.
Identifier	A unique data string used as a key in the biometric system to name a person's identity and its associated attributes. An example of an identifier would be an MRTD number.
Identity	The collective set of distinct personal and physical features, data and qualities that enable a person to be definitively identified from others. In a biometric system, identity is typically established when the person is registered in the system through the use of so-called "breeder documents" such as birth certificate and citizenship certificate.
Identity Document	Document used to identify its holder and issuer, which may carry data required as input for the intended use of the document.
Image	A representation of a biometric as typically captured via a video, camera or scanning device. For biometric purposes this is stored in digital form.
Impostor	A person who applies for and obtains a document by assuming a false identity, or a person who alters his physical appearance to represent himself as another person for the purpose of using that person's document.
Index marks	These marks are printed on the outside edge of each page in consecutive order starting from the top on the first page to a lower position on the following page and so on. The register mark of the last page appears at the bottom. This printing method leads to the appearance of a continuous stripe on the edge of the passport. Any page that has been removed will register as a gap. When printed in UV colour, this stripe becomes visible only under UV light. Also called collation marks.
Infra-red drop-out ink	An ink which forms a visible image when illuminated with light in the visible part of the spectrum and which cannot be detected in the infrared region.
Infra-red ink	An ink which is visible in the infrared light spectrum.
Initialization (of a smart card)	The process of populating persistent memory (EEPROM, etc.) with data that are common to a large number of cards while also including a minimal amount of card unique items (e.g. ICC serial number and Personalization keys).
Inspection	The act of a State or organization examining an MRTD presented to it by a traveller (the MRTD holder) and verifying its authenticity.
Inspection system	A system used for inspecting MRTDs by any public or private entity having the need to validate the MRTD, and using this document for identity verification, e.g. border control authorities, airlines and other transport operators, financial institutions.
Intaglio	A printing process used in the production of security documents in which high printing pressure and special inks are used to create a relief image with tactile feel on the surface of the document.

Term	Definition
Integrated Circuit (IC)	Electronic component designed to perform processing and/or memory functions.
Integrated Circuit Card (IC card, ICC)	A card into which been inserted one or more ICs.
Integrity	The ability to confirm that the Logical Data Structure and its components have not been altered from that created by the issuing State or organization.
Interface	A standardized technical definition of the connection between two components.
Interface device	Any terminal, communication device or machine to which the ICC is connected during operation.
Interoperability	The ability of several independent systems or sub-system components to work together.
Iris (printing)	See: Rainbow Printing.
Issuer data block	A series of Data Groups that are written to the optional capacity expansion technology by the issuing State or organization.
Issuing authority	The entity accredited for the issuance of an MRTD to the rightful holder.
Issuing State	The country issuing the MRTD.
Issuing organization	Organization authorized to issue an official MRTD (e.g. the United Nations Organization, issuer of the laissez-passer).
JPEG and JPEG2000	Standards for the data compression of images, used particularly in the storage of facial images.
Key exchange	The process for getting session keys into the hands of the conversants.
Key management	The process by which cryptographic keys are provided for use between authorized communicating parties.
Key pair	A pair of digital keys — one public and one private — used for encrypting and signing digital information.
Label	A self-adhesive sticker which is used as the data page within the passport. This is not a generally recommended practice, particularly for longer-term validity documents.
Laissez-passer	A document, generally similar to a passport, issued under the auspices of a supranational entity (e.g. United Nations).
Laminate	A clear material, which may have security features designed to be securely bonded to protect the biographical data or other page of the document.
Laser engraving	A process whereby personalized data are "burned" into the substrate with a laser. The data may consist of text, portraits and other security features.
Laser perforation	A process whereby numbers, letters or images are created by perforating the substrate with a laser.
Latent image	A hidden image formed within a relief image which is composed of line structures which vary in direction and profile resulting in the hidden image appearing at predetermined viewing angles, achieved by intaglio printing.

Term	Definition
Lenticular Feature	Security feature in which a lens structure is integrated in the surface of the document or used as a verification device.
Level 1 inspection	Cursory examination for rapid inspection at the point of usage (easily identifiable visual or tactile features).
Level 2 inspection	Examination by trained inspectors with simple equipment.
Level 3 inspection	Inspection by forensic specialists.
Live capture	The process of capturing a biometric sample by an interaction between an MRTD holder and a biometric system.
Logical Data Structure (LDS)	The Logical Data Structure describes how data are stored and formatted in the contactless IC of an eMRTD.
Machine Assisted Document Verification	A process using a device to assist in the verification of the authenticity of the document in respect to data and/or security.
Machine Readable Official Travel Document (MROTD)	A document, usually in the form of a card of TD1 or TD2 size, that conforms to the specifications of Doc 9303-5 and Doc 9303-6 and may be used to cross international borders by agreement between the States involved.
Machine Readable Passport (MRP)	A passport conforming with the specifications contained in Doc 9303-4. Normally constructed as a TD3 size book containing pages with information on the holder and the issuing State or organization and pages for visas and other endorsements. Machine readable information is contained in two lines of OCR-B text, each with 44 characters.
Machine Readable Travel Document (MRTD)	Official document, conforming with the specifications contained in Doc 9303, issued by a State or organization which is used by the holder for international travel (e.g. MRP, MRV, MROTD) and which contains mandatory visual (eye readable) data and a separate mandatory data summary in a format which is capable of being read by machine.
Machine Readable Visa (MRV)	A visa conforming with the specifications contained in Doc 9303-7. The MRV is normally attached to a visa page in a passport.
Machine Readable Zone (MRZ)	Fixed dimensional area located on the MRTD, containing mandatory and optional data formatted for machine reading using OCR methods.
Machine-verifiable biometric feature	A unique physical personal identification feature (e.g. facial image, fingerprint or iris) stored electronically in the chip of an eMRTD.
Master key	Root of the derivation chain for keys.
Master List Signer	An entity that digitally signs a Master List of CSCA certificates. The Master List signer is authorized by its national CSCA to perform this function through the issuance of a Master List Signer certificate.
Match/Matching	The process of comparing a biometric sample against a previously stored template and scoring the level of similarity. A decision to accept or reject is then based upon whether this score exceeds the given threshold.

Term	Definition
Message	The smallest meaningful collection of information transmitted from sender to receiver. This information may consist of one or more card transactions or card transaction-related information.
Message Authentication Code (MAC)	A MAC is a message digest appended to the message itself. The MAC cannot be computed or verified unless a secret is known. It is appended by the sender and verified by the receiver which is able to detect a message falsification.
Metallic ink	Ink exhibiting a metallic-like appearance.
Metameric inks	A pair of inks formulated to appear to be the same colour when viewed under specified conditions, normally daylight illumination, but which are a mismatch at other wavelengths.
Microprint	Printed text or symbols smaller than 0.25 mm/0.7 pica points.
MRP data page	A fixed-dimensional page within the MRP containing a standardized presentation of visual and machine readable data.
Multiple biometric	The use of more than one biometric.
Non-volatile memory	A semiconductor memory that retains its content when power is removed (i.e. ROM, EEPROM).
One-to-a-few	A hybrid of one-to-many identification and one-to-one verification. Typically the one-to-a-few process involves comparing a submitted biometric sample against a small number of biometric reference templates on file. It is commonly referred to when matching against a "watch list" of persons who warrant detailed identity investigation or are known criminals, terrorists, etc.
One-to-many	Synonym for "Identification".
One-to-one	Synonym for "Verification".
Operating system	A programme which manages the various application programmes used by a computer.
Optically Variable Device (OVD)	Security Feature displaying different colours or image appearance depending on viewing angle or verification conditions.
Optically Variable Feature (OVF)	An image or feature whose appearance in colour and/or design changes dependent upon the angle of viewing or illumination. Examples are: features including diffraction structures with high resolution (diffractive optically variable image device/DOVID), holograms, colour-shifting inks (e.g. ink with optically variable properties) and other diffractive or reflective materials.
Out-of-band	Refers to communications which occur outside of a previously established communication method or channel.
Overlay	An ultra-thin film or protective coating that may be applied to the surface of a document in place of a laminate.
Padding	Appending extra bits to either side of a data string up to a predefined length.
Penetrating numbering ink	Ink containing a coloured component, which penetrates deep into a substrate.

Term	Definition
Personal Identification Number (PIN)	A numeric security code used as a mechanism for local one-to-one verification with the purpose to ascertain whether the card holder is in fact the natural person authorized to access or use a specific service such as the right to unlock certain information on the card.
Personalization	The process by which the portrait, signature and biographical data are applied to the document.
Phosphorescent ink	Ink containing a pigment that glows when exposed to light of a specific wavelength, the reactive glow remaining visible and then decaying after the light source is removed.
Photochromic ink	An ink that undergoes a reversible colour change when exposed to light of a specified wavelength.
Photo-substitution	A type of forgery in which the portrait in a document is substituted for a different one after the document has been issued.
Physical security	The range of security measures applied during production and personalization to prevent theft and unauthorized access to the process.
PKD participant	An ICAO Member State or other entity issuing or intending to issue eMRTDs that follows the arrangements for participation in the ICAO PKD.
Portrait	A visual representation of the facial image of the holder of the document.
Private Key	A cryptographic key known only to the user, employed in public key cryptography in decrypting or signing information.
Probe	The biometric sample of the enrollee whose identity is sought to be established.
Public Key	The public component of an integrated asymmetric key pair, used in encrypting or verifying information.
Public key certificate	The public key information of an entity signed by the certification authority and thereby rendered unforgettable.
Public key cryptography	A form of asymmetric encryption where all parties possess a pair of keys, one private and one public, for use in encryption and digital signing of data.
Public Key Directory (PKD)	The central database serving as the repository of Document Signer Certificates, CSCA Master Lists, Country Signing CA Link Certificates and Certificate Revocation Lists issued by Participants, together with a system for their distribution worldwide, maintained by ICAO on behalf of Participants in order to facilitate the validation of data in eMRTDs.
Public Key Infrastructure (PKI)	A set of policies, processes and technologies used to verify, enrol and certify users of a security application. A PKI uses public key cryptography and key certification practices to secure communications.
Public key system	A cryptographic method using pairs of keys, one of which is private and one is public. If encipherment is done using the public key, decipherment requires application of the corresponding private key and vice versa.
Rainbow printing (iris or split fountain printing)	A technique whereby two or more colours of ink are printed simultaneously on a press to create a continuous merging of the colours similar to the effect seen in a rainbow. Also called prismatic, or iris printing.

Term	Definition
Random access	A means of storing data whereby specific items of data can be retrieved without the need to sequence through all the stored data.
Random Access Memory (RAM)	A volatile memory randomly accessible used in the IC that requires power to maintain data.
Reactive inks	Inks that contain security reagents to guard against attempts at tampering by chemical erasure (deletion), such that a detectable reaction occurs when bleach and solvents come into contact with the document.
Read only memory (ROM)	Non-volatile memory that is written once, usually during IC production. It is used to store operating systems and algorithms employed by the semiconductor in an integrated circuit card during transactions.
Read range	The maximum practical distance between the contactless IC with its antenna and the reading device.
Receiver data block	A series of Data Groups that are written to the optional capacity expansion technology by a receiving State or authorized receiving organization.
Receiving State	The country inspecting the holder's MRTD.
Registration	The process of making a person's identity known to a biometric system, associating a unique identifier with that identity, and collecting and recording the person's relevant attributes into the system.
Registration Authority (RA)	A person or organization responsible for the identification and authentication of an applicant for a digital certificate. An RA does not issue or sign certificates.
Relief (3-D) design (Medallion)	A security background design incorporating an image generated in such a way as to create the illusion that it is embossed or debossed on the substrate surface.
Response	A message returned by the slave to the master after the processing of a command received by the slave.
Rivest, Shamir and Adleman (RSA)	Asymmetric algorithm invented by Ron Rivest, Adi Shamir and Len Adleman. It is used in public-key cryptography and is based on the fact that it is easy to multiply two large prime numbers together, but hard to factor them out of the product.
Score	A number on a scale from low to high, measuring the success that a biometric probe record (the person being searched for) matches a particular gallery record (a person previously enrolled).
Secure hash algorithm (SHA)	Hash function specified by NIST and published as a federal information processing standard FIPS-180.
Secured message	A message that is protected against illegal alteration or origination.
Secondary image	A repeat image of the holder's portrait reproduced elsewhere in the document by whatever means.
Security thread	A thin strip of plastic or other material embedded or partially embedded in the substrate during the paper manufacturing process. The strip may be metallized or partially de-metallized.

Term	Definition
See-through register (front-to-back)	See: front-to-back register.
Sensitive Data	Finger and iris image data stored in the LDS Data Groups 3 and 4, respectively. These data are considered to be more privacy sensitive than data stored in the other Data Groups.
Shadow Image	Used as a synonym to Ghost Image: A second representation of the holder's portrait on the document, reduced in contrast and/or saturation and/or size.
Sheet	The individual piece of substrate in a passport which comprises more than one passport page.
Size 1 machine readable official travel document (TD1)	A card with nominal dimensions guided by those specified for the ID-1 type card (ISO/IEC 7810) (excluding thickness).
Size 2 machine readable official travel document (TD2)	A card or label conforming with the dimensions defined for the ID-2 type card (ISO/IEC 7810) (excluding thickness).
Skimming	Electronically reading the data stored in the contactless IC without authorizing this reading of the document.
Small size (Format-B) machine readable visa (MRV-B)	An MRV conforming with the dimensional specifications contained in Doc 9303-7, sized to maintain a clear area on the passport visa page.
Steganography	An image or information encoded or concealed within a primary visual image.
Structure feature	A structure feature involves the incorporation of a measurable structure into or onto the MRTD. The presence of the structure may be detected and measured by the detection machine.
Substance feature	A substance feature involves the incorporation into the MRTD of a material which would not normally be present and is not obviously present on visual inspection. The presence of the material may be detected by the presence and magnitude of a suitable property of the added substance.
Symmetric algorithm	A type of cryptographic operation using the same key or set of keys for encryption of plain text and decryption of associated cipher text.
Synthetic	A non-paper based material used for the biographical data page or cards. The term "synthetic" is used synonymously for "plastic", which encompasses materials like polycarbonate, PET and similar materials and combinations thereof.
System	A specific IT installation, with a particular purpose and operational environment.
System integration	The process by which cardholder-facing, internal and partner-facing systems and applications are integrated with each other.

Term	Definition
System security policy	The set of laws, rules and practices that regulate how sensitive information and other resources are managed, protected and distributed within a specific system.
Tactile feature	A surface feature giving a distinctive "feel" to the document.
Taggant	A not-naturally occurring substance that can be added to the physical components of an MRTD, and is typically a Level 3 feature, requiring special equipment for detection.
Tagged ink	Inks containing compounds that are not naturally occurring substances and which can be detected using special equipment.
Tamper resistance	The capability of components within a document to withstand alteration.
Template/Reference template	Data which represent the biometric measurement of an enrollee used by a biometric system for comparison against subsequently submitted biometric samples.
Template size	The amount of computer memory taken up by the biometric data.
Thermochromic ink	An ink which undergoes a reversible colour change when the printed image is exposed to a specific change in temperature.
Threshold	A "benchmark" score above which the match between the stored biometric and the person is considered acceptable or below which it is considered unacceptable.
Trust Anchor	In cryptographic systems with hierarchical structure this is an authoritative entity for which trust is assumed and not derived.
Token image	A portrait of the holder of the MRTD, typically a full frontal image, which has been adjusted in size to ensure a fixed distance between the eyes. It may also have been slightly rotated to ensure that an imaginary horizontal line drawn between the centres of the eyes is parallel to the top edge of the portrait rectangle if this has not been achieved when the original portrait was taken or captured.
Usual Mark	Symbol that replaces a holder's written signature in case the holder is not able to sign.
UV dull substrate	A substrate that exhibits no visibly detectable fluorescence when illuminated with UV light.
Validation	The process of demonstrating that the system under consideration meets in all respects the specification of that system.
Variable laser image	A feature generated by laser engraving or laser perforation displaying changing information or images dependent upon the viewing angle.
Verification/verify	The process of comparing a submitted biometric sample against the biometric reference template of a single enrollee whose identity is being claimed, to determine whether it matches the enrollee's template. Contrast with "Identification".
Visual inspection zone (VIZ)	Those portions of the MRTD (data page in the case of MRP) designed for visual inspection, i.e. front and back (where applicable), not defined as the MRZ.
Watermark	A custom design, typically containing tonal gradation, formed in the paper or other substrate during its manufacture, created by the displacement of materials therein, and traditionally viewable by transmitted light.

Term	Definition
Wavelet Scalar Quantization (WSQ)	A means of compressing data used particularly in relation to the storage of fingerprint images.
Windowed or Transparent feature	Security feature created by the construction of the substrate, whereby part of the substrate is removed or replaced by transparent material, which can incorporate additional security features such as lenses or tactile elements.
X.509 v3 certificate	The internationally recognized electronic document used to prove identity and public key ownership over a communication network. It contains the issuer's name, user's identifying information, and issuer's digital signature.
Zone	An area containing a logical grouping of data elements on the MRTD. Seven (7) zones are defined for MRTDs.

4.3 Key Words

Key words are used to signify requirements.

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" used in capitalized form in Doc 9303 are to be interpreted as described in [RFC 2119]:

MUST	This word, or the terms "REQUIRED" or "SHALL", means that the definition is an absolute requirement of the specification.
MUST NOT	This phrase, or the phrase "SHALL NOT", means that the definition is an absolute prohibition of the specification.
SHOULD	This word, or the adjective "RECOMMENDED", means that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
SHOULD NOT	This phrase, or the phrase "NOT RECOMMENDED" means that there may exist valid reasons in particular circumstances when the particular behaviour is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behaviour described with this label.
MAY	This word, or the adjective "OPTIONAL", means that an item is truly optional. One user may choose to include the item because a particular application requires it or because the user feels that it enhances the application while another user may omit the same item. An implementation which does not include a particular option MUST be prepared to interoperate with another implementation which does include the option, though perhaps with reduced functionality. In the same vein an implementation which does include a particular option MUST be prepared to interoperate with another implementation which does not include the option (except, of course, for the feature the option provides).
CONDITIONAL	The usage of an item is dependent on the usage of other items. It is therefore further qualified under which conditions the item is REQUIRED or RECOMMENDED. This is an additional key word used in Doc 9303 (not part of RFC 2119).

Guidance in the use. Imperatives of the type defined here must be used with care and sparingly. In particular, they MUST be used only where it is actually required for interoperation or to limit behaviour which has potential for causing harm (e.g. limiting retransmissions). For example, they must not be used to try to impose a particular method on implementers where the method is not required for interoperability.

Security considerations. These terms are frequently used to specify behaviour with security implications. The effects on security of not implementing a MUST or SHOULD, or doing something the specification says MUST NOT or SHOULD NOT be done, may be very subtle. Document authors should take the time to elaborate the security implications of not following recommendations or requirements as most implementers will not have had the benefit of the experience and discussion that produced the specification.

In case OPTIONAL features are implemented, they MUST be implemented as described in Doc 9303.

4.4 Object Identifiers

In Parts 9303-10, 9303-11, and 9303-12 ICAO Object Identifiers are specified. This paragraph lists these actual ICAO Object Identifiers:

```
-- ICAO security framework
id-icao OBJECT IDENTIFIER ::= {2.23.136}

id-icao-mrtd OBJECT IDENTIFIER ::= {id-icao 1}

id-icao-mrtd-security OBJECT IDENTIFIER ::= {id-icao-mrtd 1}


-- LDS security object
id-icao-ldsSecurityObject OBJECT IDENTIFIER ::= {id-icao-mrtd-security 1}


-- CSCA master list
id-icao-cscaMasterList OBJECT IDENTIFIER ::= {id-icao-mrtd-security 2}

id-icao-cscaMasterListSigningKey OBJECT IDENTIFIER ::= {id-icao-mrtd-security
3}


-- Active Authentication protocol
id-icao-aaProtocolObject OBJECT IDENTIFIER ::= {id-icao-mrtd-security 5}


-- CSCA name change
id-icao-extensions OBJECT IDENTIFIER ::= {id-icao-mrtd-security 6}

id-icao-nameChange OBJECT IDENTIFIER ::= {id-icao-mrtd-security-extensions 1}


-- document type list, see TR "LDS and PKI Maintenance"
id-icao-documentTypeList OBJECT IDENTIFIER ::= {id-icao-mrtd-security-
extensions 2}
```

```
-- Deviation List Base Object identifiers
id-icao-DeviationList OBJECT IDENTIFIER ::= {id-icao-mrtd-security 7}

id-icao-DeviationListSigningKey OBJECT IDENTIFIER ::= {id-icao-mrtd-security 8}


-- Deviation Object Identifiers and Parameter Definitions
id-Deviation-CertOrKey OBJECT IDENTIFIER ::= {id-icao-DeviationList 1}

id-Deviation-CertOrKey-DSSignature OBJECT IDENTIFIER ::= {id-Deviation-
CertOrKey 1}

id-Deviation-CertOrKey-DSEncoding OBJECT IDENTIFIER ::= {id-Deviation-
CertOrKey 2}

id-Deviation-CertOrKey-CSCAEncoding OBJECT IDENTIFIER ::= {id-Deviation-
CertOrKey 3}

id-Deviation-CertOrKey-AAKeyCompromised OBJECT IDENTIFIER ::= {id-
Deviation-CertOrKey 4}

id-Deviation-LDS OBJECT IDENTIFIER ::= {id-icao-DeviationList 2}

id-Deviation-LDS-DGMalformed OBJECT IDENTIFIER ::= {id-Deviation-LDS 1}

id-Deviation-LDS-SODSignatureWrong OBJECT IDENTIFIER ::= {id-Deviation-LDS
3}

id-Deviation-LDS-COMInconsistent OBJECT IDENTIFIER ::= {id-Deviation-LDS 4}

id-Deviation-MRZ OBJECT IDENTIFIER ::= {id-icao-DeviationList 3}

id-Deviation-MRZ-WrongData OBJECT IDENTIFIER ::= {id-Deviation-MRZ 1}

id-Deviation-MRZ-WrongCheckDigit OBJECT IDENTIFIER ::= {id-Deviation-MRZ 2}

id-Deviation-Chip OBJECT IDENTIFIER ::= {id-icao-DeviationList 4}

id-Deviation-NationalUse OBJECT IDENTIFIER ::= {id-icao-DeviationList 5}


-- LDS2 Object Identifiers
id-icao-lds2 OBJECT IDENTIFIER ::= {id-icao-mrtd-security 9}

id-icao-tsSigner OBJECT IDENTIFIER ::= {id-icao-mrtd-security-lds2 1}

id-icao-vSigner OBJECT IDENTIFIER ::= {id-icao-mrtd-security-lds2 2}

id-icao-bSigner OBJECT IDENTIFIER ::= {id-icao-mrtd-security-lds2 3}
```

```
-- SPOC Object Identifiers
id-icao-spoc OBJECT IDENTIFIER ::= {id-icao-mrtd-security 10}

id-icao-spocClient OBJECT IDENTIFIER ::= {id-icao-mrtd-security-spoc 1}

id-icao-spocServer OBJECT IDENTIFIER ::= {id-icao-mrtd-security-spoc 2}
```

4.5 The Use of Notes

While in ISO/IEC standards notes are informative, in Doc 9303 notes are part of the normative text and used to emphasize requirements or additional information.

5. GUIDANCE ON THE USE OF DOC 9303

5.1 Doc 9303 Composition

Doc 9303 is comprised of twelve parts. Each part describes a specific aspect of the MRTD. The parts of Doc 9303 are composed in such way that the issuer of MRTDs can compose a complete set of relevant specifications, relevant to a specific type of MRTD (form factor). The relationship between these form factors and the parts of Doc 9303 is described in Section 5.2 of this Part 1.

The following parts form the complete Doc 9303 specifications for Machine Readable Travel Documents:

Part 1 — Introduction
The document at hand is Part 1.

Part 2 — Specifications for the Security of the Design, Manufacture and Issuance of MRTDs
Part 2 provides mandatory and optional specifications for the precautions to be taken by travel document issuing authorities to ensure that their MRTDs, and their means of personalization and issuance to the rightful holders, are secure against fraudulent attack. Mandatory and optional specifications are also provided for the physical security to be provided at the premises where the MRTDs are produced, personalized and issued and for the vetting of personnel involved in these operations.

Part 3 — Specifications common to all MRTDs
Part 3 of Doc 9303 is based on the Sixth Edition of Doc 9303, Part 1, Volume 1, *Machine Readable Passports – Passports with Machine Readable Data Stored in Optical Character Recognition Format* (2006) and the Third Edition of Doc 9303, Part 3, Volume 1, *Machine Readable Official Travel Documents – MRtds with Machine Readable Data Stored in Optical Character Recognition Format* (2008).

Part 3 defines specifications that are common to TD1, TD2 and TD3 size Machine Readable Travel Documents (MRTDs) including those necessary for global interoperability using visual inspection and machine readable (optical character recognition) means. Detailed specifications applicable to each document type appear in Doc 9303, Parts 4 through 7.

Part 4 — Specifications for Machine Readable Passports (MRPs) and other TD3 size MRTDs
Part 4 defines specifications that are specific to TD3 size Machine Readable Passports (MRPs) and other TD3 size Machine Readable Travel Documents (MRTDs). For brevity, the term MRP has been used throughout Part 4 and, except where stated, all the specifications herein shall apply equally to all other TD3 size MRTDs.

Part 5 — Specifications for TD1 size Machine Readable Official Travel Documents (MROTDs)
Part 5 defines specifications that are specific to TD1 size Machine Readable Official Travel Documents (MROTDs).

Part 6 — Specifications for TD2 size Machine Readable Official Travel Documents (MROTDs)
Part 6 defines specifications that are specific to TD2 size Machine Readable Official Travel Documents (MROTDs).

Part 7 — Machine Readable Visas
Part 7 defines the specifications for Machine Readable Visas (MRVs) which allow compatibility and global interchange using both visual (eye readable) and machine readable means. The specifications for visas can, where issued by a State and accepted by a receiving State, be used for travel purposes. The MRV shall, as a minimum, contain the data specified in a form that is legible both visually and by optical character recognition methods, as presented in Part 7.

Part 7 contains specifications for both Format-A as well as Format-B types of visas, and is based on the Third Edition of Doc 9303, Part 2, *Machine Readable Visas* (2005).

Part 8 — Emergency Travel Documents
Reserved for future use.

Part 9 —Deployment of Biometric Identification and Electronic Storage of Data in MRTDs
Part 9 defines the specifications, additional to those for the basic MRTD set forth in Parts 3, 4, 5, 6, and 7 of Doc 9303, to be used by States wishing to issue an electronic Machine Readable Travel Document (eMRTD) capable of being used by any suitably equipped receiving State to read from the document a greatly increased amount of data relating to the eMRTD itself and its holder. This includes mandatory globally interoperable biometric data that can be used as an input to facial recognition systems, and, optionally, to fingerprint or iris recognition systems. The specifications require the globally interoperable biometric data to be stored in the form of high-resolution images.

Part 10 — Logical Data Structure (LDS) for Storage of Biometrics and Other Data in the Contactless Integrated Circuit (IC)
Part 10 defines a Logical Data Structure (LDS) for eMRTDs required for global interoperability. The contactless integrated circuit capacity expansion technology contained in an eMRTD selected by an issuing State or organization SHALL allow data to be accessible by receiving States. Part 10 defines the specifications for the standardized organization of these data. This requires the identification of all mandatory and optional Data Elements and a prescriptive ordering and/or grouping of Data Elements that SHALL be followed to achieve global interoperability for reading of details (Data Elements) recorded in the capacity expansion technology optionally included on an MRTD (eMRTD).

Part 11 — Security Mechanisms for MRTDs
Part 11 provides specifications to enable States and suppliers to implement cryptographic security features for Machine Readable Travel Documents (eMRTDs) offering ICC read-only access.

Part 11 specifies cryptographic protocols to:

- prevent skimming of data from the contactless IC;
- prevent eavesdropping on the communication between the IC and reader;
- provide authentication of the data stored on the IC based on the PKI described in Part 12, and provide authentication of the IC itself.

Part 12 — Public Key Infrastructure for MRTDs
Part 12 defines the Public Key Infrastructure (PKI) for the eMRTD application. Requirements for issuing States or organizations are specified, including operation of a Certification Authority (CA) that issues certificates and CRLs. Requirements for receiving States and their Inspection Systems validating those certificates and CRLs are also specified.

5.2 Relationship between MRTD Form Factors and relevant Doc 9303 Parts

Table 1-1 describes which parts of Doc 9303 are relevant for specific types of MRTDs (form factors).

Table 1-1. Form factors cross-reference table

	Doc 9303 Part											
	1	2	3	4	5	6	7	8	9	10	11	12
TD3 size MRTD (MRP)	√	√	√	√								
TD3 size eMRTD (eMRP)	√	√	√	√					√	√	√	√
TD1 size MROTD	√	√	√		√							
TD1 size eMROTD	√	√	√		√				√	√	√	√
TD2 size MROTD	√	√	√			√						
TD2 size eMROTD	√	√	√			√			√	√	√	√
MRV	√	√	√				√					

6. REFERENCES (NORMATIVE)

Certain provisions of international Standards, referenced in this text, constitute provisions of Doc 9303. Where differences exist between the specifications contained in Doc 9303 and the referenced Standards, to accommodate specific construction requirements for machine readable travel documents, including machine readable visas, the specifications contained herein shall prevail.

Annex 9 Convention on International Civil Aviation ("Chicago Convention"), Annex 9 – *Facilitation.*

RFC 2119 RFC 2119, S. Bradner, "Key Words for Use in RFCs to Indicate Requirement Levels", BCP 14, RFC2119, March 1997.

— END —


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Doc 9303

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Seventh Edition, 2015

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AMENDMENTS

Amendments are announced in the supplements to the *Products and Services Catalogue;* the Catalogue and its supplements are available on the ICAO website at www.icao.int. The space below is provided to keep a record of such amendments.

RECORD OF AMENDMENTS AND CORRIGENDA

AMENDMENTS		
No.	Date	Entered by

CORRIGENDA		
No.	Date	Entered by

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TABLE OF CONTENTS

1. SCOPE

The Seventh Edition of Doc 9303 represents a restructuring of the ICAO specifications for Machine Readable Travel Documents. Without incorporating substantial modifications to the specifications, in this new edition Doc 9303 has been reformatted into a set of specifications for Size 1 Machine Readable Official Travel Documents (TD1), Size 2 Machine Readable Official Travel Documents (TD2), and Size 3 Machine Readable Travel Documents (TD3), as well as visas. This set of specifications consists of various separate documents in which general (applicable to all MRTDs) as well as MRTD form factor specific specifications are grouped.

This Part 4 of Doc 9303 is based on the Sixth Edition of Doc 9303, Part 1, *Machine Readable Passports*, Volume.1 (2006).

Doc 9303, Part 4 defines specifications that are specific to TD3 size Machine Readable Passports (MRPs) and other TD3 size Machine Readable Travel Documents (MRTDs). For brevity the term MRP has been used throughout this document and, except where stated, all the specifications herein shall apply equally to all other TD3 size MRTDs. This document should be read in conjunction with:

- Part 1 — *Introduction*;
- Part 2 — *Specifications for the Security of the Design, Manufacture and Issuance of MRTDs*;
- Part 3 — *Specifications Common to all MRTDs*.

Together these specifications provide for global data interchange of MRTDs both by visual (eye readable) and machine readable (optical character recognition) means.

Additional specifications providing for global data interchange of electronic data in eMRPs and eMROTDs can be found in Doc 9303, Parts 9 through 12.

2. CONSTRUCTION AND DIMENSIONS OF THE MRP AND MRP DATA PAGE

2.1 Construction

The MRP shall take the form of a book consisting of a cover and a minimum of eight pages and shall include a data page onto which the issuing State or organization enters the personal data relating to the holder of the document and data concerning the issuance and validity of the MRP.

2.2 MRP Data Page Nominal Dimensions

The nominal dimensions shall be as specified in ISO/IEC 7810 (except thickness) for the TD3 size MRTD, i.e.:

88.0 mm ± 0.75 mm × 125.0 mm ± 0.75 mm (3.46 in ± 0.03 in × 4.92 in ± 0.03 in).

2.3 MRP Data Page Edge Tolerances

The edges of the data page following final preparation shall be within the area circumscribed by the concentric rectangles as illustrated in Figure 1.

Inner rectangle: 87.25 mm × 124.25 mm (3.44 in × 4.89 in)
Outer rectangle: 88.75 mm × 125.75 mm (3.49 in × 4.95 in)

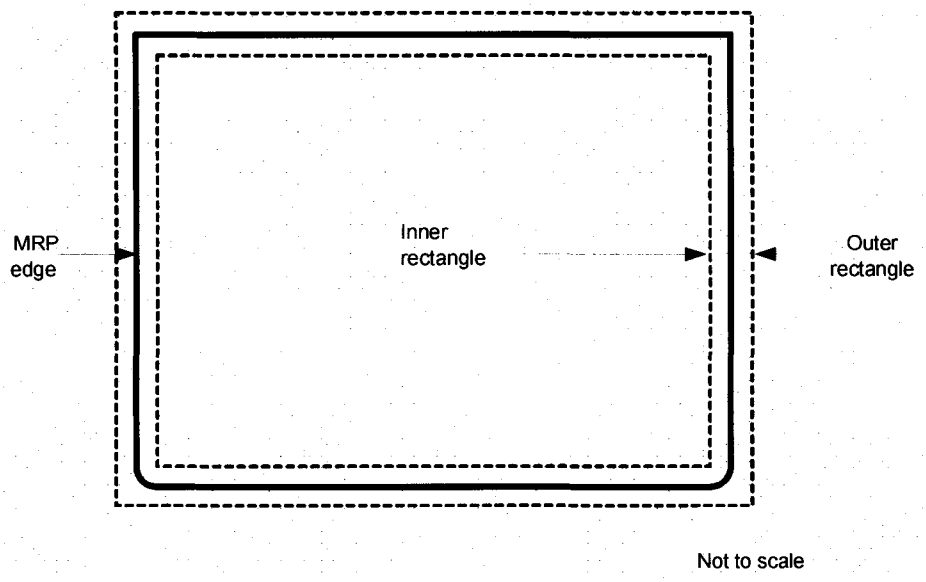


Figure 1. MRP data page dimensional illustration

2.4 MRP Data Page Margins

The dimensional specifications refer to the outer limits of the MRP data page. A margin of 2.0 mm (0.08 in) along the left and right hand edges and top edge must be left clear of data, as shown in Figure 2. The position of data in the machine readable zone is as shown in Figure 3.

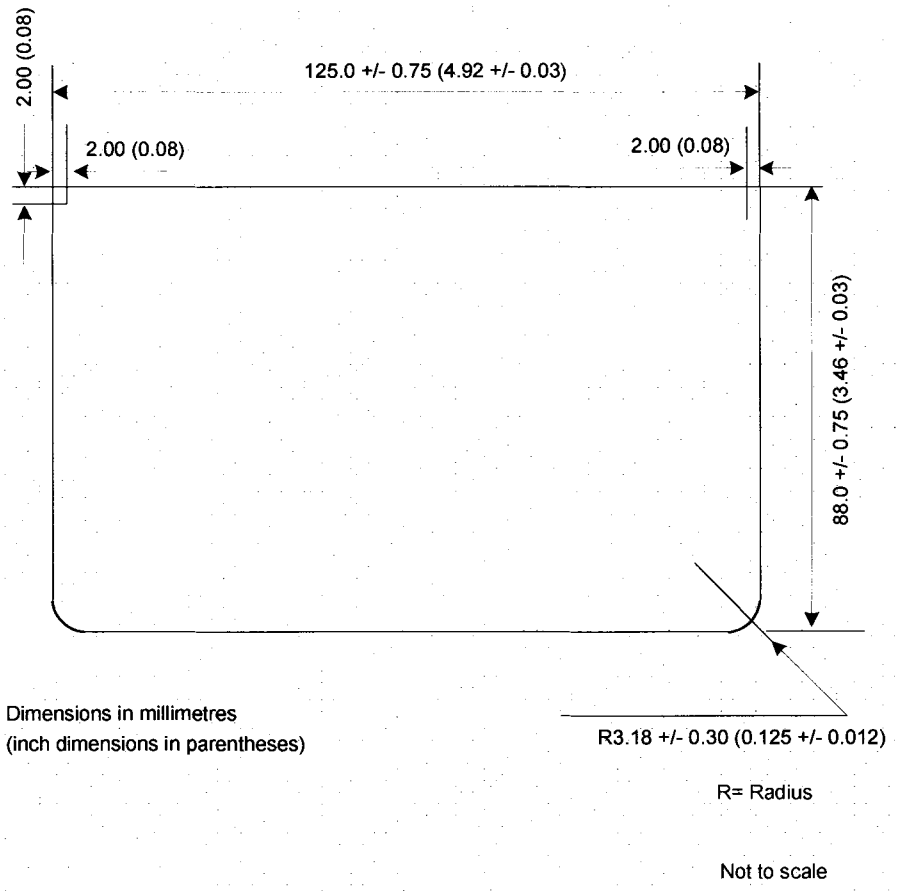


Figure 2. Edge margins of the MRP data page

2.5 MRP Data Page Thickness

The thickness, including any final preparation (e.g. laminate), shall be as follows:

- Minimum:

No minimum thickness is specified. However, States are advised that currently available materials are unlikely to provide an adequately robust data page if the thickness is below 0.15 mm (0.006 in);

- Maximum:

0.90 mm (0.035 in).

The thickness of the area within the machine readable zone shall not vary by more than 0.10 mm (0.004 in).

General note.— The decimal notation in these specifications conforms to ICAO practice. This differs from the ISO practice, which is to use a decimal point (.) in imperial measurements and a comma (,) in metric measurements.

2.6 MRP Dimensions

The dimensional specifications defined in Paragraphs 2.2 to 2.3 above also apply to the MRP book. If required for binding purposes, the 88.0 mm (3.46 in) dimension may be increased.

3. GENERAL LAYOUT OF THE MRP DATA PAGE

The MRP data page follows a standardized layout to facilitate reading of data globally by visual and machine readable means.

The MRP data page should either be an inner page in close proximity to an end leaf of the MRP or form part of the cover of the MRP. Where the MRP data page is part of the cover, precautions must be taken to ensure that the endleaf/cover assembly combined with the means of personalization are together resistant to fraudulent attack, particularly by delamination of the cover structure. Where the MRP data page is not constructed as part of the cover, the recommended practice is to locate the MRP data page on page 2 or on the penultimate page of the MRP. The location of the MRP data page in any other position in the MRP will give rise to problems for document examiners in the operation of swipe readers reading the MRZ. The MRZ shall be positioned adjacent to the outside long edge of the book, parallel to the spine of the book (see Figures 3 and 4).

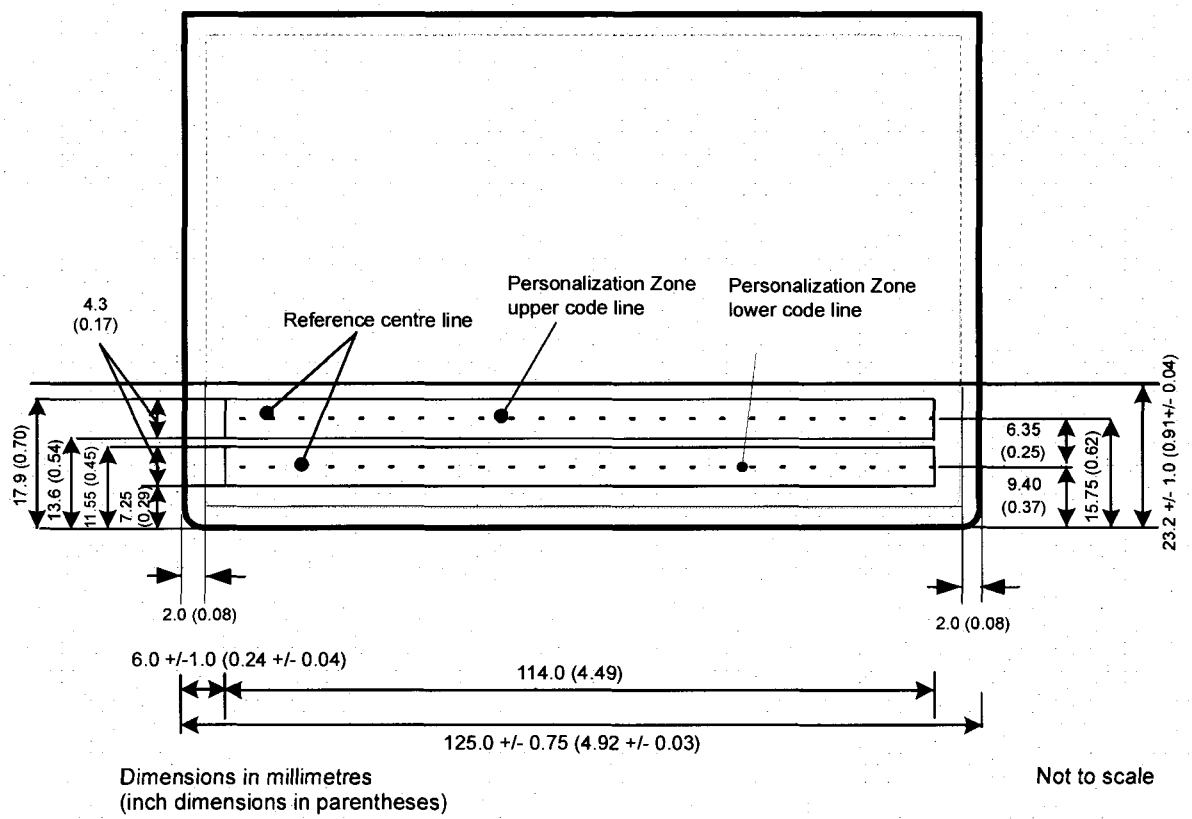


Figure 3. Schematic diagram of the Machine Readable Zone (MRZ)

3.1 MRP Zones

To accommodate the various requirements of States' laws and practices and to achieve the maximum standardization within those divergent requirements, the MRP data page is divided into seven zones as follows:

3.1.1 Front of MRP data page

Zone I	Mandatory header
Zone II	Mandatory and optional personal data elements
Zone III	Mandatory and optional document data elements
Zone IV	Mandatory holder's signature or usual mark (original or reproduction)
Zone V	Mandatory identification feature
Zone VII	Mandatory machine readable zone (MRZ)

3.1.2 Back of MRP data page, or an adjacent page

Zone VI	Optional data elements

3.2 Content and Use of Zones

Zones I to V, which, together with Zone VI, form the Visual Inspection Zone (VIZ), and Zone VII, which is the Machine Readable Zone (MRZ), contain mandatory elements in a standard sequence which represent the minimum requirements for the MRP data page. The optional elements in Zones II, III and VI accommodate the diverse requirements of issuing States or organizations, allowing for presentation of additional data at the discretion of the issuing State or organization, while achieving the desired level of standardization. The location of zones and standard sequence for data elements are set out in Figure 4. The technical specifications for the printing of data on the MRP data page are defined in Section 4. Figures 8, 9 and 10 outline the guidelines for positioning and adjusting the dimensional specifications of Zones I to V to accommodate the flexibility desired by issuing States or organizations. Some examples of personalized MRP data pages are shown in Appendix A.

3.2.1 Zone IV — Location of holder's signature or usual mark

Field 18, the holder's signature or usual mark (or a reproduction thereof), shall normally be placed in Zone IV of the MRP data page (see Figure 4). Where the issuing State or organization wishes to locate the holder's signature or usual mark on a page other than the MRP data page, it may, as specified in the Data Element Directory, relocate Field 18 to Zone VI on the back of the MRP data page or to the page adjacent to the MRP data page. In this case, the size of adjacent fields in the visual zone on the MRP data page may be increased.

3.2.2 Zone V — Position of holder's portrait

Within Zone V, the holder's portrait shall be at least 2.0 mm (0.08 in) from the left-hand edge of the MRP data page. The use of affixed or stick-on portrait photos is not permitted and these shall not be used. Instead, the portrait image shall be integrated with the biodata page using a secure personalization technology.

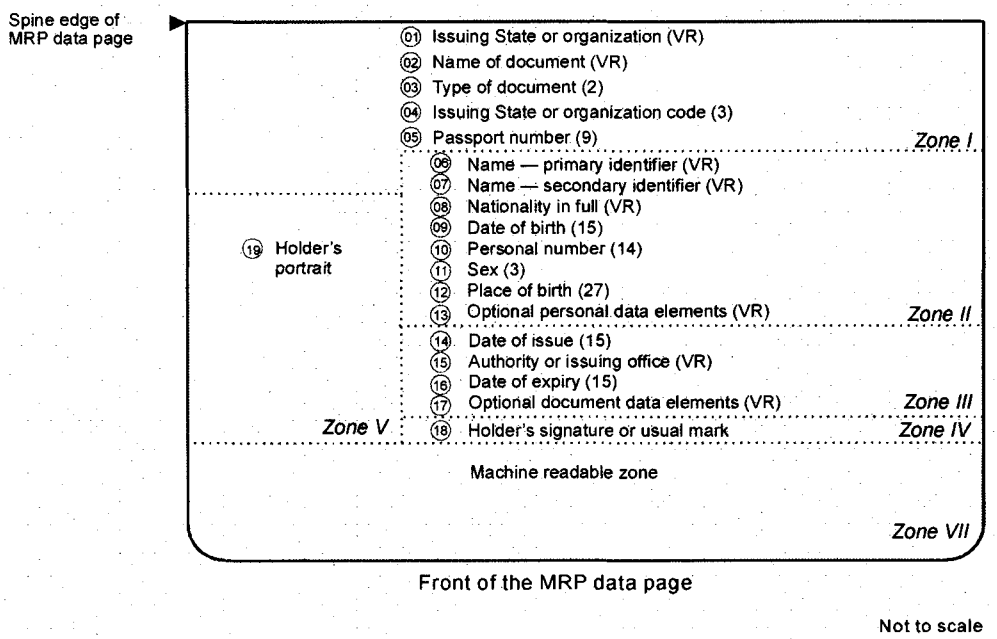


Figure 4. Sequence of data elements on front side of MRP data page

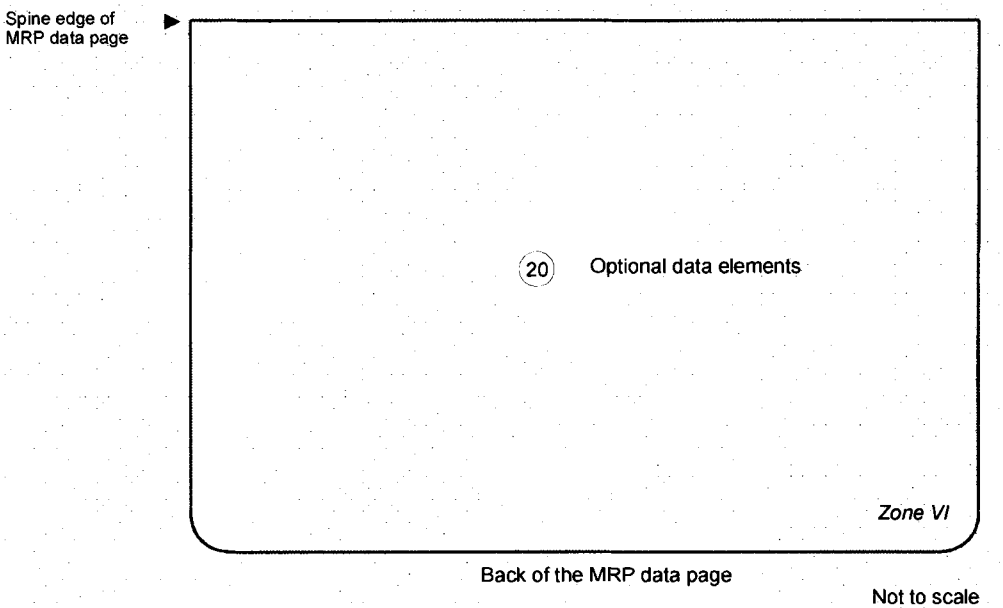


Figure 5. Data elements on reverse side

Notes to Figures 4 and 5:
Note 1.— (VR) = variable number of characters in field.
Note 2.— (n) = the maximum or fixed number of characters allowed in the field.
Note 3.— O = indicates the field number.

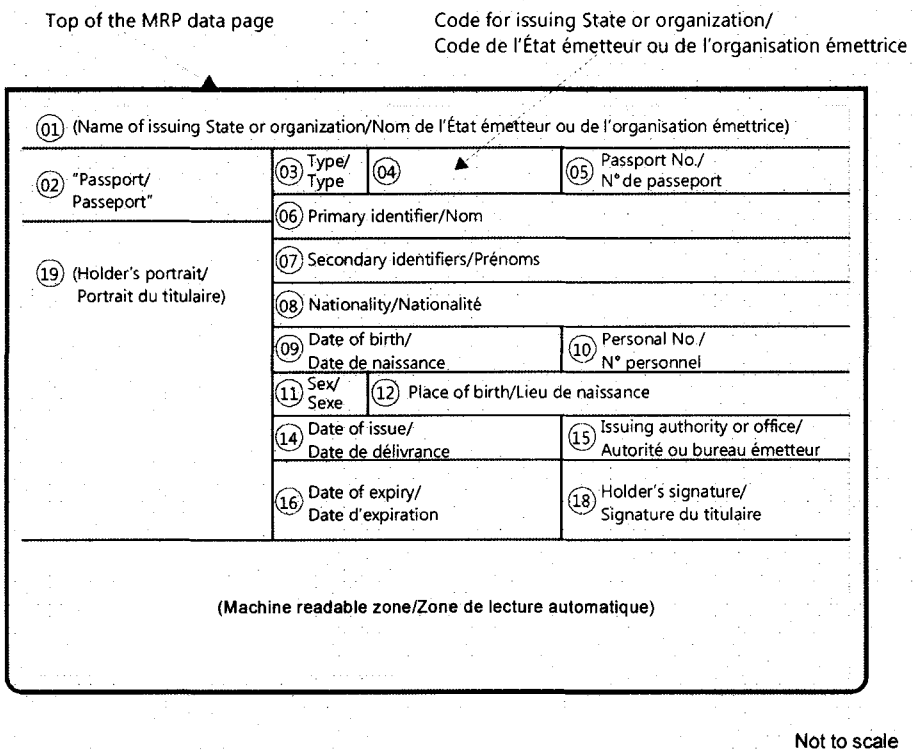
3.2.3 Data elements

The data elements to be included in the zones, the preparation of the zones and guidelines for the dimensional layout of zones shall be as described in Section 4 of this Part.

3.2.4 Mandatory zones

The MRP data page shall contain Zones I, II, III, V and VII. If the issuing State or organization's practice is to omit mandatory elements 01 and 02 (issuing State or organization, in full, and document, in full) from the header (Zone I), these data elements shall be placed on an adjacent or preceding page.

Zone IV shall be present either on the data page or on an adjacent page and contain the holder's signature or usual mark, i.e. original or reproduction. Alternatively, at the discretion of the issuing State or organization, the holder's signature may be located in Zone VI on the reverse side of the MRP data page. Zone V shall include the personal identification feature(s) which shall include a portrait solely of the rightful holder. At the discretion of the issuing State or organization, the name fields in Zone II and the holder's signature or usual mark in Zone IV may overlay Zone V provided this does not hinder recognition of the data in any of the three zones.



Note 1.— Optional data Fields 13 and 17 are excluded in the recommended practice.
Note 2.— Captions corresponding to the field names printed in the above illustration, except those within parentheses, shall be printed on the MRP data page.

Figure 6. Schematic of nominal layout of data elements

Data elements shall appear in a standard sequence as shown in Figures 4 and 5. Figure 6 is a schematic of the nominal layout of data elements on the front side of an MRP data page, and Figure 7 is a template for the position of the personalized data fields.

The dimensions and boundaries of Zone VII, the machine readable zone, are fixed. Zone VII conforms in height to the MRZ defined for all MRTDs so that the machine readable data lines fall within the effective reading zone (ERZ) specified in Doc 9303-3.

MRZ (Zone VII) data elements shall be as defined in Paragraph 4.2.2 and illustrated in Appendix B, Figure 15.

3.2.5 Optional data zone

Zone VI, which may be on the back of the data page or on an adjacent page, is a zone for optional data for use at the discretion of the issuing State or organization.

A template for the layout of personalized data elements on the front side of an MRP data page is shown in Figure 7.

3.3 Dimensional Flexibility of Zones I to V

Zones I to V may be adjusted in size and shape within the overall dimensional specifications of the MRP data page to accommodate the diverse requirements of issuing States or organizations. All zones, however, shall be bounded by straight lines, and all angles where straight lines join shall be right angles (i.e. 90 degrees). It is recommended that the zone boundaries not be printed on the MRP data page. The nominal position of the zones is shown in Figure 8.

When an issuing State or organization chooses to produce an MRP data page that contains a transparent or otherwise unprintable border, this will result in a reduction of the available area within the zones. The full MRP data page dimensions and zone boundaries shall be measured from the outside edge of this border, which is the external edge of the MRP data page.

Zone I shall be located along the top edge of the MRP data page and extend across the full 125.0 ± 0.75 mm (4.92 ± 0.03 in) dimension. (The top edge is the edge coincident with the spine of the MRP.) The issuing State or organization may vary the *vertical* dimension of Zone I, as required, but this dimension shall be sufficient to allow legible interpretation of the data elements in the zone and shall not be greater than 17.9 mm (0.70 in).

Zone V shall be located such that its left edge is coincident with the left edge of the MRP data page as shown in Figure 8. The dimensions of the portrait contained in Zone V are specified in Section 4.1.1.1, the Visual Data Element Directory, Field 19.

Zone V may move *vertically* along the left edge of the MRP data page and overlay a portion of Zone I as long as individual details contained in either zone are not obscured.

The upper boundary of Zone II shall be coincident with the lower boundary of Zone I.

When there is a specific requirement for the name fields to extend across the MRP data page, Zone II may extend up to the full 125.0 ± 0.75 mm (4.92 ± 0.03 in) dimension of the MRP data page. If the full dimension is used, Zone II shall overlay a portion of Zone V. In this case, issuing States or organizations shall ensure that data contained in either zone is not obscured.

The lower boundary of Zone II may be positioned at the discretion of the issuing State or organization. Enough space must be left for Zones III and IV below the boundary. This boundary does not need to be straight across the 125.0 ± 0.75 mm (4.92 ± 0.03 in) dimension of the MRP data page. This is illustrated in Figure 9.

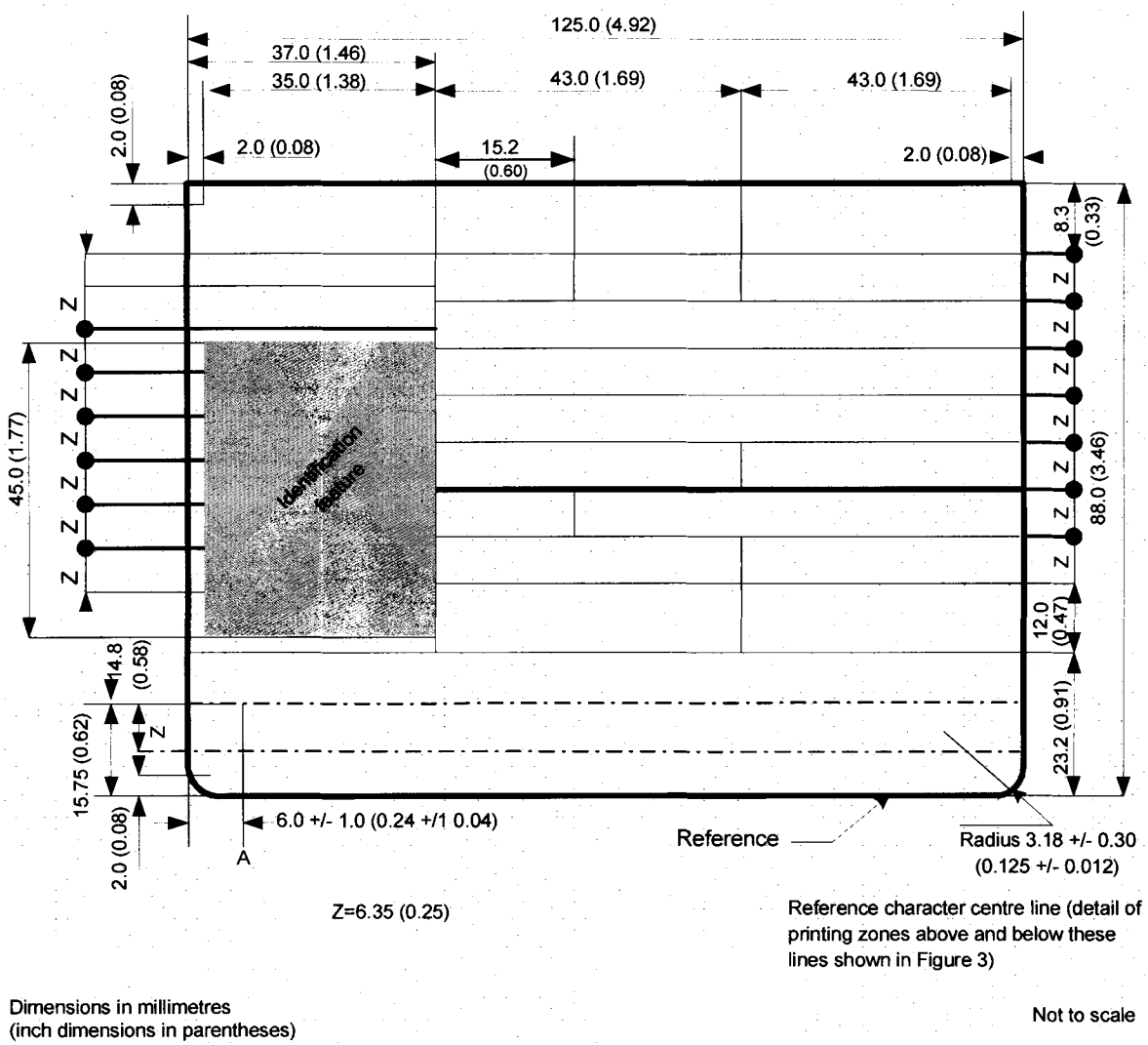


Figure 7. Template for the personalization data fields

Note 1.— To allow for variations during manufacture of the MRP, a tolerance of ± 1.0 mm (± 0.04 in) is allowed for the 23.2 mm (0.91 in) dimension of the MRZ and within that overall tolerance the boundary between the VIZ and the MRZ shall not be skewed more than 0.5 mm (0.02 in) over the 125.0 mm (4.92 in) dimension.

Note 2.— 'A' — There shall be no text to the left of this line in the MRZ.

Note 3.— Except for background security print there shall be no print in the 2.0 mm (0.08 in) margins.

Note 4.— The borderlines of the fields shall be omitted on the actual MRP data page.

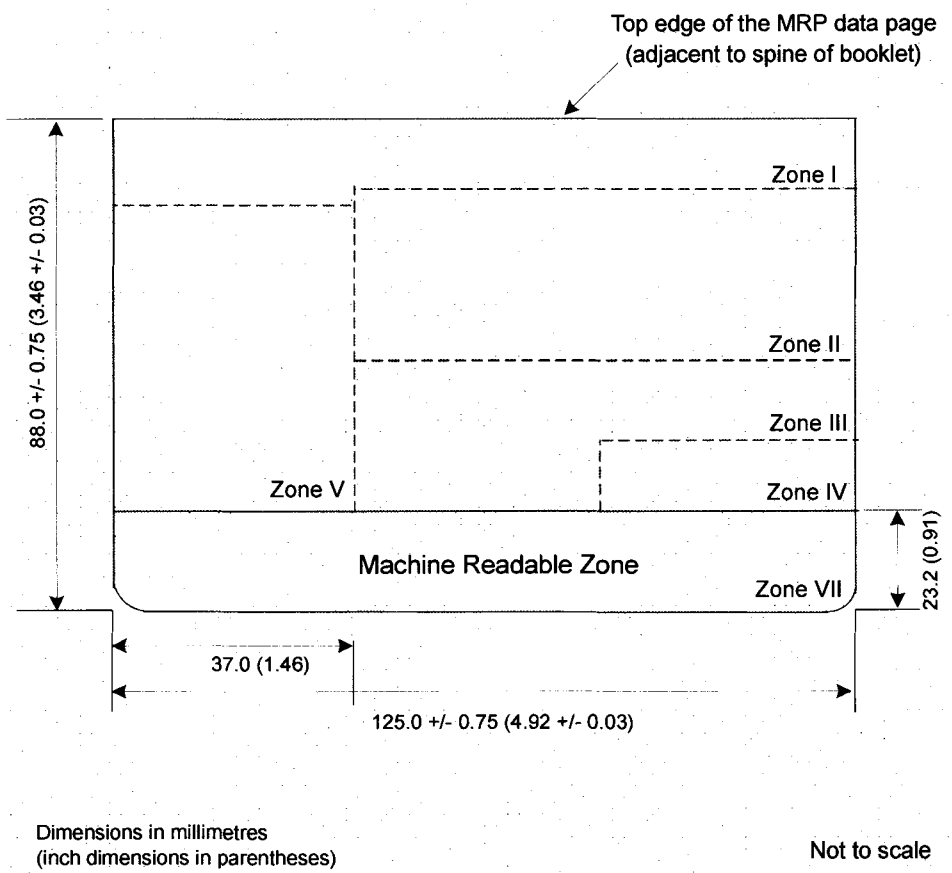


Figure 8. Nominal positions of Zones I-V

Note 1.— Dotted lines indicate zone boundaries whose positions are not fixed, enabling issuing States or organizations flexibility in the presentation of data. See paragraph 3.3.

Note 2.— Zone VI, where used, appears on the back of the data page or on an adjacent page.

Zone III should start at the right vertical boundary of Zone V and may extend, at the discretion of the issuing State or organization, to the right edge of the MRP data page. Figures 9 and 10 illustrate the flexibility permitted to issuing States or organizations.

If Zone IV is placed on the MRP data page, it shall be at the bottom of the VIZ on the front of the MRP data page, its lower boundary coincident with the top edge of the MRZ. Figures 8 and 9 show two alternative positions for Zone IV. Figure 10 shows an MRP data page where Zone IV has been placed on an adjacent page.

Zone IV may also overlay Zone V, though this practice is not recommended. In this case, issuing States or organizations shall ensure that individual details contained in either zone are not obscured. See Appendix A, Figure 13.

When an issuing State or organization wishes to have a displayed image of an MRP holder's fingerprint, the image may be displayed within the area designated for Zone II as illustrated in Appendix A, Figure 14.

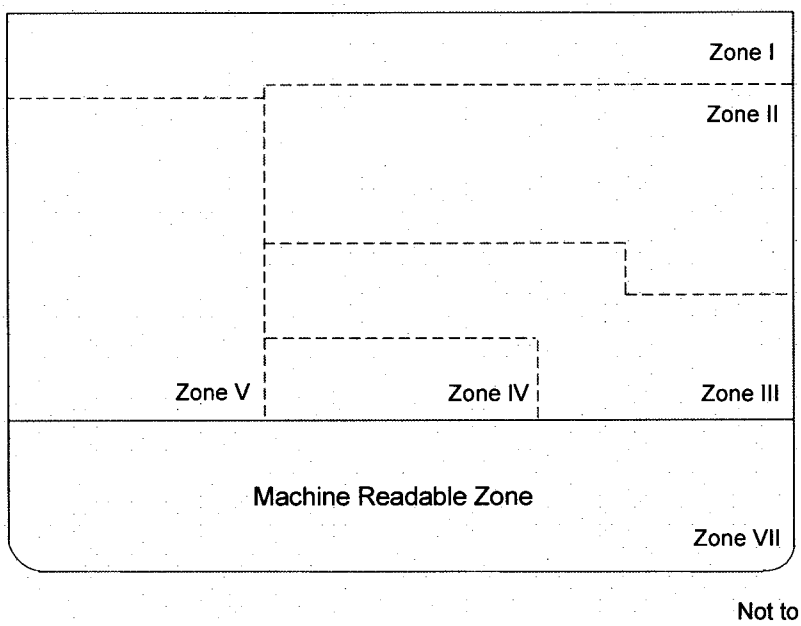


Figure 9. Example of flexible positioning of zones illustrating a staircase boundary between Zones II and III

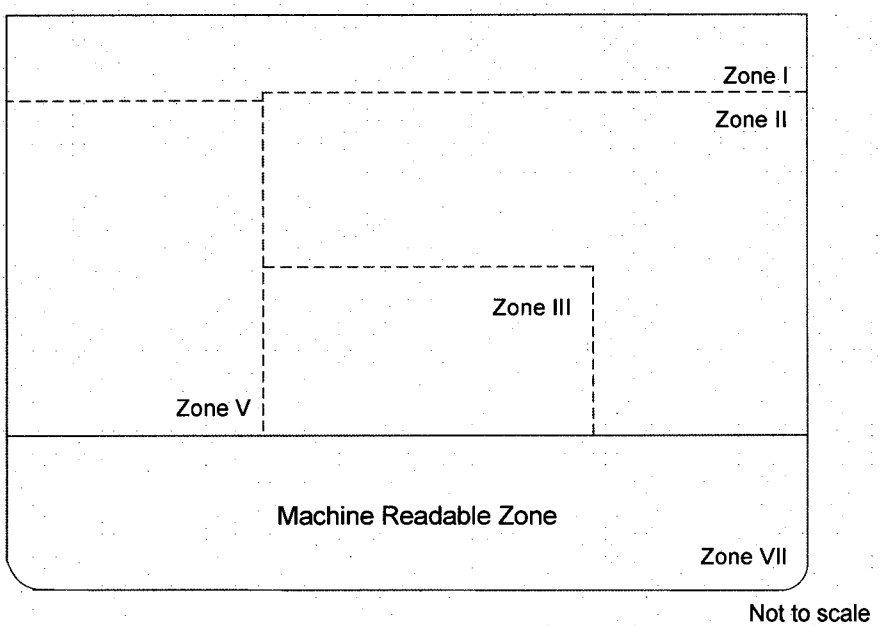


Figure 10. Example of flexible positioning of zones in which Zone IV (signature) is moved to an adjacent page and Zone III positioned such that it does not extend to the right-hand edge of the data page

4. CONTENTS OF THE MRP DATA PAGE

4.1 Visual Inspection Zone (VIZ) (Zones I through VI)

Guidance on the typeface, size and line spacing, the languages and character set, to be used in the VIZ may be found in Doc 9303-3.

If any optional field or data element is not used, the data may be spread more evenly in the visual zone of the MRP data page consistent with the requirement for sequencing zones and data elements.

4.1.1 Data element directory

The data elements in the VIZ are specified as follows:

4.1.1.1 Visual inspection zone — Data element directory

Field/ zone no.	*Data element*	*Specifications*	*Maximum no. of character positions*	*References and notes**
01/I (Mandatory)	Issuing State or organization (in full)	The name of the State or organization responsible for issuing the MRP shall be displayed in full. For additional details see Doc 9303-3.	Variable	Notes a, c, d, f, g. If omitted, shall appear on an adjacent or preceding page in the passport.
02/I (Mandatory)	Document	The word for "passport" in the language of the issuing State or organization, plus either PASSPORT (English), PASSEPORT (French) or PASAPORTE (Spanish) if the language of the issuing State or organization is not English, French or Spanish. For additional details see Doc 9303-3.	Variable	Notes a, c, d, g, m, n. If omitted, shall appear on an adjacent or preceding page in the passport.
03/I (Mandatory)	Document code	Capital letter P to designate an MRP. One additional capital letter may be used, in the character position after the letter P and at the discretion of the issuing State or organization, to designate other types of passports such as MRP issued to diplomatic staff,	2	Notes a, g, l, m.

Field/ zone no.	*Data element*	*Specifications*	*Maximum no. of character positions*	*References and notes**
		an MRP issued for travel on government business, or a passport issued for a special purpose.		
04/I (Mandatory)	Issuing State or organization (in code)	As abbreviated in the three-letter code specified in Doc 9303-3.	3 Fixed	Notes a, f, l.
05/I (Mandatory)	Passport Number	As given by the issuing State or organization to uniquely identify the document from all other MRTDs issued by the State or organization. For additional details see Doc 9303-3.	9	Notes a, b, c, g, l.
06/07/II (Mandatory)	Name	The full name of the holder, as identified by the issuing State or organization. For additional details see Doc 9303-3.	Variable	Notes a, c, g, k, l.
06/II (Mandatory)	Primary Identifier	Predominant component(s) of the name of the holder as described in Doc 9303-3. In cases where the predominant component(s) of the name of the holder (e.g. where this consists of composite names) cannot be shown in full or in the same order, owing to space limitations of Field(s) 06 and/or 07 or national practice, the most important component(s) (as determined by the State or organization) of the primary identifier shall be inserted.	Variable	Notes a, c, g, k, l.
07/II (Mandatory)	Secondary Identifier	Secondary component(s) of the name of the holder as described in Doc 9303-3. The most important component(s) (as determined by the State or organization) of the secondary identifier of the holder shall be inserted in full, up to the maximum dimensions of the field frame. Other components, where necessary, may be	Variable	Notes a, c, k, g, l.

Field/ zone no.	Data element	Specifications	Maximum no. of character positions	References and notes*
		represented by initials. Where the holder's name has only predominant component(s), this data field shall be left blank. A State may optionally utilize the whole zone comprising Fields 06 and 07 as a single field. In such a case, the primary identifier shall be placed first, followed by a comma and a space, followed by the secondary identifier.		
08/II (Mandatory)	Nationality	For details see Doc 9303-3.	Variable	Notes a, c, f, g, l, o.
09/II (Mandatory)	Date of birth	Holder's date of birth as recorded by the issuing State or organization. If the date of birth is unknown, see Doc 9303-3 for guidance.	Variable	Notes a, b, c, g, l.
10/II (Optional)	Personal number	Field optionally used for personal identification number given to holder by the issuing State or organization. For additional details see Doc 9303-3.	Variable	Notes a, b, c, e, g.
11/II (Mandatory)	Sex	Sex of the holder, to be specified by use of the single initial commonly used in the language of the State where the document is issued and, if translation into English, French or Spanish is necessary, followed by an oblique and the capital letter F for female, M for male, or X for unspecified.	3	Notes a, c, g, l.
12/II (Optional element in mandatory zone)	Place of birth	Field optionally used for city and State of the holder's birthplace. Refer to Doc 9303-3 for further details.	Variable	Notes a, c, e, f, g.

Field/ zone no.	*Data element*	*Specifications*	*Maximum no. of character positions*	*References and notes**
13/II (Optional element in mandatory zone)	Optional personal data elements	Optional personal data elements e.g. personal identification number or fingerprint, at the discretion of the issuing State or organization. If a fingerprint is included in this field, it should be presented as a 1:1 representation of the original. If a date is included it shall follow the form of presentation described in Doc 9303-3.	Variable	Notes a, b, c, e, g, i.
14/III (Mandatory)	Date of issue	For details see Doc 9303-3.	Variable	Notes a, b, c, g, i, l.
15/III (Mandatory)	Authority or issuing organization	Authority or issuing organization for the MRP. This field shall be used to indicate the issuing authority or issuing organization and, optionally, its location, which may be personalized within this field. For additional details see Doc 9303-3.	Variable	Notes a, b, c, f, g, j, l.
16/III (Mandatory)	Date of expiry	Date of expiry of the MRP. For additional details see Doc 9303-3.	Variable	Notes a, b, c, g, l.
17/III Optional element in mandatory zone	Optional document data elements	Optional data elements relating to the document. For additional details see Doc 9303-3.	Variable	Notes a, b, c, e, g.
18/IV (Mandatory)	Holder's signature or usual mark	At the discretion of the issuing State or organization, the signature or usual mark may be located in Zone VI. The size of the field to be allocated to the signature or usual mark on the adjoining page shall be at the discretion of the issuing State or organization, subject to the overall dimensional limits of the MRP. For additional details see Doc 9303-3.	Variable	Notes e, j.

Field/ zone no.	*Data element*	*Specifications*	*Maximum no. of character positions*	*References and notes**
19/V (Mandatory)	Identification feature	This field shall contain a portrait of the holder. The portrait shall not be larger than 45.0 mm x 35.0 mm (1.77 in x 1.38 in) nor smaller than 32.0 mm x 26.0 mm (1.26 in x 1.02 in). The position of the field concerned shall be aligned to the left of Zones II, III and IV. See Doc 9303-3 for additional specifications for the portrait.		Note d.
20/VI (Optional)	Optional data elements	Additional optional data elements at the discretion of the issuing State or organization. For additional details see Doc 9303-3.		Notes a, b, c, e, g, i.

* Notes can be found following paragraph 4.2.2.2.

4.2 Machine Readable Zone (MRZ) (Zone VII)

4.2.1 Data position, data elements and print position in the MRZ

4.2.1.1 Data position

The MRZ is located on the front of the MRP data page. Figure 3 defines the location of the MRZ and the nominal position of the data therein.

4.2.1.2 Data elements

The data elements corresponding to Fields 03 to 09, 11 and 16 of the VIZ shall be personalized in machine readable form, in the MRZ, beginning with the left most character position in each field in the sequence indicated in the data structure specifications shown below. Figure 15 indicates the structure of the MRZ.

4.2.1.3 Print position

The position of the left-hand edge of the first character shall be 6.0 ± 1.0 mm (0.24 ± 0.04 in) from the left-hand edge of the document. Reference centre lines for the OCR lines and the minimum starting position for the first character of each line are shown in Figure 3. The positioning of the characters is indicated by those reference lines and by the printing zones for the two code lines in Figure 7.

4.2.2 Data structure of machine readable data for the MRP data page

4.2.2.1 Data structure of the upper machine readable line

MRZ character positions (line 1)	*Field no. in VIZ*	*Data element*	*Specifications*	*Number of characters*	*References and notes**
1 to 2	03	Document code	The first character shall be P to designate an MRP. One additional letter may be used, at the discretion of the issuing State or organization, to designate a particular MRP. If the second character position is not used for this purpose, it shall be filled by the filler character (<).	2	Notes a, d, m.
3 to 5	04	Issuing State or organization	The three-letter code specified in Doc 9303-3 shall be used. Spaces shall be replaced by filler characters (<).	3	Notes a, d, f.
6 to 44	06, 07	Name	For details see Doc 9303-3.	39 [Primary identifier(s), secondary identifier(s) and fillers]	Notes a, c, d.
		Punctuation in the name	Representation of punctuation is not permitted in the MRZ. For details on apostrophes, hyphens, commas, etc., see Doc 9303-3.		
		Name prefixes and suffixes	For details see Doc 9303-3.		
		Filler	When all components of the primary and secondary identifiers and required separators (filler characters) do not exceed 39 characters in total, all name components shall be included in the MRZ and all unused character positions shall be completed with filler characters (<) repeated up to position 44 as required.		
		Truncation of the name	When the primary and secondary identifiers and required separators (filler characters) exceed the number of character positions available for names (i.e. 39), they shall be truncated as follows:		Notes a, d.

MRZ character positions (line 1)	Field no. in VIZ	Data element	Specifications	Number of characters	References and notes*
			Characters shall be removed from one or more components of the primary identifier until three character positions are freed, and two filler characters (<<) and the first character of the first component of the secondary identifier can be inserted. The last character (position 44) shall be an alphabetic character (A through Z). This indicates that truncation may have occurred. Further truncation of the primary identifier may be carried out to allow characters of the secondary identifier to be included, provided that the name field shall end with an alphabetic character (position 44). This indicates that truncation may have occurred. When the name consists of only a primary identifier which exceeds the number of character positions available for the name, i.e. 39, characters shall be removed from one or more components of the name until the last character in the name field is an alphabetic character.		

* Notes can be found following paragraph 4.2.2.2.

4.2.2.2 Data structure of the lower machine readable line

MRZ character positions (line2)	Field no. in VIZ	Data element	Specifications	Number of characters	References and notes*
1 to 9	05	Passport number	As given by the issuing State or organization to uniquely identify the document. Any special characters or spaces in the passport number as shown in the VIZ shall be replaced by the filler character (<). The number shall be followed by the filler character (<) repeated up to position 9 as required.	9	Notes a, b, d.

MRZ character positions (line2)	*Field no. in VIZ*	*Data element*	*Specifications*	*Number of characters*	*References and notes**
10		Check digit	Shall be calculated as specified in Doc 9303-3 and positioned as specified in paragraph 4.2.4.	1	Notes b, d.
11 to 13	08	Nationality	As a three-letter code representing the holder's nationality as listed in Doc 9303-3. Spaces are replaced by filler characters.	3	Notes a, d, f.
14 to 19	9	Date of birth	See Doc 9303-3 for details.	6	Notes b, d, i.
20		Check digit	Shall be calculated as specified in Doc 9303-3 and positioned as specified in paragraph 4.2.4.	1	Notes b, d.
21	11	Sex	F = female; M = male; < = unspecified.	1	Notes a, d.
22 to 27	16	Date of expiry	See Doc 9303-3 for details.	6	Notes b, d, i.
28		Check digit	Shall be calculated as specified in Doc 9303-3 and positioned as specified in paragraph 4.2.4.	1	Notes b, d.
29 to 42	10	Personal number or other optional data elements	Any special characters, including spaces in the personal identification number given to the holder by the issuing State or organization, shall be replaced by the filler character (<). The number shall be followed by the filler character (<) repeated up to position 42 as required. When the personal number field is not used, the character positions 29 to 42 in the second MRZ line should be completed with filler characters (<) (see also under "check digit", character position 43 below).	14	Notes a, b, d.
43		Check digit	Shall be calculated as specified in Doc 9303-3 and positioned as specified in paragraph 4.2.4. When the personal number field is not used and filler characters (<) are used in positions 29 to 42, the check digit	1	Notes b, d.

MRZ character positions (line2)	*Field no. in VIZ*	*Data element*	*Specifications*	*Number of characters*	*References and notes**
			may be zero or the filler character (<) at the option of the issuing State or organization.		
44		Composite check digit	Composite check digit for characters of machine readable data of the lower line in positions 1 to 10, 14 to 20 and 22 to 43, including values for letters that are a part of the number fields and their check digits. Shall be calculated as specified in Doc 9303-3.	1	Notes b, d.

** Notes to the Visual and Machine Readable data element directories:*

a) Alphabetic characters (A to Z) as defined in Doc 9303-3.

b) Numeric characters (0 to 9) as defined in Doc 9303-3.

c) Punctuation may be included in the VIZ. In the MRZ only the filler character specified in Doc 9303-3 may be used.

d) The field caption is not printed on the document.

e) The use of a caption to identify the field is at the option of the issuing State.

f) In the case of the United Nations laissez-passer, Field 01 (Issuing State or Organization) in the VIZ shall be completed with the words "UNITED NATIONS — NATIONS UNIES". In keeping with the international character of United Nations officials, neither nationality nor place of birth shall be shown. The caption for Field 08 (Nationality) shall read instead: "Official of/Fonctionnaire des" and the words "UNITED NATIONS/ NATIONS UNIES" entered instead of nationality. Field 12 (Place of birth) shall be left blank. The codes to be used in Field 04 (Code for issuing State or organization) in the VIZ as well as in character positions 3 to 5 (Issuing State or Organization) in the upper line of the MRZ and in character positions 11 to 13 (Nationality) in the lower line shall be as specified in Doc 9303-3.

g) A blank space (or spaces) is included. Blank spaces between words shall count towards the maximum number of characters permitted in the field.

h) Intentionally omitted from the Data Element Directory. In the sixth and earlier editions of Doc 9303, this Note provided for stick-in portrait photographs the use of which is no longer permitted in an MRP.

i) The method of writing dates is given in Doc 9303-3.

j) The space reserved for Field 15 may be expanded to include additionally the space for Field 18 when the option is taken of locating the holder's signature or usual mark on the adjacent page. In this instance, the authority or issuing organization may be expressed as two lines of variable numbers of character positions.

k) When the name cannot be accommodated in the space provided for it in the VIZ, a notation giving the full name may be written on another page of the MRP. Alternatively, a smaller type font may be selected for use in the VIZ only.

l) The field caption shall be printed on the document.

m) In documents other than passports, e.g. United Nations laissez-passer, seafarer's identity document or refugee travel document, the official title of the document shall be indicated instead of "Passport". However, the first character of the document code shall be P.

n) In Machine Readable Convention Travel Documents (MRCTDs) the words "Travel Document" shall be indicated instead of "Passport".

o) In MRCTDs States may include or omit the nationality data element. If nationality is included, it is recommended that States enter "Stateless Person" or "Refugee". This ensures consistency between the VIZ and the MRZ (where the three-letter code for Stateless Persons – XXA, and for Refugees – XXB, appears).

4.2.3 Truncation of names in the MRZ

The name field in the MRZ of the MRP allows for a maximum of 39 characters in the upper line. If the primary and secondary identifiers using the above procedure exceed the available character positions, then truncation shall be carried out using the procedure set out in the following paragraphs. If the total number of characters in the name, including filler characters, is 39 or fewer the name shall not be truncated.

In truncating the name components, the last character of the name field shall be an alpha character (A to Z inclusive) as an indication that truncation has occurred (see the Data Element Directory of the MRZ in 4.2.2).

Note.— Where long names extend to the last character position in the name field, the presence of an alpha character means that the name must be treated as though truncation had occurred.

4.2.3.1 Examples of name of the holder in the MRZ

Note.— In the following examples, the document is assumed to be a passport issued by the State of Utopia. The first five characters of the upper machine readable line are P<UTO.

a) Usual representation:

Name: Anna Maria Eriksson
VIZ: ERIKSSON, ANNA MARIA
MRZ: `P<UTOERIKSSON<<ANNA<MARIA<<<<<<<<<<<<<<<<<<<<`

b) Central primary identifier:

Name: Deborah Heng Ming Lo
VIZ: HENG, DEBORAH MING LO
MRZ: `P<UTOHENG<<DEBORAH<MING<LO<<<<<<<<<<<<<<<<<<<`

c) Hyphen as part of the name:

Name: Susie Margaret Smith-Jones
VIZ: SMITH-JONES, SUSIE MARGARET
MRZ: `P<UTOSMITH<JONES<<SUSIE<MARGARET<<<<<<<<<<<<`

d) Apostrophe as part of the name:

Name: Enya Siobhan O'Connor
VIZ: O'CONNOR, ENYA SIOBHAN
MRZ: P<UTOOCONNOR<<ENYA<SIOBHAN<<<<<<<<<<<<<<<<<<

e) Multiple name components:

Name: Martin Van Der Muellen
VIZ: VAN DER MUELLEN, MARTIN
MRZ: P<UTOVAN<DER<MUELLEN<<MARTIN<<<<<<<<<<<<<<<<

f) No secondary identifier:

Name: Arkfreith
VIZ: ARKFREITH
MRZ: P<UTOARKFREITH<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

4.2.3.2 Truncated names — Secondary identifier truncated

a) One or more name components truncated to initials:

Name: Nilavadhanananda Chayapa Dejthamrong Krasuang
VIZ: NILAVADHANANANDA, CHAYAPA DEJTHAMRONG KRASUANG
MRZ: P<UTONILAVADHANANANDA<<CHAYAPA<DEJTHAMRONG<K

b) One or more name components truncated:

Name: Nilavadhanananda Arnpol Petch Charonguang
VIZ: NILAVADHANANANDA, ARNPOL PETCH CHARONGUANG
MRZ: P<UTONILAVADHANANANDA<<ARNPOL<PETCH<CHARONGU

4.2.3.3 Truncated names — Primary identifier truncated

a) One or more components truncated to initials:

Name: Dingo Potoroo Bennelong Wooloomooloo Warrandyte Warnambool
VIZ: BENNELONG WOOLOOMOOLOO WARRANDYTE WARNAMBOOL, DINGO POTOROO
MRZ: P<UTOBENNELONG<WOOLOOMOOLOO<WARRANDYTE<W<<DI

b) One or more components truncated:

Name: Dingo Potoroo Bennelong Wooloomooloo Warrandyte Warnambool
VIZ: BENNELONG WOOLOOMOOLOO WARRANDYTE WARNAMBOOL, DINGO POTOROO
MRZ: P<UTOBENNELONG<WOOLOOM<WARRAND<WARNAM<<DINGO

c) One or more components truncated to a fixed number of characters:

Name: Dingo Potoroo Bennelong Wooloomooloo Warrandyte Warnambool
VIZ: BENNELONG WOOLOOMOOLOO WARRANDYTE WARNAMBOOL, DINGO POTOROO
MRZ: P<UTOBENNEL<WOOLOO<WARRAN<WARNAM<<DINGO<POTO

4.2.3.4 Names that just fit, indicating possible truncation by letter in the last position of the name field, but which are not truncated

Name: Jonathon Warren Trevor Papandropoulous
VIZ: PAPANDROPOULOUS, JONATHON WARREN TREVOR
MRZ: P<UTOPAPANDROPOULOUS<<JONATHON<WARREN<TREVOR

Note.— Even though there is an alpha character in the 44th position of this passport upper machine readable line, this name has not been truncated but it must be assumed that it has been truncated.

4.2.4 Check digits in the Machine Readable Zone

The data structure of the lower machine readable line specified in paragraph 4.2.2.2 provides for the inclusion of five check digits as follows:

Check digit	*Character positions (lower MRZ line) used to calculate check digit*	*Check digit position (lower MRZ line)*
Passport number	1-9	10
Date of birth	14-19	20
Date of expiry	22-27	28
Personal number	29-42	43
Composite check digit	1-10, 14-20, 22-43 *Note.— Positions 11-13 and 21 are excluded when calculating the composite check digit.*	44

4.3 Representation of the Issuing State or Organization and Nationality of Holder in the MRZ and the VIZ

Use of three-letter Country codes is mandatory in the MRZ and Field 04 in the VIZ and optional for the holder's nationality in the VIZ. Specific locations are defined in the following table:

	Zone	*Field no.*	*Character position no.*	*Number of character positions*
Issuing State or organization	VIZ	04	3-5	3
	MRZ (upper line)			3
Holder's nationality	VIZ	08	11-13	variable
	MRZ (lower line)			3

5. REFERENCES (NORMATIVE)

ISO/IEC 7810	ISO/IEC 7810:2003, Identification cards – Physical characteristics.
ISO/IEC 18745-1	ISO/IEC 18745-1:2014, Information technology – Test methods for machine readable travel documents (MRTD) and associated devices – Part 1: Physical test methods for passport books (durability).

— — — — — — — —

Appendix A To Part 4

EXAMPLES OF A PERSONALIZED MRP DATA PAGE (INFORMATIVE)

Figure 11. Example of an MRP data page that conforms to the recommended practice layout.

Figure 12. Example of an MRP data page excluding Zone IV (the holder's signature or usual mark) and including Optional Data Field 13, for optional personal details (e.g. occupation) in Zone II.

Figure 13. Example of an MRP data page appearing on an interior page of the book. The name of the issuing State or organization and the name of the document have appeared on an earlier page and are therefore omitted from the data page. The example also illustrates Zone V (the portrait) moved vertically upwards with Zone IV (the signature) overlaying the portrait, and the personal number from Zone II placed beneath the portrait.

Figure 14. Example of an MRP data page with the layout adjusted to accommodate a displayed fingerprint in Zone II.

Appendix B To Part 4

CONSTRUCTION OF THE MACHINE READABLE ZONE OF THE PASSPORT DATA PAGE (INFORMATIVE)

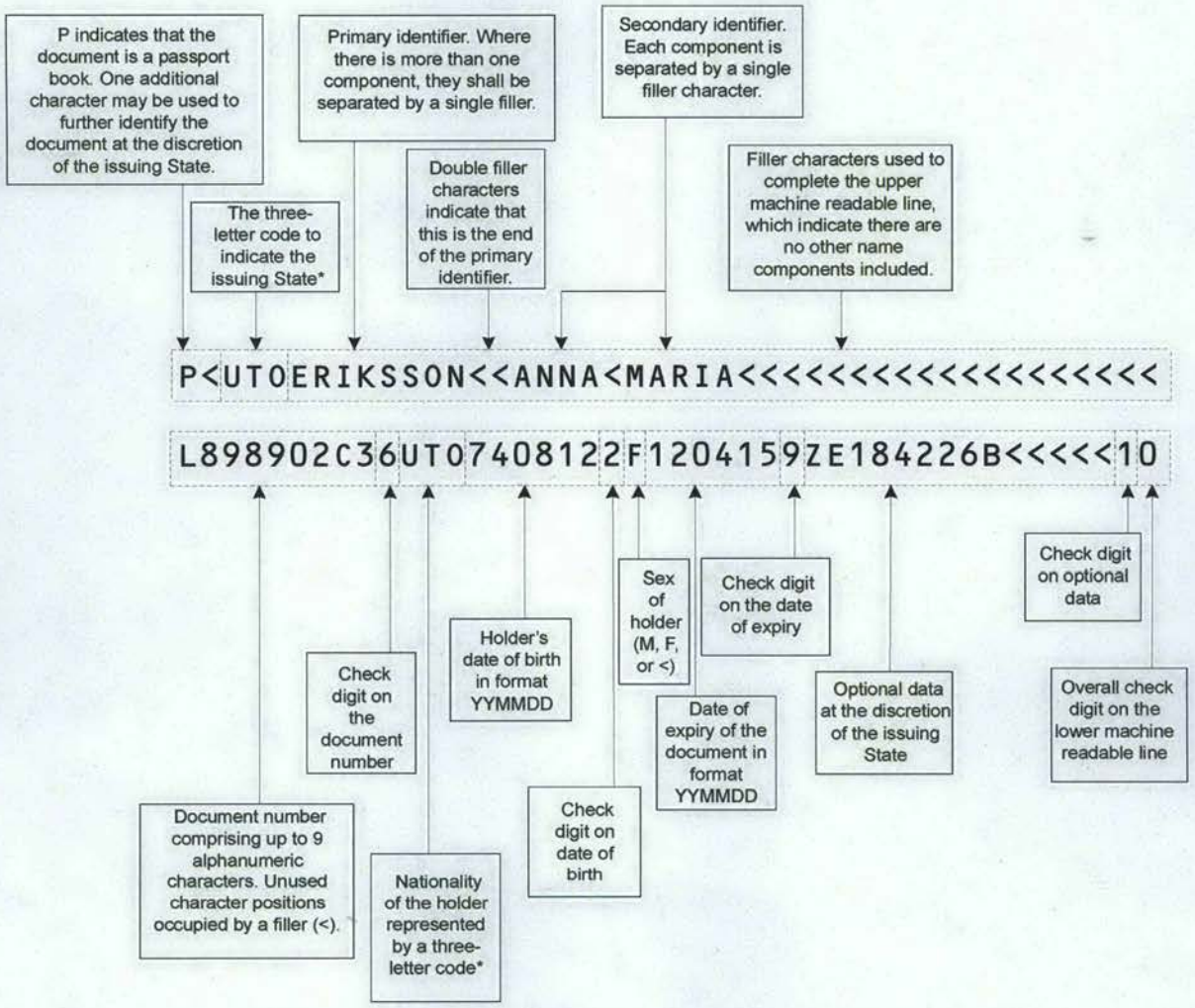


Figure 15. Example showing the sequence and content of data elements in the MRZ

*Note 1.— * Three letter codes are given in Doc 9303-3.*

Note 2.— Dotted lines indicate data fields; these, together with arrows and comment boxes, are shown for the reader's understanding only and are not printed on the document.

Note 3.— Data is inserted into a field beginning at the first character position starting from the left. Any unused character positions shall be occupied by filler characters (<).

— END —

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INFORMATION PAPER

TAG/MRTD/21-IP/4
20/11/12
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TECHNICAL ADVISORY GROUP ON MACHINE READABLE TRAVEL DOCUMENTS (TAG/MRTD)

TWENTY-FIRST MEETING

Montréal, 10 to 12 December 2012

Agenda Item 5: Country and Organization Reports

A REVIEW OF THE REQUIREMENT TO DISPLAY THE HOLDER'S GENDER ON TRAVEL DOCUMENTS

(Presented by New Zealand)

1. INTRODUCTION

1.1 The New Zealand Passport Office has produced the paper "Displaying the holder's gender on travel documents: Is it still appropriate in the age of e-travel documents". The paper is presented in Appendix A of this information paper.

1.2 This information paper summarises the key points of the paper presented in Appendix A and outlines a course of action for the TAG/MRTD.

1.3 When the paper refers to travel documents, it is referring to all machine readable travel documents.

2. BACKGROUND

2.1 Under 8.6 - Data element directory in IV - Technical Specifications for Machine Readable Passports of Part 1 Volume 1 Doc 9303 6th edition, travel documents are required to display the gender of the holder.

2.2 Displaying detailed biodata information about the holder, including their gender, has enabled travel documents to be used more effectively to identify the holder.

2.3 There have been significant changes in the technology travel documents use to identify the holder since the introduction of e-travel documents. The use of facial recognition technology and other biometric

identification methods provide an opportunity to look beyond relying on the biodata displayed on travel documents, including gender, to confirm an identity.

3. KEY COSTS OF CHANGE

3.1 Removing the requirement to display a holder's gender on travel documents would complicate the operations of border authorities. Some border authorities use the gender field as an input into risk assessment before passengers arrive and to identify passengers travelling through border points.

3.2 Changing the requirement would impose significant costs on border authorities. Border control software would need to be upgraded and modified to handle travel documents that do not display the holder's gender.

3.3 The complications to border operations may have a corresponding effect of longer check in times for passengers and people encountering problems when travelling on a travel document that does not display their gender.

4. KEY BENEFITS OF CHANGE

4.1 Border authorities would not have to deal with passengers travelling on a travel document displaying a gender that does not reflect the holder's identity. Transgender passengers would be less likely to encounter problems travelling.

4.2 Issuance offices may not have to collect gender information about applicants and would issue fewer travel documents with incorrect biodata information.

4.3 Removing the mandatory requirement to display a holder's gender on travel documents could pre-empt calls for change and show ICAO is a future focused organisation.

5. CONCLUSION

5.1 The costs of the removing the requirement to display the holder's gender on travel documents outweigh the benefits at this stage. The costs of the change would be more significant given the adverse affects on the operations of border authorities and the potential inconvenience for passengers. However, the tangible benefits of not requiring travel documents to display the holder's gender mean there is still a significant opportunity for ICAO in changing the mandatory requirement in the future.

6. RECOMMENDATIONS

6.1 The New Zealand Passport Office recommends ICAO:

a) maintains the requirement to display the holder's gender at this stage;

b) reassesses this requirement when future border control systems would be less affected by the removal of the gender field; and

c) standardises any change to the requirement to display the holder's gender across all travel documents to minimise the complications for border authorities.

7. ACTION BY THE TAG/MRTD

7.1 The New Zealand Passport Office invites the TAG/MRTD to:

a) note the contents of the paper "Displaying the holder's gender on travel documents: still useful in the age of e-travel documents" presented in Appendix A; and

b) periodically review the mandatory requirement to display the holder's gender on travel documents in the future.

APPENDIX A

TAG-MRTD/21-IP/4
Appendix A

Displaying the holder's gender on travel documents: Is it still appropriate in the age of e-travel documents

Executive Summary

Purpose

This paper:

- *presents the results from the New Zealand Passport Office's research into the ICAO requirement to display the holder's gender on travel documents for identity purposes;*
- *explains the consequences of removing the gender field for official agencies and passengers; and*
- *recommends a course of action for ICAO.*

Introduction

ICAO is a specialised agency of the United Nations that sets the standards necessary for safe and efficient international civil aviation. The inclusion of a travel document holder's gender was made a mandatory requirement for travel documents in the standards set out in ICAO Document 9303, first introduced in 1980. Displaying the holder's gender has enabled travel documents to be used more effectively to identify the holder. However, the introduction of e-travel documents and the advanced identification methods these documents use creates the argument that it is no longer necessary for travel documents to display the holder's gender.

ICAO gender requirements for travel documents were discussed during a Five Nations conversation on transgender issues. New Zealand agreed to review the wider issue of gender on travel documents on behalf of the Five Nations group.

Findings

From consultation with officials from Immigration New Zealand and the New Zealand Customs Service, the New Zealand Passport Office found some border authorities use information about a person's gender to:

- *input into risk assessments before passengers arrive;*
- *identify passengers travelling through border points;*
- *process passport information while using travel document readers; and*
- *collect statistical information about passengers to provide to agencies who monitor changes in population.*

The New Zealand Passport Office's research has also shown that:

- *the gender field is not always a reliable way to confirm an identity as a holder's gender can change; and*
- *over the July 2011 to June 2012 period, approximately 0.009% of the travel documents despatched from the New Zealand Passport Office had the wrong gender displayed.*

Conclusions

Based on these initial findings, we can conclude that removing details of the holder's gender on travel documents may have the negative consequences of:

- *weakening the ability of border authorities to risk assess before passengers arrive and undermine the performance of electronic border systems, resulting in slower passenger processing and more interventions from border officials;*
- *passengers encountering problems when travelling on a travel document that does not display their gender to a country which does not accept these travel documents;*
- *requiring border authorities to modify their software at a significant cost to process travel documents with and without the gender field; and*
- *requiring passengers to provide their gender details in other formats to agencies and other parties who want this information.*

Not displaying the holder's gender on travel documents may have the benefits of:

- *preventing border officials dealing with travel documents that display a gender that does not reflect the holder's identity and reduce the risk of transgender people encountering problems while travelling;*
- *reducing the number of travel documents with incorrect biodata issued; and*
- *allowing issuance offices to avoid the time and cost required to collect gender information about applicants.*

Recommendations

We recommend that ICAO:

1. *maintains the requirement for travel documents to display the holder's gender at this stage as the costs of the change outweigh the benefits;*
2. *reassesses this requirement when future border control systems would be less affected by the removal of the gender field; and*
3. *standardises any change to the requirement to display the holder's gender across all travel documents to minimise the complications for border authorities.*

Discussion
This section of the paper sets out:
- ICAO standards;
- Technology developments that may make the gender field less relevant;
- the costs of changing the mandatory requirement; and
- the benefits of changing the mandatory requirement.

ICAO standards
International travel documents have historically displayed information to indicate the gender of the holder. When international standards for travel documents were put in place, the historic practice of displaying the gender was made a mandatory requirement for all machine readable travel documents. Using detailed biodata information about a person, including their gender, on travel documents reduces the risk of these documents being issued to the wrong identity or multiple documents being issued to one identity. Displaying the holder's gender also helps border officials to verify an identity by doing a quick visual check of the gender on the travel document compared to the holder.

Technology developments that may make the gender field less relevant
There have been significant changes in the technology used in travel documents to identify the holder since the introduction of e-travel documents. These changes, outlined below, show the advanced identification methods which may remove the need to display the holder's gender on travel documents.

Facial Recognition Technology
The international move to e-travel documents reduces the risk of illegitimate applicants obtaining legitimate documents. All e-travel documents use Facial Recognition Technology (FRT) to confirm the identity of a person and bind it to a legitimate document. FRT enables:
- one-to-one matches when e-travel documents are renewed to ensure the document is issued to the correct identity; and
- one-to-many matches that help to prevent a person obtaining travel documents over multiple identities.

Border authorities who use facial recognition systems can analyse the facial image contained in an e-travel document and seek to match that with the person presenting it.

The movement towards an international system based on e-travel document technology is ongoing. E-travel documents are not mandatory under ICAO standards and it will take some countries a significant amount of time to introduce these documents. Even in countries where e-travel documents have been introduced, the technology to process the documents is not in place at all border points.

While the use of FRT is currently limited, this advanced identification method is likely to be widely used and become more useful over time. The older method of displaying detailed biodata information, including gender, may become less necessary to confirm an identity.

Optional biometrics
ICAO standards allow e-travel documents to store a holder's fingerprints or iris biometrics, which enables the use of further advanced identification methods. A number of European countries store fingerprint biometrics in e-travel documents and border authorities are increasingly capturing fingerprint information as part of identity management systems. As this technology matures and is integrated into border systems, it may provide an effective way to quickly identify passengers.

Modern databases
Advances in database systems are another technological change that means knowing a person's gender is less important for identity purposes. Old databases typically searched based on surnames and initials. In

these databases, knowing a person's gender significantly narrows the results of a search in systems that hold information about a large number of people. However, searches in modern databases are often based on full names. Unless the name is unisex, adding the gender often does not narrow down the search results in the modern databases increasingly used by official agencies.

The costs of changing the mandatory requirement

If ICAO changes the requirement to display the holder's gender on travel documents, the agencies most adversely affected would be border authorities. Unlike issuance offices, which generally can determine their own internal processes as long as they comply with ICAO standards, border authorities deal with passengers travelling on travel documents of many nationalities.

It is useful for border authorities to have access to information on the gender of passengers travelling through border points. Knowing a passenger's gender helps improve security as it allows border authorities to categorise passengers and do risk assessments before they arrive to be processed. Border authorities who process passengers using systems designed according to international best practice use gender as an input to increase the speed passengers are processed. Not knowing a passenger's gender would adversely affect their systems in the ways outlined below.

Border authorities' ability to risk assess would be reduced

Border authorities would be less able to establish the context of a passenger's travel and do risk assessments before passengers arrive. Knowing the passenger's gender is useful in determining if someone matches the profile of a person of interest. This cannot always be done using a passenger's name because some names are unisex.

Border authorities may need to rely more on assessing passengers at border points. Passengers who may be a person of interest would have to be screened carefully by border officials. A shift to doing risk assessments on passenger arrival could lead to a greater reliance on a wider screening of passengers based on anxiety, hostility or other suspicious characteristics.

Increased risk of fraudulent travel documents

There is a small risk that border officials may have to process more passengers using fraudulent travel documents. If the holder's gender is not displayed, it may be easier for fraudulent travel documents to be used by both males and females for travel under a false identity. This is particularly the case with photo-substituted travel documents. However, this risk is limited for the following reasons.

- An imposter would need to match the photo in the travel document if unaltered.
- The common method for forgery is to replace the entire biodata page with information tailored to the person attempting to travel on the document.
- Professional forgers are likely to possess a travel document with the desired gender.

The effectiveness of detection systems would be reduced

A significant problem for border officials is the detection systems used to process passengers would be less reliable. Automatic systems such as watchlist checks would bring up more false matches if a passenger's gender information is not entered in border control systems. Excessive false alarms may undermine security as officials are more likely to ignore alerts if they are constantly dealing with false matches. These false matches would also decrease the speed passengers are processed.

The efficiency of electronic systems would be reduced

The speed which passengers are processed would likely be further affected by electronic systems performing less efficiently. Many electronic systems that process passenger information use the gender

field during calculations and for name matching routines. The consequences of a reduction in speed of the electronic systems would be significant given the numbers of international travellers that need to be processed.

Systems would need to handle different types of travel documents
The electronic systems used by border authorities would have to deal with the challenge of processing travel documents with and without the gender field. The systems would need to be modified to ensure travel documents with no entry in the gender field are not treated as an error. If this was managed by the software recognising the data on the various travel document nationalities, border authorities would have to modify their software whenever a country removed the gender field from their travel documents.

Upgrading and modifying software would impose significant costs on border authorities and airlines. Ongoing costs would be high as the systems used to read travel documents would have to handle processing the two types of travel documents for a significant period of time. If ICAO made not displaying the gender field mandatory, this period would be around 10 years. If displaying the gender field became optional, this period of having to modify software to process the different types of travel documents would be indefinite.

Less statistical information may be available for other agencies
Border authorities would not be able to use their software to compile statistical information about the gender of passengers if this information is not available. This would limit their ability to provide information to agencies that are interested in the gender of people entering and exiting border points. Some agencies may find it problematic if they can't obtain this information as it is useful for making population estimates and determining:

- health and education needs;
- economic strategies; and
- projected fertility, crime and electoral enrolment rates.

The costs of changing the mandatory requirement outlined above indicate how removing details of the holder's gender on travel documents would complicate the operations of border authorities. A change that impacts negatively on how border authorities operate would have corresponding adverse effects on passengers.

Check-in would be slower
Passengers would probably have to wait longer to be processed through border points. This delay would partly be due to reduced efficiencies of electronic border control systems. Also, border officials would be more likely to intervene because of increased reliance on passenger screening and the need to deal with more false alerts. Border official interventions may mean that in some instances they would have to ask passengers to confirm their gender to ensure that an official of the appropriate gender conducts the search.

Passengers may be required to provide gender information in other formats
Passengers may be required to confirm their gender in other ways if it is not displayed on their travel document. Official agencies collecting passenger's information for statistical purposes may require gender details be supplied on a form as passengers enter or exit a country. Airlines may require a person's gender details to avoid the possibility of being held liable for not providing this information to official agencies where such information is required.

Travel documents may not be readily accepted by all border authorities
Passengers with a travel document that does not display their gender may encounter problems while travelling. Border officials in some countries may take time to recognise or understand such a change in

ICAO standards. It may also take time for some border authorities to modify their electronic systems to handle travel documents that don't display the gender field.

A comprehensive international agreement to manage this change would be crucial. An agreement would help to ensure the different types of travel documents are widely recognised by border officials. The risk of passengers encountering problems travelling on a travel document that does not display their gender would be reduced further if a large number of countries used this type of travel document.

A secondary use of travel documents may be undermined
The common secondary use of travel documents to provide identification in non-travel situations may be undermined if the gender field is removed. People issued a travel document that does not display their gender would lose an official way to prove their gender. This may be inconvenient where someone is required to provide an official document that displays their gender, perhaps to access a service restricted to only males or females.

The benefits of changing the mandatory requirement
Given the significant negative consequences of travel documents not displaying the holder's gender for border authorities and passengers, the mandatory requirement should not be changed at this time. However, border authorities should consider moving towards systems that do not rely on knowing the gender details of passengers. If border authorities make this change, ICAO should reassess the mandatory requirement. There would be a number of benefits if travel documents did not display the holder's gender.

Travel documents would not display a gender that does not appear to match the holder
Border authorities would not have to deal with passengers travelling on a travel document displaying a gender that is not useful to confirm their identity. The holder's gender is not always a reliable way to confirm an identity for the following reasons.

- The holder can change the gender on their travel document in many countries if they go through the appropriate process.
- The process to change the gender on travel documents is inconsistent between countries, which creates the possibility of a person with travel documents under different nationalities having different genders on these documents.
- The risk of inconsistencies may increase if more countries follow Australia and New Zealand's lead and allow travel documents with the gender displayed as X. ICAO standards defines X as unspecified, which allows individual countries to determine who is eligible for this option.

It is true that only a very small percentage of people change their gender. However, the ability of people to change their gender creates a potential problem for agencies that rely on this information to verify an identity.

The transgender community would benefit
The risk of transgender people encountering problems while travelling would be reduced by removing the gender field on travel documents. Transgender people may experience an easier process as they would no longer have the problem of travelling on travel documents where the gender displayed doesn't match their appearance. Also, transgender people with their gender displayed as X would avoid dealing with border officials that do not recognise this option.

Issuance offices may not have to collect gender information
Removing the requirement to display the holder's gender on travel documents would streamline the process of issuing travel documents. As long as an applicant's gender is not required for another reason, passport application forms would not need to request this information. Issuance offices would not have to

capture and store the gender details of applicants in their databases. Processing officers would not be required to ensure the correct gender is printed on travel documents.

There would be fewer travel documents issued with incorrect biodata information

Issuance offices would issue significantly fewer travel documents with incorrect biodata information if travel documents did not display the holder's gender. It is an easy mistake for applicants to choose the wrong gender option on an application and for processing officers to miss this mistake. Of the over 600,000 travel documents issued by the New Zealand Passport Office from July 2011 to June 2012, approximately 0.009% displayed the wrong sex. Not displaying the gender on travel documents would prevent:

- the inconvenience for customers of being issued a travel document with the wrong gender;
- issuance offices having to reissue travel documents due to the original document displaying the wrong gender; and
- border authorities having to process travel documents displaying the wrong gender.

Changing the mandatory requirement may future proof ICAO standards

ICAO could pre-empt calls for change by removing the requirement to display the holder's gender on travel documents if it becomes feasible to do so. While there may not be strong calls for this requirement to be changed now, this may change in the future. As the use of advanced identification methods based on biometrics increases, people may question why displaying their gender on travel documents is necessary. The requirement may also be hard to justify if there are moves to prevent discrimination of passengers based on their gender during processing through border points.

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COMMENTS

GENDER AND SEX DESIGNATIONS FOR IDENTIFICATION PURPOSES: A DISCUSSION ON INCLUSIVE DOCUMENTATION FOR A LESS ASSIMILATIONIST SOCIETY

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INTRODUCTION

The United States federal government and the individual U.S. states' failure to allow trans*[1] and gender non-conforming[2] persons a right to self-

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1. The term "trans*" will be used throughout to designate a catch-all umbrella for transgender, transsexual, two-spirit, transmasculine, transfeminine, transvestite, and other gender-nonconforming persons. The terms "gender non-conforming," transgender, transsexual, et. al. will be stated in the text when individual consideration of such identity is necessary to distinguish from the umbrella characterization. *See LGBTTIQQ2SAA+*

identify[3] on official documents causes an array of problems. Many such individuals experience identification-related difficulties in everyday life—in immigration, housing, and employment situations, among others.[4] American

Definitions, REVEL & RIOT, *available at* http://www.revelandriot.com/resources/lgbtq-and-trans-definitions/; *see also What Does the Asterisk in "Trans*" Stand For?*, IT'S PRONOUNCED METROSEXUAL (Mar. 2015), *available at* http://itspronouncedmetrosexual.com/2012/05/what-does-the-asterisk-in-trans-stand-for/; Hugh Ryan, *What Does Trans* Mean, and Where Did It Come From?*, OUTWARD (Jan. 10, 2014), http://www.slate.com/blogs/outward/2014/01/10/trans_what_does_it_mean_and_where_did_it_come_from.html.

2. Dr. Eric Anthony Grollman, *What Is Gender "Non-Conformity"?*, KINSEY CONFIDENTIAL (March 8, 2011), http://kinseyconfidential.org/gender-nonconformity/ ("Gender non-conformity . . . is behaving and appearing in ways that are considered atypical for one's gender.").

3. As noted below, many U.S. states require invasive medical procedures, other medical treatment, and professional consultation for individuals to have the sex designation changed on legal documentation. Moreover, the United States does not currently have any system in place for gender non-conforming individuals for whom a "male" or "female" designation is inaccurate, and would force such individuals to inhabit a role with which they do not identify. The problem of being discriminated against as a result of a person not appearing as the gender stated on legal documentation is well documented. *See* Andrew Cray & Jack Harrison, *ID Accurately Reflecting One's Gender Identity Is a Human Right*, CTR. FOR AM. PROGRESS (Dec. 18, 2012), *available at* https://cdn.americanprogress.org/wp-content/uploads/2012/12/TransgenderID-4.pdf (public policy scholars estimate some 25,000 transgender U.S. voters could become disenfranchised as a result of stringent state voter ID laws due to anti-transgender discrimination and because such individuals may not appear to be the person on their voter identification).

4. When not seen as their true genders, trans* people are commonly placed into institutions based on, or considered as an "other" that institutions are unable to accommodate, or categorized with regard to their sex organs. Such a system often leads to traumatic experiences for the individuals in these positions. *See, e.g.*, Jorge Rivas, *New Yorkers Brave the Cold To Rally for Transgender Asylum Seeker*, FUSION (March 5, 2015), http://fusion.net/story/59091/new-yorkers-brave-the-cold-to-rally-for-transgender-asylum-seeker/ (Guatemalan transgender detainee Nicoll Hernandez-Polanco seeking asylum in the United States has been held since October 2014 in a room with 12+ men at an immigration detention facility in Arizona, where she has been the victim of physical and emotional assault. Activists in New York, Los Angeles, Arizona, and Washington D.C. to convey the message to the Obama Administration that "detention harms LGBTQ people," and that transgender women face particularly awful conditions in detention. In detention, Nicoll is forced to sleep and shower next to cisgender men, and has been the victim of transphobic treatment by fellow detainees and guards. Advocates say she has been sexually assaulted by a male detainee, has been groped numerous times. Prison guards have groped her breasts, pulled her hair, and a prison cook has referred to her as "the woman with balls" on multiple occasions.). Trans* jobseekers have a notoriously high unemployment rate—reported around 14% in 2011—over twice the national average. As a result of transphobic job discrimination, trans* persons often are forced to sell sex in order to survive, work that is both illegal and places them at high risk of violence. Keisha Allen states that she has worked as a prostitute since being kicked out of her house as a teenager, and is now middle-aged. She has applied for many other jobs, including dishwashing and cashier positions, and has not been considered for any past the first interview. Because her "name doesn't match [her] ID, and [her] body doesn't match what it says on [her] ID," she has not been considered for employment. Moreover, as a homeless person, she is relegated to the male section of a

society meets trans* issues with an air of disregard and misunderstanding – especially the concept of *self-identification*[5] – a reality which perpetuates the mistreatment of the trans* community, and maintains an unavailability of resources for its members. An overhaul of our conception of trans* and other gender non-conforming people is vital to the well-being of the American trans* community and those trans* persons who seek support as they evade persecution.

This Comment compares recent international and domestic measures taken to alleviate trans* alienation and human rights violations to reveal possible solutions for the United States. This writing focuses heavily on background information exactly because much is missing in our society's understanding of the needs of the trans* community in terms of accommodations, rights, identities, and infrastructure. Because the proposed reforms essentially require building American gender consciousness from the ground up, background information helps illustrate how, why, and where American trans* accommodation is lacking.

The background section begins the Comment with an exposition of gender as a social concept, and starts to explain how a binary Male/Female dichotomous paradigm falls short of representing the wide variety of ways that people actually perform,[6] relate to, and identify with their gender. The section

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shelter, despite identifying as a woman. Another transgender woman states that despite 40+ years in the auto industry, she was fired after telling her employer she intended to transition from male to female. She says that word of her transgender identity spread throughout the industry, and she was only able to obtain employment, hundreds of applications later, in a position that paid less than half of what she was previously earning. As a result of such a significant pay cut, she has struggled to keep her home. Blake Ellis, *Transgender Job Seekers Face Uphill Battle*, CNN MONEY (Feb. 22, 2013), http://money.cnn.com/2013/02/22/pf/transgender-unemployment/.

5. Self-identification also appears in the critical race jurisprudence, through the concept sometimes termed "elective race" theory. *See generally* Camille Gear Rich, *Elective Race: Recognizing Race Discrimination in the Era of Racial Self-Identification*, 102 GEORGETOWN L. REV. 1501, 1505 (2014) (author notes modern anti-discrimination laws and the legal community must tackle the "dignity concerns of individuals as they attempt to control the terms upon which their bodies are assigned racial meaning").

6. To "perform gender" can be understood as portraying one's gender through action, to physically act it out. Gender performance as a concept was popularized by renowned gender theorist and cultural critic Judith Butler, who posits that gender should not be conceived of as fixed, but that it shifts and changes.

> [G]ender is in no way a stable identity or locus of agency from which various acts proceed; rather, it is an identity tenuously constituted in time—an identity instituted through a *stylized repetition of acts*. Further, gender is instituted through the stylization of the body and, hence, must be understood as the mundane way in which bodily gestures, movements, and enactments of various kinds constitute the illusion of an abiding gendered self.

Judith Butler, *Performative Acts and Gender Constitution: An Essay in Phenomenology and Feminist Theory*, 40 THEATRE J. 519, 519-520 (Dec. 1988). *See generally* Juliet Jacques, *Gender Is a Performance – For Everyone, Not Just Transsexuals*, THE GUARDIAN (Dec. 29, 2010), http://www.theguardian.com/lifeandstyle/2010/dec/29/gender-performance-stage ("Underlying some of those stares and taunts is the assumption that my gender itself is a 'performance': that is, false (or less real than other people's). Well, it is largely performative,

continues by examining U.S. institutions' progress and shortfalls in accommodating trans* citizens who wish to alter their legal identification documentation to accurately reflect their gender. The section emphasizes sex-gender conflation and some aspects of assimilationism.[7]

Next, this Comment looks at recent steps taken in other countries for the purpose of accommodating trans* citizens' needs for legal documentation. The types of documentation discussed include birth certificates, driver's licenses, and passports. This emphasizes foreign processes that do not mandate binary male or female identification. The countries this Comment focuses on most include India, Australia, and Canada, as those countries have made significant strides toward the inclusion of trans* rights in this area.[8] This section of the Comment acts as a backdrop for the "solutions" section toward the end of the Comment. The last part of the analysis discusses routes the United States may take if it decides to address the non-binary identification needs of the trans* community. This final section compares the measures of the aforementioned

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as it is for everyone: my style and mannerisms develop in relation to my personality, changing over time, and I enjoy the creative potential inherent in this.").

7. Assimilation and assimilationism refer to appearing, acting, or otherwise "passing" within a dominant paradigm. Here, I refer to trans* persons assimilating to dominant conceptions of queer culture—or rather, passing within society's most accepted notions of LGBT. This notion is based on inherent privileges of whiteness, of looking "traditionally male" or "traditionally female," as engaging in two-person relationships, and other constructs of identity that do not explicitly defy social norms of acceptable lifestyles and identities. In *Seeking Queer Visibility, Rejecting Assimilation*, author Lucas Waldron describes the privileges he recognizes as a white trans* person who "passes" as a man in social situations. He writes:

> For me, assimilation is especially accessible. As a passing white transsexual man with a degree in political science, a job that pays for my San Francisco apartment, and a boyish appearance that makes elderly women at the grocery store smile at me with trusting eyes, it's easy for me to be satisfied with my own experience of assimilation into a society that already acknowledges white men as actively more powerful than others. I know, however, that the political and cultural successes my community has experienced in recent years disproportionately affect and favor me and leave much of my community in the margins, grasping for tangible change.

Lucas Waldron, *Seeking Queer Visibility, Rejecting Assimilation*, HUFFPOST GAY VOICES (Jan. 7, 2014), http://www.huffingtonpost.com/lucas-waldron/seeking-queer-visibility-_b_4525703.html. Author Sally Hines discusses varying opinions on the appropriateness of assimilation into dominant lesbian and gay culture among trans* persons. Hines notes, "[w]hile some interviewees considered gender assimilation to be both desirable and necessary for the protection of transgender civil rights, others offered a challenge to the notion of assimilation, proposing a (trans)gender politics in which different is considered as a site of importance and celebration in its own right." Hines further writes, that "[w]hole some [transgender persons construct] distinct transgender identity positions, consciously created in opposition to traditional ways of thinking about gender, sexuality and transition, others [articulate] individualism and [are] reluctant to position themselves as members of a collective transgender culture." SALLY HINES, TRANSFORMING GENDER: TRANSGENDER PRACTICES OF IDENTITY, INTIMACY AND CARE 187 (Policy Press 2007).

8. Additionally, Canada is the United States' "neighbor to the north," and arguably a country our government might look to first when contemplating how to address trans* inclusion measures.

countries and attempts to formulate a hypothetical framework for the United States—while accounting for concerns that have remained or arisen following changes in the "model" countries.

This Comment does not intend to solve the problem of the United States' lack of non-binary designation options for official identification documents. Instead, this Comment aims to give the reader the information to spark discussion about a variety of approaches and possibilities for solving the issue. Full inclusion of non-binary-identified and trans* people will require substantial planning and reform. With that in mind, this Comment strives to provide many different outlooks on a difficult and nuanced subject, so that we might arrive at a more inclusive and safe society for trans* people.

I. BACKGROUND

"[G]ender is each person's deeply felt internal and individual experience [thereof], which may or may not correspond with the sex assigned at birth, including personal sense of the body . . . and other expressions of gender, including dress, speech, and mannerisms."[9] Although the majority of trans* identified individuals continuously identify as man or woman, others identify somewhere along the spectrum[10] of gender identity, and may feel at home as man and woman, or as neither binary gender.[11]

People with nonbinary identities are members of the trans* community who identify outside of a gender binary comprised of the mutually exclusive categories of man and woman. Some trans* people have static gender identities of which they are definitively aware from very early childhood, while others have fluid identities that may change or evolve over the course of their lives.[12]

There has been a marked push in recent years in countries around the globe to respond to trans* communities' demands for recognition of non-binary gender identity. Some countries have responded by recognizing a need for non-traditional gender and sex identifiers on legal identification documentation.[13]

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9. Olga Tomchin, *Bodies and Bureaucracy: Legal Classification and Marriage-Based Immigration for Trans* People*, 101 CAL. L. REV. 813, 819 (2013).

10. A basic binary concept of gender based on the physical does not account for the variations between individuals, other than distinctions between men and women. The gender spectrum is a way to help explain that facets of a person's life intersect to form their gender identity, that gender is nuanced, and comprises self-expression, biology, etc., to create a "multidimensional array of possibilities." *Understanding Gender*, GENDER SPECTRUM, https://www.genderspectrum.org/quick-links/understanding-gender/.

11. *See* Tomchin, *supra* note 9, at 820.

12. *Id.*

13. *See generally Australian Government Guidelines on the Recognition of Sex and Gender*, AUSTL. GOV'T 2-8 (July 2013), *available at* http://www.ag.gov.au/Publications/Documents/AustralianGovernmentGuidelinesontheRecognitionofSexandGender/AustralianGovernmentGuidelinesontheRecognitionofSexandGender.PDF; Arshiya Khullar, *The Transgender Community: Legally Invisible No More?*, CNN (April 17, 2014), http://www.cnn.com/2014/04/17/world/asia/countries-introduce-gender-neutral-policies-for-transgenders/ (discussing recent "victories" for nonbinary gender

These measures are significant because trans* persons fall by the wayside in societies where most individuals identify as a binary gender; that is, man *or* woman.[14] This can be observed in everyday American life: public restrooms that presuppose an individual's identity fits neatly into a metaphorical box implicitly labeled "born male-bodied – Men" or "born female-bodied – Women."[15] By and large, American society does not account for gender identities outside the traditional binary system, nor does it really even consider trans* existence except perhaps as a passing thought during Pride Week or, recently, tokenized and fetishized on television.[16] Even so, mainstream "gender equality" and "LGBTQ" organizations rarely call attention to the trans* community or its related social issues[17] other than in drag and Pride-related contexts.[18] As a result, most Americans remain under-informed or hold

identification in India (recognition of a third or "other" gender), Australia (third gender recognition), Germany (allowing intersex children's birth certificates to be marked "X")).

14. *See* Nico Dacumos, *All Mixed Up with No Place to Go: Inhabiting Mixed Consciousness on the Margins, in* NOBODY PASSES: REJECTING THE RULES OF GENDER AND CONFORMITY 20-36 (Mattilda ed., 2006) (author recounts how they do not know exactly how to character their gender identity; that it's "not quite FTM and still emotionally, historically, and politically attached to butchness;" that "any . . . honest articulation of my gender identity will never convince [those healthcare providers] who [base] access to medical treatments like gender reassignment surgery and hormone therapy based on a narrow and pathologizing understanding of "transsexuality," to allow me self-determination over how I choose to modify my body").

15. There are accounts of transgender students being denied access to facilities that appropriately accommodate their non-conforming gender identity. Harper Jean Tobin & Jennifer Levi, *Securing Equal Access to Sex-Segregated Facilities for Transgender Students*, 28 WIS. J.L. GENDER & SOC'Y 301, 301 (2013) ("Denial of equal access to facilities that correspond to a student's gender identity singles out and stigmatizes transgender students, inflicts humiliation and trauma, interferes with medical treatment, and empowers bullies.").

16. *See, e.g.*, Julie Zeilinger, *No, TV Industry, Being Transgender Is Not a "Hot" Trend*, MIC (March 31, 2015), http://mic.com/articles/114140/no-tv-industry-being-transgender-is-not-a-hot-trend; E. Jessica Groothis, *The Rayon Effect: What Cisgender Actors Bring to Transgender Characters*, TRANSADVOCATE (April 5, 2014), http://www.transadvocate.com/the-rayon-effect-what-cisgender-actors-bring-to-transgender-characters_n_13344.htm; Alissa Scheller & Cameron Love, *Transgender People Are More Visible Than Ever, But It's Still Legal to Discriminate Against Them in Most States*, HUFFINGTON POST (June 3, 2015 3:07 PM), http://www.huffingtonpost.com/2015/06/03/transgender-discrimination-laws_n_7502266.html (juxtaposing media frenzy surrounding Caitlyn Jenner with extreme disregard for important issues like trans* homelessness and violence toward transpeople).

17. The Human Rights campaign, which happens to be the most-recognizable gay rights in the United States today, has a long and sordid history of excluding transgender considerations from bills, from working for the organization, and from even consulting with the trans* community for input in its crusade for nationwide same-sex marriage. Executive Director of HRC Elizabeth Burch is infamously quoted as stating that including trans* protections in the Employment Non-Discrimination Act would happen "over her dead body." Monica Roberts, *Why the Transgender Community Hates HRC*, TRANSGRIOT (OCT. 8, 2007), http://transgriot.blogspot.com/2007/10/why-transgender-community-hates-hrc.html.

18. Noting that transgender activist Sylvia Rivera is lauded in the LGBT rights movement as a leader of the Stonewall protests (largely seen as the kick-off of the U.S. movement toward LGBT equality), and transwomen celebrities Laverne Cox and Janet

misconceptions about the trans* community. Thus, the community and its needs remain all too invisible to the public.

A. *Gender Designations in the United States*

The federal government and all states allow an individual to change a driver's license gender designation to or from Male/Female on account of gender identity.[19] The requirements for such an alteration vary, though most states require the applicant to submit a document indicating that the applicant's gender has changed,[20] and many require writings from health care professionals showing whether an individual requesting a designation change suffers from a physical or mental condition and has undergone appropriate treatment.[21] The District of Columbia requires a professional affirmation that the applicant's gender is either male or female and is expected to continue as such for the foreseeable future.[22] Some states still require surgery before a gender

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Mock had been chosen to grand marshal 2014 Pride events in New York City and San Francisco, Meredith Talusman argues that trans people are forgotten when the LGBT Pride celebrations end. Talusman remarks that the story of trans people being marginalized within the LGBT rights movement and tokenized where convenient, is never given enough attention. Meredith Talusman, *45 Years After Stonewall, the LGBT Movement Has a Transphobia Problem*, THE AM. PROSPECT (June 25, 2014), http://prospect.org/article/45-years-after-stonewall-lgbt-movement-has-transphobia-problem (Talusman staunchy criticizes HRC for billing itself as an organization that champions rights for all humans (evident in part by the organization's very name), but in reality apportions "resources primarily towards gay and lesbian rights causes, at a time when the trans people have become the most marginalized group in the American struggle for civil rights." Talusman further argues that "[i]f HRC's rhetoric is founded on the notion that it fights for the right to be human, then [it] must acknowledge that trans people are the most dehumanized group fighting for civil rights in the United States today. To have relied on [the human rights] argument at a time when that mantle belonged to gays and lesbians, then to disavow it when another group has come into existence as a greater priority, only reinforces the shameful truth that the Human Rights Campaign only prioritizes the cause of human rights when those humans happen to be gay and lesbian—but not trans.").

19. *ID Documents Center*, NAT'L CTR. TRANSGEND. EQUAL., http://www.transequality.org/documents (last updated Oct. 19, 2015).

20. For instance, the State of California requires that an applicant complete the Medical Certification and Authorization (Gender Change) form, which includes a physician or psychologist's certification of the applicant's gender identification, "gender demeanor," and whether applicant's gender identification is "transitional" or "complete." For minors, a parent's signature is required. CAL. DEP'T OF MOTOR VEHICLES, MEDICAL CERTIFICATION AND AUTHORIZATION (GENDER CHANGE) (2008), *available at* www.dmv.ca.gov/portal/wcm/connect/683f91d7-5c27-4260-970e-c23139bb8e22/dl329.pdf?MOD=AJPERES; *see Changing Your Legal Identification in California*, TRANSGEND. LAW CTR., http://transgenderlawcenter.org/issues/id/changing-your-legal-identification-in-california (applicants under the age of 18 must provide parent's signature to request gender designation change for a driver's license). *See also Changing Your Driver's License*, TRANS ROAD MAP, http://www.tsroadmap.com/reality/drivers-license.html (listing of requirements by state).

21. *See, e.g.*, CAL. DEP'T OF MOTOR VEHICLES, *supra* note 20.

22. *See ID Documents Center*, *supra* note 19 (under the requirements for Washington D.C.).

designation on a driver's license may be updated,[23] and several require a court order as proof of gender.[24]

However, federal and state measures allowing a sex/gender designation change can only be seen as inadequate. These government protocols conflate gender and sex,[25] a common and problematic confusion.[26] To conflate sex with gender is to reinforce an age-old paradigm as "the foundation of societal order"[27]—that humans are either born male (to become men) or female (to become women), and that specific roles necessarily must follow.[28] The problem the system creates for members of the trans* community is predictable. A trans* individual will very likely be able to change the gender/sex designation on a driver's license so long as state procedure is followed. But for the individual who instead identifies as anything other than male/man or female/woman, the only choice is to assimilate,[29] or conform, to the dominant social order—at least for the purpose of obtaining a driver's license.[30]

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23. *Florida's Name Change Kit: A Guide for Transgender Individuals Seeking to Amend Their Identity to Conform to Their New Legal Name and Gender Designation*, NAT'L CTR. FOR LESBIAN RIGHTS (Aug. 9, 2006), http://www.nclrights.org/wp-content/uploads/2013/07/fl_namechg_kit.pdf (requiring that one must undergo surgery to obtain a different gender marker on a driver license or identification card in the State of Florida); *cf. Know Your Rights*, LAMBDA LEGAL, http://www.lambdalegal.org/know-your-rights/transgender/identity-document-faq#Q2 (half of U.S. states have no surgery requirement at all for a gender designation change on a driver's license).

24. *See, e.g.*, *Change Information on Your Driver License or ID Card*, TEXAS DEP'T PUB. SAFETY, http://www.txdps.state.tx.us/DriverLicense/changes.htm ("A transgender person must bring an original certified court order verifying the change."); *cf. Know Your Rights: Transgender Inclusion & Protection*, SC EQUALITY, http://scequality.org/knowyourrights/transgender/ (requiring medical documentation of gender change, plus a court order or certified birth certificate in the state of South Carolina, but stating that "[t]he general accepted method to change one's gender is to present medical documentation that gender has been changed and a court order to the local DMV").

25. *See, e.g.*, ALASKA DIV. MOTOR VEHICLES, CERTIFICATION FOR CHANGE OF DESIGNATOR ON DRIVER LICENSE OR IDENTIFICATION CARD, *available at* http://doa.alaska.gov/dmv/forms/pdfs/427.pdf (Alaska certification by a health provider refers to both "change of sex designator" and "applicant's gender identification").

26. *See* Thu-Huong Ha, *How Should We Talk About Transgender Issues?*, TED (Mar. 31, 2014), http://ideas.ted.com/2014/03/31/how-should-we-talk-about-transgender-issues (discussing societal reactions to sex/gender distinction by cisgender people, noting "[m]ale and female are the two pillars upon which our society is built. Gender dictates everything from what kind of relationship you get into to where you take a piss. And if you upend that, it's very threatening for people. It challenges the system by which they live.").

27. Francisco Valdes, *Chapter One: Modern Culture: Codification & Internalization*, 83 CALIF. L. REV. 36, 40 (1995).

28. *See generally id.* at 36-118 (discussion found throughout article).

29. *See* Angel Daniel Matos, *Gay Assimilationists Versus Radical Queers: The Death of Queerness?*, THE EVER AND EVER THAT FICTION ALLOWS (Apr. 6, 2013), http://angelmatos.net/2013/04/06/gay-assimilationists-versus-radical-queers-the-death-of-queerness/ ("[A]ssimilationists seek complete integration within existing cultural norms and institutions, while radical queers reject integration because they view it as an embrace of the very values and institutions that have fostered sexual and gender-based oppression in the first place."); *see also Transsexuals, from "Passing" to Radical Assimilation*, TRANSSEXUAL ROAD MAP, http://www.tsroadmap.com/info/assimilation.html (last visited Dec. 3, 2015)

Government requirements of various "proof" to alter a designation—from doctor's notes, court orders, and diagnoses, to entire medical procedures—further indicates that American society is deaf to trans* identity issues and the deeply personal nature of gender. Because gender identity is grounded in self-identity,[31] and is by its very nature not an objectively-derived designation, a state arguably cannot require any showing of proof without denying a person's autonomy.[32] At present, the United States government does not provide a gender designation option for persons who do not identify as either Male or Female, or for intersex persons who for medical reasons feel they do not fit in either binary category.[33]

(regarding MtF transsexuals, the author states "Assimilationists are interested in acceptance as female within mainstream society, and many women in transition who desire to achieve this level of acceptance find it an elusive goal. For some, the price of silence is too high, but for others, it is simply not possible due to appearance and socialization issues. Unfortunately, our community and society at large places a heirarchy [*sic*] based on level of acceptance, which leads some visibly gender variant and unassimilated people to feel inadequate or resentful of being relegated to an "inferior" status."); Kelby Harrison discusses "passing" in similar terms as I use "assimilation" here. In *Sexual Deceit: The Ethics of Passing*, Harrison mentions Claudia Mills' exploration of passing as:

> [E]ither: a) pretending to be x rather than a y, or b) trying in some artificial way to make yourself into an x rather than a y, instead of simply accepting or affirming yourself as a y [with the] motivation to pass . . . [as] grounded in conditions of oppression. One would not wish to be a x if the social conditions did not favor existing as x over y.

Going further, Harrison notes that "'[t]o identify' might be a form of performance, . . . a narrative, or . . . the self-application of an identity marker: such as declaring oneself a Yankees fan." KELBY HARRISON, SEXUAL DECEIT: THE ETHICS OF PASSING 34 (2013).

30. Assimilate to the binary system by choosing either male or female in order to procure the identification documentation sought. *See* Christin Milloy, *Ontario Registrar Has Rejected More than Half of Sex-Designation Requests, Including Mine—and They Shredded My Birth Certificate!*, RISE UP AND SEIZE EQUAL. (June 16, 2013), http://chrismilloy.ca/2013/06/source-ontario-registrar-has-rejected-more-than-half-of-sex-designation-requests-including-mine-and-they-shredded-my-birth-certificate/ (explaining that Canadian transgender individuals may—in theory, and often with difficulty in practice—change the designation on a birth certificate so long as it is changed from "male" to "female" or "female" to "male," while "people with non-binary identities are left out in the cold.").

31. Shuvo Gosh, M.D., *Gender Identity and Gender Role*, MEDSCAPE (June 11, 2012), http://emedicine.medscape.com/article/917990-overview ("Gender identity is defined as a personal conception of oneself as male or female (or rarely, both or neither). This concept is intimately related to the concept of gender role, which is defined as the outward manifestations of personality that reflect the gender identity. Gender identity, in nearly all instances, is self-identified, as a result of a combination of inherent and extrinsic or environmental factors; gender role, on the other hand, is manifested within society by observable factors such as behavior and appearance.").

32. Here, "a state" refers both to country and to any of the several U.S. states. When it comes to passports, issued by the U.S. Department of State, there exists no legitimate interest in the federal government's requirement that a person's sex or gender be designated.

33. *See* Jacob Scobey-Thal, *Third Gender: A Short History: From Ancient Greece to Modern Pakistan, the Political and Cultural Emergence of a Complex, Controversial Term*, FOREIGN POLICY (June 30, 2014), http://foreignpolicy.com/2014/06/30/third-gender-a-short-

For passports, the process is markedly different. As of 2010, an individual may obtain a passport with a changed sex designation, valid for ten years.[34] In order to obtain such a passport, however, the requesting individual must present a letter from a licensed physician familiar with the applicant's transition-related treatment.[35] Moreover, an individual applying for a changed-designation passport must have undergone "appropriate clinical treatment for gender transition" in order to be eligible.[36] The silver lining in the passport application process is that the U.S. Department of State loosely defines what qualifies as appropriate treatment—it really just amounts to whatever one's healthcare provider has decided is appropriate, in the applicant's individual case, to "facilitate gender transition."[37]

While the change certainly means a step in the direction of trans* inclusion, it is far from enough. While the 2010 policy does not necessarily require surgical procedures,[38] only a change from "male" to "female" or from

history/ ("1951-1952: Christine Jorgensen, born George William Jorgensen in New York, completes sex-reassignment surgery in Denmark. Jorgensen, who served in the U.S. Army, gains national recognition as the first American widely known to have had the surgery. New York's *Daily News* runs a front-page story with the headline, 'Ex-GI Becomes Blonde Beauty.' (The United States, however, legally recognizes only two genders; this remains the case today.)"); James Michael Nichols, *White House Petitioned to Legally Recognize Non-Binary Genders*, HUFFPOST GAY VOICES (March 19, 2014 2:36 PM), http://www.huffingtonpost.com/2014/03/19/non-binary-gender-petition_n_4994200.html (Petition to Obama Administration demands that U.S. politicians "legally recognize individuals whose bodies and experiences fall outside of the male/female gender binary." The petition reads in part: "Legal documents in the United States only recognize 'male' and 'female' as genders. . .leaving anyone who does not identify as one of these two genders with no option. . .This petition asks the Obama administration to legally recognize genders outside of the male/female binary, and provide an option for these genders on all legal documents and records."); *see also* Jennifer Rellis, *"Please Write 'E' in This Box" Toward Self-Identification and Recognition of a Third Gender: Approaches in the United States and India*, 14 MICH. J. GENDER & L. 223, 223-27 (2008) (discussing that despite 1-4 percent of the world's population being intersex, American society-at-large does not accept the concept of "sexual identity outside the male-female binary"—a reality depicted in the fact that "the medical standard of care for intersex infants in the United States calls for corrective, [non-medically necessary] surgery aimed at 'normalizing' external genitalia to fit" male/female expectations).

34. *See Understanding the New Passport Gender Change Policy*, NAT'L CTR. TRANSGEND. EQUAL. (Last Updated Mar. 2014), http://www.transequality.org/sites/default/files/docs/kyr/passports_2014.pdf.

35. *Id.*

36. *Id.*

37. *See id.; see also Bureau of Consular Affairs, Gender Reassignment Applicants*, U.S. DEP'T OF STATE, http://travel.state.gov/content/passports/english/passports/information/gender.html (last visited Dec. 3, 2015) ("In order to have the passport issued in your new gender, you must submit a physician certificate with your application that validates whether your gender transition is in process or complete. . . . If a physician certifies that your transition is complete, you are eligible for a full validity ten-year passport.").

38. *Understanding the New Passport Gender Change Policy*, *supra* note 34 (explaining that the doctor need not certify applicant has undergone specific treatment or procedure for passport designation change).

"female" to "male" is allowed.[39] This reality makes circumstances difficult for gender non-conforming persons and those whose healthcare providers may recommend treatment that the passport applicants themselves do not want. It is further unclear as to what constitutes "appropriate" treatment under the new rules, leading commentators to speculate as to whether individuals may be subject to cissupremacist[40] understandings of gender identity.[41] The U.S. government's requirement that a person choose from the traditional gender binary when deciding which designation represents them legally and officially does not leave any options for persons who identify as neither binary gender—other than to choose to live the lie of an unsuitable designation.

B. International Approaches Regarding Trans Identification and Official Identification Documentation*

A handful of countries have taken measures in recent years to alleviate some of the problems trans* and gender non-conforming persons face when choosing a designation for legal documentation.[42] Australia in particular took a

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39. *See* Autumn Sandeen, *X for Indeterminate, Unspecified, or Intersex*, LGBT WEEKLY (Feb. 28, 2013), http://lgbtweekly.com/2013/02/28/x-for-indeterminate-unspecified-or-intersex/ (discussing whether a third gender category should exist in the United States, comparing the most recent changes in trans*-accommodating passport measures in the U.S. with those in Australia which recognize and allow an option for persons who do not identify with their assigned sex, nor with "male" or "female" designations); *see also Bureau of Consular Affairs, Gender Reassignment Applicants*, *supra* note 37 (noting that "completed gender reassignment" or "transition," or one that is "in process" as a qualification for changing the passport designation from M to F, or vice versa).

40. Cissupremacy may be defined as a discriminatory mindset that favors and values cisgender women and men over trans* people. For example, some "women-only" movements have made a point to explicitly exclude trans* women, based on the assertion that women not born with "traditionally female" biology are not real women. Parallels have been drawn with other historical hate groups, including "men's rights" activists and the white supremacist Ku Klux Klan, often citing the transphobic call to action by anti-trans* feminist Janice Raymond that "transsexualism should be 'morally mandated out of existence.'" *See* Joelle Ruby Ryan, *What They Call "Womyn-Only" Space Is Really Cisgender-Only Space*, TRANSADVOCATE (May 21, 2012) http://www.transadvocate.com/what-they-call-womyn-only-space-is-really-cisgender-only-space_n_6289.htm.

41. Aron Macarow questions the adequacy of U.S. passport-issuing policy. The author points out that U.S. Department of State language explaining the issuance of two-year passports (as opposed to the standard 10-year passport book for adults) for persons "in process" rather than "complete" does not make sense. For how does one complete gender? Moreover, societal views of individuals as either male or female still reign in the United States, making travel potentially hard for citizens of countries with more progressive non-binary passport designation options. Macarow offers an anecdote from Australian citizen Morgan Carpenter: "As an adult with an X passport I can tell you that actually using the passport is fraught with difficulty. I can't fly to the US with that passport, indeed I can't even book a meeting about that with their consulate." Aron Macarow, *These Eleven Countries Are Way Ahead of the US on Trans Issues*, (Feb. 9, 2015), http://www.attn.com/stories/868/transgender-passport-status.

42. *See id.* (as of February 2015, Malta offers "X" as a third gender or "decline to state" option for passport applicants, Australia allows an X option, Bangladesh offers an

great stride toward trans* inclusion when Scottish-Australian Norrie May-Welby pursued the legal status of neither man nor woman (for *four years*), and achieved a landmark decision by the High Court.[43] The High Court of Australia eventually found, in April 2014, that the New South Wales Registry of Births, Deaths and Marriages possessed the power to record May-Welby's sex as "not specified."[44] May-Welby was born with male sex organs, and underwent bottom surgery[45] to transition to female.[46] However, May-Welby realized she[47] did not identify as woman, and doctors correspondingly found that she was "neuter," did not identify as male or female, and had neither male nor female sex organs.[48] However, the case of Norrie May-Welby was not the first step taken by Australia to account for nonbinary identified persons. Alex MacFarlane is believed to be the first person in Australia to obtain a passport displaying the sex designation "X"—on account of being intersex,[49] as opposed to May-Welby's status as neuter.

MacFarlane was issued a birth certificate that stated sex as "indeterminate—also known as intersex" in the state of Victoria, Australia.[50] As a result of the decision to allow the "X" marker for MacFarlane, Australian government policy until 2011 was to only allow the "X" marker on passports

"other" category, New Zealand offers an option for non-binary and transgender persons, Germany offers a blank or "X" designation for intersex citizens, India offers a third gender category for intersex, transgender, and hijra individuals, and Nepal offers a third gender category.).

43. In 2010, Norrie May-Welby received a designation of gender neutrality in New South Wales, Australia, becoming the first (publicized, at least) person to be officially recognized as neither man nor woman—or, gender "not specified." May-Welby's birth certificate was changed to reflect the "neutral gender." *See Norrie May-Welby: The World's First Legally Genderless Person*, THE WORLD POST (May 18, 2010, 5:12 AM), http://www.huffingtonpost.com/2010/03/18/norrie-may-welby-the-worl_n_502851.html.

44. Julia Baird, *Neither Female Nor Male*, N.Y. TIMES (April 6, 2014), http://www.nytimes.com/2014/04/07/opinion/neither-female-nor-male.html?_r=1 ("Last week . . . [Australia's] High Court, in a historic decision, ruled that . . . Norrie May-Welby could register as 'nonspecific' on official certificates.").

45. "Bottom surgery" refers to genital surgeries, often referred to as "gender reconstruction surgeries." *Hudson's FTM Resource Guide*, FTMGUIDE.ORG, http://www.ftmguide.org/grs.html (last visited Dec. 3, 2015); *see also Resources and Services – Terminology: Key Terms*, UNIV. OF MAINE, http://umaine.edu/lgbt/resources-3/terminology/ (trans* terminology resource definition: "Bottom Surgery – Surgery on the genitals designed to create a body in harmony with a person's preferred gender expression.").

46. *See* Kirsti Rawstron, *NSW Registrar of Births, Deaths and Marriages v. Norrie: Implications for Sex Segregation Studies* TASA-THE AUSTL. SOC. ASS'N 1, 4-5, https://staging.tasa.org.au/wp-content/uploads/2014/12/Rawston-K.pdf.

47. Norrie May-Welby has stated "she" as the preferred pronoun. *See id.* at 1.

48. *Id.* at 4-5.

49. MacFarlane is regarded as possibly the first person in the world to be issued a passport recognizing their being intersex. While women typically possess a 46XX chromosomal makeup, and men 46XY, MacFarlane possesses a 47XXY chromosomal makeup. *See* Julie Butler, *X Marks the Spot for Intersex Alex*, W. AUSTL. NEWSPAPER (Jan. 2003), http://www.crossdressing.pl/main.php?lv3_id=675&lv2_id=32&lang=en.

50. *See* JENNIFER E. GERMON, GENDER 182 (2009).

when the applicant could "present a birth certificate that notes their sex as indeterminate."[51] In 2011, government policy broadened to allow the issuance of passports with the "X" designation to anyone documented as indeterminate sex, with the guideline that "sex reassignment surgery is not a prerequisite to issue a passport in a new gender," and stating further that the issuing of such a passport did not require amended birth or citizenship documents.[52] The Australian government has further revised requirements for sex and gender recognition, and today extends the "X" designation to all adults who so choose, with the option available in all governmental matters.[53] Moreover, Australian Commonwealth guidelines state that the Australian government recognizes the difference between, and thus collects data regarding gender, as opposed to just sex,[54] stating that "[w]here sex and/or gender information is collected and recorded in a personal record, individuals should be given the option to select M (male), F (female) or X (Indeterminate/Intersex/Unspecified)."[55]

The progress in Australian policy may serve as a model for similar measures in the United States, though not without thorough analysis. Substantial criticism of the Australian developments have since come to light (not least amongst the trans* community), and would have to be dealt with to create a beneficial policy. Critics of the Australian model argue that the Australian government has "further stigmatise[d] an already stigmatised minority" in intersex persons, by treating everyone who happens to fall under the umbrella of indeterminate/intersex/unspecified as one in the same.[56] Gina Wilson, President of Organisation Intersex International Australia, worries that the Australian government's action may lead to unintended consequences for intersex persons—such as the inability to get married—in the event that the inclusion of the X category creates a legally-unrecognized "new class of people, a third sex,"[57] and a second class of citizens. To counter, some trans* rights advocates applaud the Australian government in recognizing that some of its citizens identify as neither male nor female, arguing that May-Welby's court

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51. Australian Human Rights Commission, *Sex Files: The Legal Recognition of Sex in Documents and Government Records*, THE SEX AND GEND. DIVERSITY PROJECT (Mar. 2009), *available at* https://www.humanrights.gov.au/sites/default/files/document/publication/SFR_2009_Web.pdf.

52. *Sex and Gender Diverse Passport Applicants*, AUSTRL. GOV'T DEP'T OF FOREIGN AFFAIRS AND TRADE, AUSTRL. PASSPORT OFFICE https://www.passports.gov.au/passportsexplained/theapplicationprocess/eligibilityoverview/Pages/changeofsexdoborpob.aspx [hereinafter Passport Applicants].

53. *Australian Government Guidelines on the Recognition of Sex and Gender*, AUSTL. GOV'T, ATTORNEY-GENERAL'S DEP'T (May 30, 2013) http://www.ag.gov.au/Publications/Pages/AustralianGovernmentGuidelinesontheRecognitionofSexandGender.aspx.

54. *See id.*

55. *See id.* (click full pdf version of the Guideline, quote at page 4).

56. Alex McKinnon, *Court Ruling "Stigmatises" Intersex People*, *STAROBSERVER (June 7, 2013), http://www.starobserver.com.au/news/court-ruling-stigmatises-intersex-people/104671.

57. *Id.*

victory means that increased scrutiny will be brought to the notion that the binary is the only means of correctly "doing gender".[58]

C. *The Indian Model*

India has also come remarkably far in accommodating trans* people on legal documents compared to other world governments. In *National Legal Services Authority v. Union of India*,[59] the Supreme Court of India recognizes a "third gender" for transgender individuals, which amounts to important changes in the rights of some trans* citizens. This includes a mandate that the Indian government provide transgender persons with the same rights and access to services as the county's other minority groups.[60] The ruling paves the way for increased employment, education, and medical care for the country's large transgender population, which previously had been turned away from such opportunities on the basis of being transgender.[61] In support of the ruling, Justice K.S. Radhakrishnan notes, "Recognition of transgenders as a third gender is not a social or medical issue but a human rights issue."[62]

University of Iowa professor and trans* activist Aniruddha Dutta argues that the Indian "third gender" ruling is overly vague for failure to specify surgery requirements.[63] In one part of the decision, a reference is made to Argentina's model, which does not require medical certification for a person to

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58. Performing gender within particular, perhaps gendered, surroundings. Candace West and Don H. Zimmerman discussed "doing gender" in 1987. "Doing gender involves a complex of socially guided perceptual, interactional, and micropolitical activities that cast particular pursuits as expressions of masculine and feminine 'natures.'" Candace West & Don H. Zimmerman, *Doing Gender*, 1 GENDER & SOC'Y 125, 126 (1987).

59. *See generally National Legal Services Authority v. Union of India and Others*, Writ Petition (Civil) No. 400 of 2012 (India: Supreme Court), *available at* http://www.refworld.org/docid/5356279d4.html [hereinafter India Court]; *see also* http://www.equalrightstrust.org/ertdocumentbank/NLSA%20v%20Union%20of%20India.pdf.

60. Terrence McCoy, *India Now Recognizes Transgender Citizens as "Third Gender,"* WASH. POST, April 15, 2014, http://www.washingtonpost.com/news/morning-mix/wp/2014/04/15/india-now-recognizes-transgender-citizens-as-third-gender/; *India Court Recognizes Transgender People as Third Gender*, BBC NEWS (April 15, 2014), http://www.bbc.com/news/world-asia-india-27031180; Michael K. Lavers, *India Supreme Court Recognizes "Third Gender,"* WASH. BLADE (April 15, 2014, 5:16 PM), http://www.washingtonblade.com/2014/04/15/india-supreme-court-recognizes-third-gender/.

61. *India Court*, *supra* note 59; *see also* Nikita Lalwani, *Landmark Ruling for Transgender Indians*, WALL ST. J. (April 15, 2014 5:56 PM), http://blogs.wsj.com/indiarealtime/2014/04/15/supreme-court-recognizes-transgendered-indians/.

62. *India Court*, *supra* note 59; *see also* Lavers, *supra* note 60 (Justice K.S. Radhakrishnan wrote in the decision, "Discrimination faced by this group in our society is rather unimaginable and their rights have to be protected, irrespective of chromosomal sex, genitals, assigned birth sex or implied gender role . . . [r]ights of transgenders, pure and simple, like hijras, eunuchs, etc., have to also be examined, so also their right to remain as a third gender as well as their physical and psychological integrity.").

63. *See Here & Now: What India's "Third Gender" Ruling Means*, WBUR (May 6, 2014), http://hereandnow.wbur.org/2014/05/06/india-third-gender [hereinafter Here & Now].

self-identify as a gender other than that to which they were assigned at birth.[64] Elsewhere, however, the decision suggests that psychological tests may be required. This is problematic "given the constraints of how diagnosis of gender dysphoria works in psychiatry and medicine, and is often based on binary and linear models of identification."[65] Moreover, the ruling mandates hospital wards exclusively house transgender patients, a requirement that would take away what some see as an individual's right to independently determine in which gender-designated ward they wish to receive treatment.[66] Lastly, Dutta argues that the lack of specificity contained in the decision will provide individual states the discretion to interpret the mandate as they please. Thus, a risk remains of "gender policing by state bureaucratic mechanisms (determining who can be third gender, who can be recognized as transitioned male or female, etc.)," and a return to surgical and hormonal requirements which many trans* people do not want or cannot access.[67]

D. The Ontario Model

The international approaches to sex/gender designation policies that are most similar to those of the U.S. and those discussed in this paper come from Canada. This is not unexpected considering the country's proximity to the United States, as well as its politics, neoconservative in comparison to those of Western Europe. The province of Ontario now allows transgender individuals to change the sex designation on birth certificates, but does not allow a change to anything other than Male or Female.[68] That said, the province no longer requires surgery for such a change to be obtained, upon order by the Human Rights Tribunal of Ontario.[69] However, in contrast with U.S. policy regarding the same matter, one is not required to undergo any medical treatment to change the designation on an Ontario driver's license.[70] Today, at most, an "opinion letter" from a health care provider stating that the change is appropriate may be necessary.[71]

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64. Aniruddha Dutta, *Thoughts on the Supreme Court Judgment on Transgender Recognition and Rights*, ORINAM (April 19, 2014), http://orinam.net/thoughts-supreme-court-judgment-transgender- recognition-rights/.

65. *Id.*

66. *See Here & Now, supra* note 63.

67. Dutta, *supra* note 64.

68. *See* Letter from Helen Kennedy, Exec. Dir., Egale Canada to Alexandra Schmidt, Senior Policy Advisor, SERVICEONTARIO (July 30, 2012), http://egale.ca/all/sex-designation/.

69. *See id.*

70. *See id.*

71. *How Do I Change the Sex on My Driver's Licence?*, SERVICEONTARIO (Feb. 23, 2015), http://www.ontario.ca/faq/how-do-i-change-sex-designation-my-drivers-licence.

E. U.S. Treatment of Trans Detainees Based on Gender Characterization*

"Transgender women are frequently housed with men, dramatically increasing the likelihood of assault."[72] Upon being raped by her male cellmate, a transgender immigration detainee was told by an on-duty staff person to just "deal with it."[73] This treatment is indicative of the federal government's lack of understanding of the realities and needs of trans* people in general, and trans* immigration detainees in particular. Instead of being housed with regard to their self-identified gender, many trans* immigrants in detention are held based on their biology.[74] Other times, trans* detainees are held in solitary confinement for long periods of time, in an attempt by Immigration and Customs Enforcement (ICE) to keep them from being harmed. Such measures often simply usher in the mental harm that comes from being completely isolated for extended periods.[75] Some seventy-five trans* prisoners are detained by ICE any given night, most of them transwomen.[76] The grave repercussions of the federal government's ignorance regarding trans* identity show that pigeonholing individuals into categories in which they do not belong has atrocious results.

It should be noted that non-immigration detention facilities in the United States also operate under an assumption of binary gender.[77] As in immigration detention facilities, prisoners are segregated based on genital appearance—binary segregation that leads to "especially horrific abuse of transgender and

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72. Parker Marie Molloy, *Activists Call for Release of Trans Immigration Detainee Raped in Custody*, THE ADVOCATE (Aug. 1, 2014 5:13 PM), http://www.advocate.com/politics/transgender/2014/08/01/activists-call-release-trans-immigration-detainee-raped-custody.

73. *Id.*

74. Mara Kiesling, Executive Director of the National Center for Transgender Equality, expresses the dire situation of transgender immigration detainees.

> They're housed wrong because they're trans. . . . There are so many alternatives to detention that could be used while waiting for asylum hearings, for deportation, for anything. There are alternatives like house arrest with ankle bracelets. Now, we're not in the business of recommending ankle bracelets, but if people are going to be put into situations where authorities don't want to protect them from frequent sexual assault, maybe ankle bracelets are the right way to go.

Molloy, *supra* note 72.

75. Joanna Vasquez recounts how she was treated in immigration detention due to a lack of appropriate measures for trans* detainees. She was with men, and attacked by a male cellmate. Guards told her the only way to ensure her safety was to house her in solitary confinement—a 6-by-13 foot cell where she was forced to live for 23 hours a day, completely alone, for the remaining seven months she spent awaiting an asylum decision. By the end of her detention, Vasquez "feared she was losing her mind as solitary took its toll." Cristina Costantini et al., *Why Did the U.S. Lock Up These Women with Men?*, FUSION (Nov. 17, 2014 7:00 AM), http://interactive.fusion.net/trans/.

76. *Id.*

77. *See* Alexander L. Lee, *Nowhere to Go But Out: The Collision Between Transgender & Gender-Variant Prisoners and the Gender Binary in America's Prisons*, JUST DETENTION INT'L (Spring 2003), http://www.justdetention.org/pdf/nowheretogobutout.pdf.

gender-variant prisoners whose genders and bodies do not conform to these stereotypes."[78] For example, trans* prisoners who have not undergone surgery to appear "traditionally" male or female, but are imprisoned in wards for a specific binary gender or sex category, are easy targets for harassment and other abuse.[79]

II. ANALYSIS

A. Inadequacy of "Male/Female" as Official Document Fields

> We all interact with gender-segregated facilities and institutions, like bathrooms and locker rooms, but many of us haven't thought about what it means that almost every institution designed to house, exploit the labor of, and control low-income people and people of color is gender-segregated. In all of these locations, gender binaries are enforced by means of humiliation, assault, and rape. . . . [I]n part because a white, liberal civil rights discourse has framed the LGBfakeT rights movement, the vital importance of these issues to the lives of most transpeople has often remained underdocumented, underanalyzed, and insufficiently acted upon. . .[80]

As most gender scholars agree, and briefly touched upon above, gender and sex are inherently separate concepts,[81] and should therefore be addressed accordingly. The United States government, as well as many Americans, regard sex and gender as one and the same—a designation one receives at birth (or, perhaps, upon later surgical procedure) that corresponds to one's sex organs.[82]

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78. *Id.* at 2-3.

79. *See id.* at 25 ("While all prisoners experience the gender-oppressive aspects of incarceration and conditions of confinement, [transgender and gender-variant] people's unique genders make them special targets because [their] bodies and minds defy the gender binary system and therefore pose unique threats to the gender enforcement aspects of state punishment. . . . [They have been] sexually assaulted, raped, and beaten by fellow prisoners and prison staff; subjected to homophobic and transphobic slurs from staff; forced to submit to frequent and unnecessary demeaning strip searches (that are in truth only performed to satisfy staff curiosity about [transgender and gender-variant prisoners'] genitals.)").

80. Dean Spade, *Fighting to Win*, *in* THAT'S REVOLTING! QUEER STRATEGIES FOR RESISTING ASSIMILATION 47, 50 (Mattilda Bernstein Sycamore 2008).

81. *See* OBOS Sexual Orientation & Gender Identity Contributors, *Separating Sex and Gender*, OUR BODIES OUR SELVES (April 10, 2014), http://www.ourbodiesourselves.org/health-info/separating-sex-and-gender/ ("Sex is commonly understood to be based on a person's genitals and reproductive organs; these anatomical details are thought to define a person as male or female. Gender is often understood to refer to gender identity, meaning your internal sense of yourself as female, male, or other, regardless of biology. . . . Gender also commonly refers to gender roles or expression, most often behaviors and physical characteristics considered masculine or feminine in a particular culture.").

82. *See id.* ("In American culture, gender is believed to follow directly from one's biological sex, so a baby born with a vagina is considered female, called a girl, and expected to grow up to be a woman who acts, dresses and talks in a manner considered by the culture

We know the refrain: boys, men, and males have penises, while girls, women, and females are by nature endowed with vaginas and vulvas. For cisgender[83] men and women—even those well-versed in gender studies—the pervasive gender/sex conflation likely glides past largely unnoticed. For trans* persons, however, society's confusion can take a toll on daily lives. "[S]ex is the legal fiction that occurs when the appearance of an infant's genitals at birth (as formalized by an 'M' or 'F' on a birth certificate) results in each person's placement into a legal category of 'male' or 'female.'"[84] But because many trans* persons do not identify with the "M" or "F" on their birth certificate, driver's license, passport, or other legal documentation (the only legal designations currently available in the United States), they must constantly battle the incongruity between who they are and the narrow categories available.

Trans* people often experience dysphoria[85] and depression as a result of their appearance or identity not "matching" the sex or gender designation on, for example, a driver's license. One FTM[86] trans* interviewee explained:

> I started my transition in 2010, injecting [testosterone], but haven't been able to change my license. As if I didn't already feel sick every time someone thought I looked like a woman, now I deal with looking like the man that I am—but have to feel stressed-out and

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and her community to be feminine. A baby born with a penis is considered male, called a boy, and expected to grow up to be a man who acts, dresses and talks in a manner considered to be masculine. In this binary way of thinking, our genitals, not our internal sense of self are the deciding factor.").

83. Cisgender refers to a person who a person who identifies with the gender assigned to them, typically at birth, in contrast to a person who is transgender and identifies with a gender not assigned at birth. Katy Steinmetz, *This is What "Cisgender" Means*, TIME (Dec. 23, 2014), http://time.com/3636430/cisgender-definition/ (author describes "cisgender" as applying to the "vast majority of people, describing a person who is not transgender. If a doctor announces, 'It's a girl!' in the delivery room based on the child's body and that baby grows up to identify as a woman, that person is cisgender." According to statistics, 99% of the population is cisgender, a term that some argue is the "an equal to" the term "transgender").

84. Tomchin, *supra* note 9.

85. A term recently adopted by the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) to "better characterize the experiences of" trans* persons than the DSM-IV's "gender identity disorder." The "critical element" of gender dysphoria is "the presence of clinically significant distress associated" in persons who identify as other than the gender assigned them at birth. According to the American Psychiatric Association, "[g]ender dysphoria is manifested in a variety of ways, including strong desires to be treated as the other gender or to be rid of one's sex characteristics, or a strong conviction that one has feelings and reactions typical of the other gender." *Gender Dysphoria*, AM. PSYCHIATRIC PUBLISHING, *available at* http://www.dsm5.org/documents/gender%20dysphoria%20fact%20sheet.pdf.

86. *Transgender Terminology: FTM*, NAT'L CTR. TRANSGEND. EQUAL., http://www.transequality.org/issues/resources/transgender-terminology (last visited Dec. 3, 2015).

> nauseous because of the potential questions I face if I have to show my ID.[87]

The interviewee noted that his struggle with depression worsens when he feels the stress of potentially being pulled over by the police, or interacting with police in political protest, stating that "it makes me feel like I shouldn't even be part of a demonstration, because the potential of getting arrested and assaulted in a jail is [too much]."[88]

But the issues run deeper for some trans* persons who would prefer to be seen as neither man nor woman. Because gender lies on a spectrum and is fluid, much like sexual orientation, a trans* person might not identify as "wholly male" or "wholly female" at a given point in life.[89] As such, a person's gender identity can also change over time—another reality government bureaucracies are far from understanding or accommodating. The second interviewee, when asked what designation they would prefer to use on official identification documents, stated they would like to be regarded as "something in between" or "queer," but does not see such an option becoming a reality in the United States anytime soon.[90]

> I haven't actually been harassed because I'm trans*, at least that I know of. But I would feel more comfortable with a [designation] that said something other than Male or Female, or maybe [simply not have such a field listed]. I don't necessarily [appear as either-or] at this point, and I guess, until I do, I can see being hassled if I had to show my license [which still states my birth name and birth sex/gender].[91]

We must learn that the obstacles trans* people face, with regard to the "wrong" sex/gender designation, do not disappear when a government agency allows a change from "male" to "female," or vice versa. The inherent fluidity of gender clashes with the binary classification scheme. This reality has serious consequences for those who do not identify as either/or and recognize that they

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87. Interview 1 (author's records).

88. *Id.*

89. Trans* advocacy group TransCentral PA provides an explanation of gender's fluid nature.

> [T]here are multiple domains defining gender. In turn, these domains can be independently characterized across a range of possibilities. Instead of the static, binary model produced through a solely physical understanding of gender, a far more rich texture of biology, gender expression, and gender identity intersect in multidimensional array of possibilities. Quite simply, the gender spectrum represents a more nuanced, and ultimately truly authentic model of human gender.

Transgender 101, TRANSCENTRAL PA, http://www.transcentralpa.org/resources_T101.htm.

90. Interview 2 (author's records).

91. *Id.*

should not be forced to essentially lie or put forth a false veneer by choosing one designation over the other.

The legal option to change the sex/gender designation on one's documentation, even when the individual seeking the alteration *does* identify with either "M" or "F", hardly begins to scratch the surface of the issues the trans* community must endure on account of gender identity, even at the hands of our government. "Discrimination on the basis of gender identity is common in welfare offices, on workfare job sites, in Medicaid offices, and in Administrative Law Hearings for welfare, Medicaid, and Security Disability benefits."[92] For those who manage to navigate the booby-trapped American benefits system, consistent access to entitlements often requires legal representation or other advocacy.[93] Unfortunately, however, "most poverty attorneys and advocacy organizations are still severely lacking in basic information about serving [trans*] clients and may reject cases on the basis of a person's gender identity, or create such an unwelcoming environment that a [trans*] client will not return for services."[94]

B. Gender Policing Based on Binary Assumptions

This Comment refers to gender policing as the invisible framework of rules and punishments society uses to keep people's gender and sexuality in "check," to enforce a binary understanding of Male/Female-only gender. A simple example might be the anecdote of a boy who is made fun of by his peers for playing with dolls or wearing pink, or the parent who polices their child's gender by scolding that "boys don't cry."[95] Others have referred to gender policing in a trans* context to discuss instances of requests for identification by police leading to "presumptions that transgender people are fraudulent, deceitful, or inherently suspicious," or past sumptuary laws which gave police the authority to arrest anyone found "impersonating another gender" by not wearing "gender appropriate clothing."[96]

Trans*-identified individuals note facing "almost insurmountable difficulty when instructed to check an 'F' or 'M' box on identification papers"[97]—neither option is adequate. Some individuals choose to use non-

92. Spade, *supra* note 80, at 49.

93. *Id.* at 50.

94. *Id.*

95. Additionally, Stephanie Medley-Rath recounts her young daughter being socialized at preschool that her favorite color should be pink, as opposed to her own preference of "all the colors." Medley-Rath notes that her daughter "is learning that this inconsequential choice has already been made for her because of her gender." Stephanie Medley-Rath, *I Like All the Colors: Gender Policing Children*, SOCIOLOGY IN FOCUS (Oct. 10, 2012), http://www.sociologyinfocus.com/2012/10/10/i-like-all-the-colors-gender-policing-children/.

96. *Enforcing the Gender Binary*, INCITE! 5, http://www.incite-national.org/sites/default/files/incite_files/resource_docs/3515_toolkitrev-policinggender.pdf.

97. LESLIE FEINBERG, TRANS LIBERATION: BEYOND PINK OR BLUE 1 (Beacon Press 1999).

standard pronouns they feel more sufficiently represent their gender, including, but not limited to ze/hir,[98] and they.[99] When addressing the reasons for pronouns other than he/she or him/her, people often mention things like a need for society to recognize their actual gender and personal truth.

One proposed solution is, of course, to understand gender as a self-assigned social construct and instead use identification markers to signify a person's sex. As one may gather, a "solution" of this sort does not rectify the problem. As Dylan Vade points out: even sex is not a black or white, male or female issue—the biological traits that society and governments use to determine sex still constrain.[100] "[T]here are endless combinations of these categories. . . [of] biological variety,"[101] but we degrade people who do not fit society's notions of the proper biological make-up of what we believe constitute the sexes. Intersex persons, for example, are often considered flawed, or seen as possessing biology that deviate from a "normal"—a "medical and social emergency . . . that must be 'corrected' immediately . . . with a knife."[102] Because our concept of sex is socially constructed and prescribed, not to mention greatly oversimplified, it cannot be said that to only list an individual's sex on documentation is an adequate remedy to the identification designation problem.

Without delving too deeply into the matter, it seems that in due process terms, a government's only purpose in denying trans* persons a non-binary option on official documents is a discriminatory one—or at least one that does not recognize the liberty at stake.

C. *Gender Policing in Detention*

American gender policing has real consequences for trans* people in specific contexts, especially in circumstances where trans* people reside in government detention. Reports show that LGBTQ individuals are abused in these situations at higher rates than those perceived or who identify as outside of the community.[103] Trans* people in particular report especially high rates of

98. *Gender Neutral Pronouns*, TRANS@MIT, http://web.mit.edu/trans/GenderNeutralPronouns.pdf (last visited Dec. 3, 2015).

99. Steven Petrow, *Gender Neutral Pronouns: When "They" Doesn't Identify as Either Male or Female*, WASH. POST, Oct. 27, 2014, http://www.washingtonpost.com/lifestyle/style/gender-neutral-pronouns-when-they-doesnt-identify-as-either-male-or-female/2014/10/27/41965f5e-5ac0-11e4-b812-38518ae74c67_story.html.

100. Dylan Vade, *Expanding Gender and Expanding the Law: Toward a Social and Legal Conceptualization of Gender that Is More Inclusive of Transgender People*, 11 MICH. J. GENDER & L. 253, 271 (2005) (including such traits as chromosomes, reproductive organs, and hormones); *see generally* Julie A. Greenberg, *Defining Male and Female: Intersexuality and the Collision Between Law and Biology*, 41 ARIZ. L. REV. 265, 275 (1999) (internal citation omitted).

101. Vade, *supra* note 100, at 280.

102. *Id.* at 281.

103. Sharita Gruberg, *Dignity Denied: LGBT Immigrants in Immigration Detention*, CTR. FOR AM. PROGRESS (2013), https://cdn.americanprogress.org/wp-

mistreatment in immigration detention, often as a direct result of trans* identity or appearance related to such identity.[104] Astonishingly, United States Immigration and Customs Enforcement (ICE) field offices failed to report some 40 percent of immigration detention center sexual assault allegations to ICE headquarters.[105] Measures have been recently implemented to protect transgender immigrant detainees, but their restrictions keep them from ensuring safe detention for all such persons.

In March 2014, the United States Department of Homeland Security (DHS) finalized standards for the Prison Rape Elimination Act (PREA),[106] which apply to immigrants held in immigration detention institutions owned by DHS, and to ICE.[107] Many of the protections set forth in the PREA standards directly apply to LGBTQ immigrants, and promote safer conditions for them in detention.[108] The standards require DHS to adopt a zero tolerance stance on sexual abuse. They also require all affected detention facilities to adopt written zero-tolerance policies and keep an outline of how they will go about detecting, preventing, and responding to "inappropriate conduct."[109] Importantly, the PREA standards include "safe placement standards" mandating that transgender immigrants not be placed in detention "solely based on identity documents or physical anatomy."[110] Instead, decisions as to where to place transgender individuals must be made after looking at several factors, such as "gender self-identification, health, safety needs, and the advice of a medical or mental health practitioner."[111] In some cases trans* immigrants may be subject to supervised release or other detention alternatives, but when they must be held at a detention facility, the standards dictate that an individual's own gender self-identification should form the basis for placement location.[112] The standards further prohibit examination of an immigrant detainee "for the sole

content/uploads/2013/11/ImmigrationEnforcement.pdf (FOIA requests and complaints filed show that LGBT inmates face "increased risk of abuse in detention" when held in immigration facilities to a similar extent as in general prison populations, "where LGBT inmates are 15 times more likely to be sexually assaulted than the general population.").

104. Amy Lieberman, *Complaints by Transgender Detainees Quantify Abuse*, WOMEN'S E-NEWS (Sept. 3, 2013) http://womensenews.org/story/lesbian-and-transgender/130902/complaints-transgender-detainees-quantify-abuse.

105. Gruberg, *supra* note 103, at 9.

106. *See DHS Announces Finalization of Prison Rape Elimination Act Standards*, U.S. DEP'T OF HOMELAND SECURITY, DHS PRESS OFFICE (Feb. 28, 2014), http://www.dhs.gov/news/2014/02/28/dhs-announces-finalization-prison-rape-elimination-act-standards.

107. Sharita Gruberg, *How the Prison Rape Elimination Act Helps LGBT Immigrants in Detention*, CTR. FOR AM. PROGRESS (April 2, 2014), https://www.americanprogress.org/issues/lgbt/report/2014/04/02/86976/how-the-prison-rape-elimination-act-helps-lgbt-immigrants-in-detention/.

108. *Id.*

109. *Id.*

110. *Id.*

111. *Id.*

112. *Id.*

purpose of determining [their] gender," in order to protect detainees' dignity and curtail wrongful touching by detention center employees.[113]

If followed, the standards appear to protect non-gender binary immigrant detainees from some of the harshest mistreatment typically suffered in detention centers—especially if such individuals are not forced into placement amongst detainee populations that will harm them. Given the reality that trans* people tend to at minimum experience harassment of some sort in any sizeable population of persons not specifically concerned with trans* welfare, it seems impossible that any placement of such individuals in detention facilities would be safe. But the standards appear to allow placement of immigrants in solitary confinement for extended periods so long as such placement was for sexual abuse reasons, and so long as no reasonable less-restrictive alternatives exist. This practice seems to make way for a singling-out of non-binary identified individuals who for identification reasons do not "belong" in either male or female detention facilities. It also allows such individuals to be subjected to the pitfalls of solitary confinement when they can only be held in detention centers.

Naturally, the PREA standards are immeasurably important for the wellbeing of trans* immigrant detainees who, if placed with members of their birth-assigned sex, would be at risk for harm. That said, the standards are not infallible and may even cause trauma in trans* detainees. To note, immigration detention facilities are required under PREA to notify an ICE supervisor within seventy-two hours of placing a detainee in solitary confinement based on "vulnerability to sexual abuse or assault" and determine the existence of less-restrictive options; however, solitary placement may nonetheless take place, a practice that has been found to cause psychological harm to the affected detainee.[114] In contrast, DHS strictly prohibits placement in solitary confinement when such placement decision would be made on the sole basis of an immigrant's gender identity.[115]

Surely we should applaud the U.S. government's attention to the safety and health concerns that arise from the detention of trans* immigrants, but we cannot stop here. The PREA standards again only apply to the treatment of those detainees held in detention facilities DHS owns, which leaves many immigrant detainees housed in facilities owned by private corporations and space rented from county and local facilities without such mandated safeguards.[116]

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113. Gruberg, supra note 103.

114. *See id*

115. *See id.*

116. *See* Mary Meg McCarthy, *U.S. Department of Homeland Security's Sexual Assault Regulations Take Effect Today*, NAT'L IMMIGRANT JUSTICE CTR. (May 6, 2014), https://immigrantjustice.org/press_releases/us-department-homeland-security%E2%80%99s-sexual-assault-regulations-take-effect-today.

D. Discussing Possible Solutions

When it really comes down to it, is it anyone's business what gender or sex a person states on their passport, driver's license, or birth certificate? Because we know neither sex nor gender are determined by a person's looks nor body, this Comment speculates that perhaps no such designation should be included on legal identification. Alternatively, if research proves a vital necessity in stating the shape of an infant's body parts on a birth certificate, then it makes the most sense to actually spell out what a child's genitalia look like. As Julie Greenberg argues, we determine biological sex in large part based on a person's ability to engage in reproductive heterosexual procreation.[117] This seems perverse.

To use this type of system would almost certainly result in discrimination or at least "othering" when an adult or adolescent individual uses said birth certificate to, for example, apply for benefits or a passport if their appearance does not match an issuing agency's perception of how a particular organ-having person should look or act. A person's gender and sex are not to be publicly accessed, scrutinized, controlled, or evaluated. Instead, they are for each individual to know—and no one else, unless given permission by the affected person themselves.

We arrive at the question: where should government "draw the line"? How many designations are necessary to avoid discrimination? It seems the answer might lead down a slippery slope.[118] I will therefore take the inquiry a step further and ask: Is any such designation truly necessary? And, at what point is an inquiry into where one "falls" in relation to "male" or "female" the government's business?[119] Without delving too deeply into the matter, it seems that a government's only purpose in denying trans* persons a non-binary option on official documents is a discriminatory one—or at least one that does not recognize the autonomy at stake.[120] As Jillian T. Weiss argues, perhaps we must question what "putative state interests can be asserted in favor of gender regulations," their legitimacy, and their "rational nexus to the law."[121] If the inability to possess a passport or birth certificate with the appropriate gender designation means that a person is subject to harassment, violence, or

117. Julie Greenberg, *Legal Aspects of Gender Assignment*, ENDOCRINOLOGIST 277, 278 (June 2003).

118. In the sense that, adding countless acceptable designations in the "sex" or "gender" field on documentation applications can never truly satisfy all people, given the fluid, self-identity-based nature of gender, and the many types of intersex.

119. *See generally* Jillian T. Weiss, *Gender Autonomy, Transgender Identity and Substantive Due Process: Finding a Rational Basis for Lawrence v. Texas*, 5 RACE, GENDER & ETHNICITY (Feb. 2010) (arguing that substantive due process may protect gender autonomy and gender self-identity).

120. These are intended as questions to the reader—not as solutions, or a call to action for a particular path toward trans* rights. Instead, the purpose is to begin a discussion as to how Americans should go about addressing lacking identification designations, and what the end goal may be.

121. *See* Weiss, *supra* note 119, at 2.

discomfort when in public situations, then it seems as though one lacks all meaningful autonomy.[122]

E. Taking on the Passport Problem

For U.S. passports to accommodate non-binary identified citizens, several changes to current regulations have to be made. One option is to introduce "X" as an alternative to M and F as a designation in passports. This would not require persons to use "male" or "female" as a designation when they do not wish to have either designator represent them for international travel and identification purposes. Where the X marker is allowed, as in Australia, trans* and intersex persons may feel more able to be open about their gender, but it still does not solve the ultimate problem of gender identity being fixed by the government. This Comment argues that the institution of an "X" marker for passports, while better than no non-binary designation option at all, still confines people to a representation of their sex or gender that they themselves have not chosen. This problem must be rectified. No person should be obligated to live under any such designation with which they have not decided to identify.

Currently, the International Civil Aviation Organisation only allows M, F, and X as accepted designations.[123] The X designation in Australia is meant to signify intersex or unspecified sex. In reality, due to the conflation of sex with gender, it trivializes trans* individuals' genders and encourages a perception that trans* persons are "other." It further implicates a notion that genders other than man or woman can exist, but are not worthy of their own designations. For passport designations to be fair to all, there must be recognition that each individual has the right to personally determine what title best fits who they are as individuals. Either *all* identities should be acceptable on passports, or none at all. The former option should allow for individuals to write in the identifier they want to go by when applying for the document, and their choice should be adopted in the passport itself, no questions asked. We cannot accept for any person's identity to be circumscribed or pigeonholed by institutions, and must instead accept any individual's gender identity.

In the alternative, perhaps sex/gender designations should be scrapped altogether. We should ask: what purpose do they serve? If the purpose is to ensure that travelers are indeed who they portray themselves to be, alternative methods, such as photographs, can serve that function. Passport sex and gender designations are too constraining, not to mention long-lasting[124] to be accurate, effective, and nondiscriminatory. Typical U.S. passports are valid for five or ten years, a timespan during which a person's gender or sexual identity may plausibly change. Not only is a person's gender or sex no one else's business, but to require an individual to pay for a new passport any time their sexual or

122. Weiss recalls her arguments regarding rights of self-determination of gender, and of self-identification of gender based on privacy protection of sensitive information. *Id.* at 6.

123. *Passport Applicants*, *supra* note 52.

124. Whereas gender can change from moment to moment.

gender identity slightly changes is prohibitively expensive.[125] To force the International Civil Aviation Organisation to accommodate all genders (the number of which is, due to the non-static nature of gender, necessarily indeterminate) with computer and infrastructure systems would also be too expensive to implement, not to mention update every time an individual realizes a change in sex or gender. Even further, gender and sex policing by federal passport agencies and international organizations is intrusive and evokes a sort of lifestyle-monitoring that seems to imply that citizens cannot be trusted to exercise personal agency and autonomy.

III. CONCLUSION

Trans*-identifying people are subject to discriminatory treatment based on gender when unable to obtain documentation that accurately depicts who they are. A parallel can be drawn from the lack of appropriate ID designations, to the violence and disparagement many experience in detention—appearing or identifying in some way that governments have yet to accept leads to one being "othered" in governmental institutions. It may be especially difficult to remove a gender/sex designation from, or to add additional designations to, a passport, on account of international rules. Even so, it has become apparent that the task is now upon us.

It appears that the common thread in the discussion regarding designations for non-binary and trans* persons is self-identification. Sex is a private matter, not solely based on a birth certificate (as is the case for intersex persons), and gender is widely regarded as based on one's feelings and perceptions of self. As such, any one person should be able to choose their personal gender where documentation of it is needed. Additionally, it seems that allowing prisoners and detainees a choice of where they will reside while in government custody is the best way to ensure their wellbeing. More than humanitarian concerns, there may be true constitutional issues at stake in the designation debate.

A total restructuring of the American outlook on gender may need to take place for us to eliminate gender designations overall. That said, there is no time like the present to begin the task of better trans* inclusion. Many questions remain in this area of study, outside the scope of this Comment but worth exploration. Among them, what constitutional issues are implicated in a mandatory gender designation requirement? Further, how does such a requirement affect political refugees and international mobility? What bearing might an increase in social, media, and social media coverage of trans* celebrities and queer politics have on public and governmental dispositions toward the role of the binary gender in Millennial America? The author's hope is for readers to discuss the information contained and conclusions drawn in this piece, and to arrive at new conclusions and ideas of their own.

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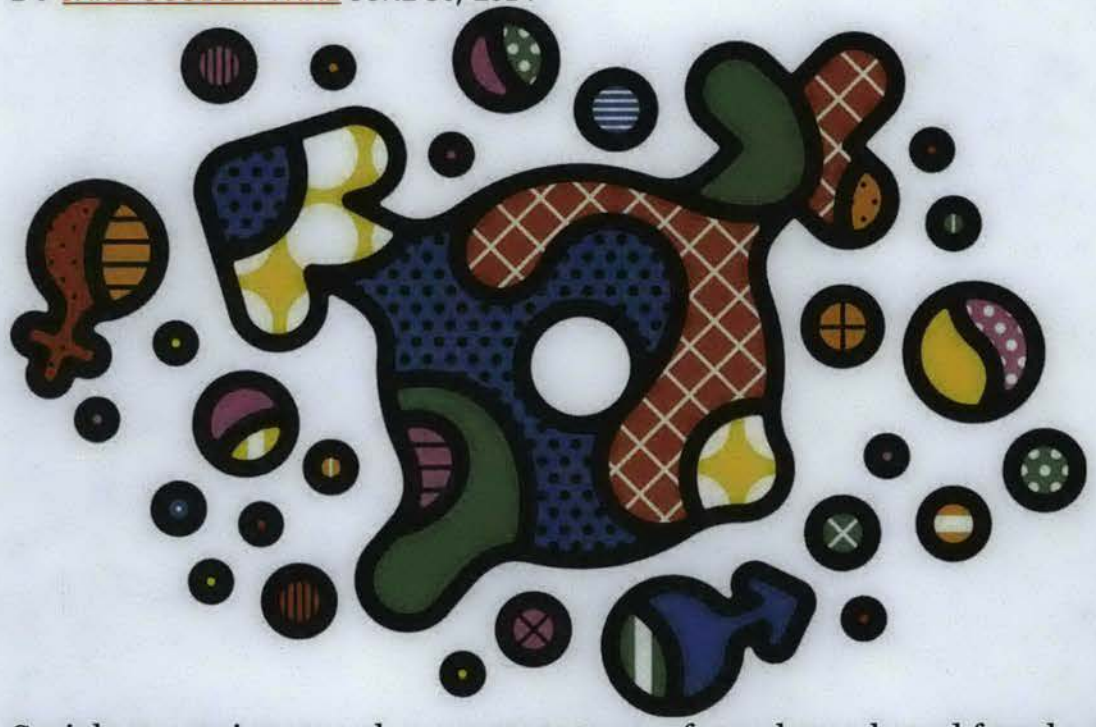
125. Passports typically cost around $100.00 to $150.00. *Passport Fees*, U.S. DEP'T OF ST. AND CONSULAR AFF. http://travel.state.gov/content/passports/english/passports/information/fees.html.

IN BOX

Third Gender: A Short History

From ancient Greece to modern Pakistan, the political and cultural emergence of a complex, controversial term.

BY JAKE SCOBEY-THAL JUNE 30, 2014



Social convention says there are two types of people: male and female. And you know who's who based on their genitalia. But in fact, various cultures have long recognized members who buck the biological binary. The ancients wrote of people who were neither men nor women; individuals have been swapping genders for centuries; and intellectuals have fiercely debated the connection between the body and the self. Today, there are many populations with alternative identities, such as *hijras* in South Asia, *kathoeys* in Thailand, and *muxes* in Mexico. Yet these groups haven't had it easy, often facing discrimination and violence. Only recently has the fight for legal recognition — and respect — of "third gender" begun to bear fruit, thanks to pioneering activists and policymakers. The world, it seems, is slowly embracing an adage once restricted to liberal universities: Gender is a construct, and people should be able to define it for themselves.

385-380 B.C.

Greek philosopher Plato writes *Symposium*, in which men at a drinking party philosophize about the nature of love. Aristophanes, a comic playwright, tells a story of creation in which "original human nature" includes a third sex. This sex "was a distinct kind, with a bodily shape and a name of its own, constituted by the

union of the male and the female: but now only the word 'androgynous' is preserved, and that as a term of reproach."

Around 200 B.C.
The *Manusmriti* (*Laws of Manu*), which forms the basis of Hindu rules, says, "A male child is produced by a greater quantity of male seed, a female child by the prevalence of the female; if both are equal, a third-sex child or boy-and-girl twins are produced." But like many other early writings on human identity, the *Manusmriti* does not distinguish between biological traits and a person's social role: The former determines the latter.

77 B.C.
Genucius, a Roman slave and eunuch, is denied inheritance on the grounds, according to art historian Lynn Roller, of being "neither a man nor a woman." He is "not even allowed to plead his own case, lest the court be polluted by his obscene presence and corrupt voice." Eunuchs, typically castrated men, often hold trusted positions — such as servants or priests — but they are also treated as abnormal.

1400s
Sworn virgins emerge in Albanian communities in the Balkans. Known as *burrneshas* ("he-she"), the virgins are women who take oaths of celibacy and live as men in order to gain certain rights and privileges. For instance, after the death of a head of household and in the absence of male heirs, a woman could become a burrnesha to secure her family's property and honor.

1860s
Karl Heinrich Ulrichs, a German thinker and writer, outlines a theory of homosexuality using "third sex" to categorize men attracted to other men. He also describes such a man as having "a female psyche confined in a male body." This theory competes with Charles Darwin's writings on sexual selection, which assert that two sexes exist for the purpose of reproduction.

1871
British administrators pass the Criminal Tribes Act in India, effectively outlawing the country's *hijras* — a community that includes people born with both male and female biological traits (called "intersex" today), transgender people (those whose gender identity doesn't match their sex assigned at birth), eunuchs, and even cross-dressers. Celebrated in sacred Indian texts, hijras had long been part of South Asian cultures, but colonial authorities viewed them as violating the social order.

1918
Earl Lind (also known as Ralph Werther and Jennie June) publishes *The Autobiography of an Androgyne*, a memoir about coming to identify as "third sex." The book, still studied widely by scholars of gender and sexuality, describes the author's life in New York City, sexual encounters with both men and women, and decision to undergo castration.

1951-1952
Christine Jorgensen, born George William Jorgensen in New York, completes sex-reassignment surgery in Denmark. Jorgensen, who served in the U.S. Army, gains national recognition as the first American widely known to have had the surgery. New York's *Daily News* runs a front-page story with the headline, "Ex-GI Becomes Blonde Beauty." (The United States, however, legally recognizes only two genders; this remains the case today.)

1950s
Psychologist John Money popularizes the term "gender role." He controversially studies intersex children to understand how social and environmental factors, in addition to genetic and hormonal ones, help determine whether a person identifies as male or female. Money's theories provide an important basis for efforts — spearheaded by the burgeoning feminist movement — to argue that gender is not simply a function of biology.

1966
Endocrinologist Harry Benjamin, who treated Jorgensen, publishes *The Transsexual Phenomenon*, with a "sex orientation scale" for men engaging in feminine behaviors. At one end are men who occasionally dress as women but don't want to be female; at the other end are men who consider themselves female and urgently want reassignment surgery. "The dominant status of the genital organs for the determination of one's sex," Benjamin writes, "has been shaken."

1970s
Mexicans in Oaxaca state establish Vela de las Intrepidas (Vigil of the Intrepids), a festival celebrating ambiguous gender identities. The Zapotec culture embraces a third-gender population called *muxes*: men who consider themselves women and others who don't strictly identify one way or the other. Muxes trace back to pre-Columbian times, when there were "cross-dressing Aztec priests and Mayan gods who were male and female at the same time," according to the *New York Times*.

1980
The American Psychiatric Association (APA) codifies "gender identity disorder," a condition in which there is a disparity between a person's assigned sex and expressed gender identity. The diagnosis allows practitioners to justify hormone treatment, sex-reassignment surgery, and other care. But critics argue that categorizing certain gender identities as mental illness is discriminatory. (In 2012, the APA renames the condition "gender dysphoria.")

1980s
Iran's supreme leader, Ayatollah Ruhollah Khomeini, issues a fatwa proclaiming no religious restriction on reassignment surgery, previously sanctioned only for intersex people. The ayatollah had been lobbied by transgender activist Maryam Khatoon Molkara. Today, Iran is a top destination for the surgery, but the trend has a dark underbelly: Many gay Iranians choose surgery to avoid persecution for homosexuality, which is still punishable by death. Iran does not recognize alternative genders.

Dec. 21, 2007
Nepal's Supreme Court mandates that the government establish a third-gender category ("other") on citizenship documents. The ruling comes in an anti-discrimination case filed by Sunil Pant, Asia's first openly gay federal-level politician and founder of the Blue Diamond Society, an NGO that works closely with transgender sex workers (long targets of police brutality in Nepal). Despite the ruling, third-gender people continue to report harassment. As of 2014, according to activists, only five individuals had officially registered as "other."

Dec. 23, 2009
Pakistan's Supreme Court orders the creation of national identity cards on which hijras can identify as a distinct gender.

Sept. 15, 2011
The Australian government announces that passports will include a third-gender option. However, the new regime has limitations: Applicants wishing to select "X" as their gender must provide a letter from a medical professional confirming that they are intersex or do not identify with the sex assigned to them at birth. (Similarly, people wishing to change their gender — from, say, female to male — must provide a letter confirming that they are undergoing treatment for a gender transition.)

Nov. 1, 2013
Germany announces that it will allow parents to register newborns as indeterminate on birth certificates. The legislation is adopted to mitigate pressure

to pursue immediate surgery for babies born with ambiguous physical features. A review by the German Ethics Council had revealed problems created by forced operations. "I will remain the patchwork created by doctors, bruised and scarred," one adult tells the BBC of surgery performed soon after birth.

Feb. 13, 2014
Facebook expands gender settings on user profiles. These include some 50 new options, including "cisgender" (someone who has a gender identity regularly associated with his or her biological sex), "neutrois" (someone who rejects a gender binary entirely), and — simply — "other."

April 15, 2014
India's Supreme Court recognizes the right of people, including hijras, to identify as third gender. The ruling requires the government to establish quotas for third-gender people in employment and education, like those already in place for other minorities. The court states, "It is the right of every human being to choose their gender."

Illustration by Craig & Karl for FP

oii AUSTRALIA

Organisation Intersex International Australia Limited

(https://oii.org.au)

On Australian passports and "X" for sex

By Admin (https://oii.org.au/author/admin/) on 9 October 2011

()THE first person to be granted an X on their passport here in Australia was Alex MacFarlane, first reported in 2003. (http://www.tandfonline.com/doi/abs/10.1080/09505430802280784?journalCode=csac20#.Un8OUZFw1cc) Eligibility was improved in 2011, under a 2011 revised (http://www.foreignminister.gov.au/releases/2011/kr_mr_110914b.html) Department of Foreign Affairs & Trade (DFAT) policy (https://www.passports.gov.au/Web/SexGenderApplicants.aspx), and the policy was extended across the federal government in 2013.

The history of the X sex marker

The only allowable designators under ICAO rules are M, F or X where X signifies "sex unknown". X has been available since 1945 when the United Nations (UN) (http://www.un.org/en/) vested control of passports in the International Civil Aviation Organisation (ICAO) (http://www2.icao.int/en/home/default.aspx).

We have been advised that the X arose out of the huge refugee migration following World War II (http://en.wikipedia.org/wiki/World_War_II). Several international organizations such as the Red Cross (http://en.wikipedia.org/wiki/International_Red_Cross_and_Red_Crescent_Movement) were responsible for resettling refugees and displaced persons following that conflict. Emergency passports were generated in large numbers to allow the quick resettlement of individuals without any identifying documentation and from places where that documentation had been destroyed during the war. When making up the passports the agencies could not, from the names alone, decipher the sex of the individuals due to foreign names often being too complicated for the ears of French, English and American aid workers.

X was made an allowable designator in view of the difficulties resettlement aid workers had with unfamiliar names and the sex usually associated with them. The rules do not require that the X must eventually be resolved into an F or M designation, though that was likely the intention when the policy was drafted. We are legally able to take advantage of this facility despite differences between the original objective and the current policy.


X marks the spot for intersex Alex

(http://www.bodieslikeours.org/pdf/xmarks.pdf)

Australian policy from 2003 to 2011

Australia has issued X on passports at least since 2003 (https://oii.org.au/18734/smh-recognition-non-specific/) when a Victorian-born Western Australian-resident intersex person, Alex MacFarlane, fought for that designator through the Administrative Appeals Tribunal and was reported to receive a passport.

Five or six Australians were granted the right to an X designator under this subsequent policy, where it was necessary to have "not specified" stated on one's birth certificate to qualify for an X designation. The Australian Human Rights Commission's *Sex files* documented this policy in section 8.2 (a). (https://www.humanrights.gov.au/sex-files-legal-recognition-concluding-paper-sex-and-gender-2009#Heading495)

The state of Victoria maintained the only birth registry that was willing to have that appellation on a birth certificate and would only do so for people known to be intersex and where that was evident from the original notification of birth paperwork – the birth certificate.

Consequently X was rarely put on passports.

The 2011 policy increases access

As of 2011, the qualification to receive an 'X' sex designation on a passport is based simply on a medical doctor's letter stating that you live as a person of indeterminate, unknown or non-specified gender*.

The 2011 policy eases the burden of proof so that a letter from a medical practitioner is all that is required to qualify, making it much easier for intersex people and anyone else to opt for it.

The X is available because of an insistence from OII Australia, and especially by our president Gina Wilson who advised the Ministerial Panel, that an X must continue to be available for intersex people who desire it.

Anyone can apply so long as they have a willing doctor – our impression is that this degree of availability was somewhat inadvertent, due to use of the word "intermediate" rather than "intersex".

OII Australia continues to lobby for the X designator to be freely available to everyone as a matter of choice and without other qualifying documents.

Update, 2013

In mid 2013, the Australian government introduced new federal guidelines for the recognition of sex and gender. These explicitly enable access to 'X' gender markers by any intersex or gender diverse person who seeks it and can obtain doctor or psychologist certification. The guidelines standardise federal data on sex and gender, and clarify that the government prefers to collect data on gender, not sex.

More information on the 2013 guidelines. (https://oii.org.au/22636/welcome-guidelines-sex-gender-recognition/)

Footnote

()*Sex, and not gender, is the marker on passports. Legislation and regulations typically don't distinguish the two.

More information

- Major reform to Australian passport law (https://oii.org.au/14416/australia-reforms-passports-law/)
- Ten years of 'X' passports, and no protection from discrimination (https://oii.org.au/21597/ten-years-of-x-passports-and-no-protection-from-discrimination/)

Categories: FAQs / Key Data (https://oii.org.au/category/faqs/), Sex and gender recognition (https://oii.org.au/category/research/recognition/), Travel (https://oii.org.au/category/research/travel/)

WPATH WORLD PROFESSIONAL ASSOCIATION for TRANSGENDER HEALTH

Re: 2015 WPATH Statement on Identity Recognition

WPATH already opposes surgery or sterilization as requirements to change legal gender, per WPATH's Identity Recognition Statement, 2010. However, some governments erect many other legal barriers preventing trans people having congruent identity documents. Some of these barriers involve health professionals directly, e.g., examining people and filling out paperwork for court proceedings. These legal barriers are harmful to trans people's health because they make social transition more difficult, put congruent identity documents out of the reach of many, and even contribute to trans people's vulnerability to discrimination and violence. These laws are at odds with WPATH's perspectives expressed in SOC 7 and in our letters advising governments at those governments' request.

The statement, dated January 19, 2015, written by the WPATH Public Policy Committee and approved by the WPATH Board of Directors, is this Association's recommendation, grounded in our clinical experience as health and legal professionals.

Jamison Green, PhD
WPATH President

WPATH Statement on Legal Recognition of Gender Identity

January 19, 2015

The World Professional Association for Transgender Health (WPATH) recognizes the right of all people to legal identity recognition and to identity documents consonant with their gender identity. Further, for optimal physical and mental health, all persons must enjoy the right to freely express their gender identity, whether or not that identity conforms to the expectations of others. Legally recognized documents matching self-identity are essential to the ability of all people to find employment, to navigate everyday transactions, to obtain health care, and to travel safely; transgender, transsexual, or gender-nonconforming status should not preclude individuals from enjoying the legal recognition all citizens expect and deserve. Barriers to legal recognition for transgender and transsexual individuals may harm physical and mental health. WPATH continues to oppose surgery or sterilization requirements to change legal sex or gender markers. No particular medical, surgical, or mental health treatment or diagnosis is an adequate marker for anyone's gender identity, so these should not be requirements for legal gender change. WPATH Standard of Care 7 recognizes that there is a spectrum of gender identities, and that choices of identity limited to Male or Female may be inadequate to reflect all gender identities: an option of X or Other (as examples) may be advisable. Marital status and parental status should not affect legal recognition of gender change, and appropriate legal gender recognition should be available to transgender youth. The right to legal recognition of gender extends to those incarcerated or institutionalized. Court hearings create financial and logistical barriers to legal gender change, and may also violate personal privacy rights or needs.

Therefore, the World Professional Association for Transgender Health urges governments to eliminate unnecessary barriers, and to institute simple and accessible administrative procedures for transgender people to obtain legal recognition of gender, consonant with each individual's identity, when gender markers on identity documents are considered necessary.

URL of this page: //medlineplus.gov/ency/article/001669.htm

Intersex

Intersex is a group of conditions where there is a discrepancy between the external genitals and the internal genitals (the testes and ovaries).

The older term for this condition is hermaphroditism. Although the older terms are still included in this article for reference, they have been replaced by most experts, patients and families. Increasingly, this group of conditions is being called disorders of sex development (DSDs).

Causes

Intersex can be divided into 4 categories:

- 46, XX intersex
- 46, XY intersex
- True gonadal intersex
- Complex or undetermined intersex

Each one is discussed in more detail below. Note: In many children, the cause of intersex may remain undetermined, even with modern diagnostic techniques.

46, XX INTERSEX

The person has the chromosomes of a woman, the ovaries of a woman, but external (outside) genitals that appear male. This most often is the result of a female fetus having been exposed to excess male hormones before birth. The labia ("lips" or folds of skin of the external female genitals) fuse, and the clitoris enlarges to appear like a penis. In most cases, this person has a normal uterus and fallopian tubes. This condition is also called 46, XX with virilization. It used to be called female pseudohermaphroditism. There are several possible causes:

- Congenital adrenal hyperplasia (the most common cause).
- Male hormones (such as testosterone) taken or encountered by the mother during pregnancy.

- Male hormone-producing tumors in the mother: These are most often ovarian tumors. Mothers who have children with 46, XX intersex should be checked unless there is another clear cause.
- Aromatase deficiency: This one may not be noticeable until puberty. Aromatase is an enzyme that normally converts male hormones to female hormones. Too much aromatase activity can lead to excess estrogen (female hormone); too little to 46, XX intersex. At puberty, these XX children, who had been raised as girls, may begin to take on male characteristics.

46, XY INTERSEX

The person has the chromosomes of a man, but the external genitals are incompletely formed, ambiguous, or clearly female. Internally, testes may be normal, malformed, or absent. This condition is also called 46, XY with undervirilization. It used to be called male pseudohermaphroditism. Formation of normal male external genitals depends on the appropriate balance between male and female hormones. Therefore, it requires the adequate production and function of male hormones. 46, XY intersex has many possible causes:

- Problems with the testes: The testes normally produce male hormones. If the testes do not form properly, it will lead to undervirilization. There are a number of possible causes for this, including XY pure gonadal dysgenesis.
- Problems with testosterone formation: Testosterone is formed through a series of steps. Each of these steps requires a different enzyme. Deficiencies in any of these enzymes can result in inadequate testosterone and produce a different syndrome of 46, XY intersex. Different types of congenital adrenal hyperplasia can fall in this category.
- Problems with using testosterone: Some people have normal testes and make adequate amounts of testosterone, but still have 46, XY intersex due to conditions such as 5-alpha-reductase deficiency or androgen insensitivity syndrome (AIS).

  People with 5-alpha-reductase deficiency lack the enzyme needed to convert testosterone to dihydrotestosterone (DHT). There are at least 5 different types of 5-alpha-reductase deficiency. Some of the babies have normal male genitalia, some have normal female genitalia, and many have something in between. Most change to external male genitalia around the time of puberty.

  AIS is the most common cause of 46, XY intersex. It has also been called testicular feminization. Here, the hormones are all normal, but the receptors to male hormones don't function properly. There are over 150 different defects that have been identified so far, and each causes a different type of AIS.

TRUE GONADAL INTERSEX

The person must have both ovarian and testicular tissue. This may be in the same gonad (an ovotestis), or the person might have 1 ovary and 1 testis. The person may have XX chromosomes, XY chromosomes, or both. The external genitals may be ambiguous or may appear to be female or male. This condition used to be called true hermaphroditism. In most people with true gonadal intersex, the underlying cause is unknown, although in some animal studies it has been linked to exposure to common agricultural pesticides.

COMPLEX OR UNDETERMINED INTERSEX DISORDERS OF SEXUAL DEVELOPMENT

Many chromosome configurations other than simple 46, XX or 46, XY can result in disorders of sex development. These include 45, XO (only one X chromosome), and 47, XXY, 47, XXX - both cases have an extra sex chromosome, either an X or a Y. These disorders do not result in a condition where there is discrepancy between internal and external genitalia. However, there may be problems with sex hormone levels, overall sexual development, and altered numbers of sex chromosomes.

Symptoms

The symptoms associated with intersex will depend on the underlying cause. They may include:

- Ambiguous genitalia at birth
- Micropenis
- Clitoromegaly (an enlarged clitoris)
- Partial labial fusion
- Apparently undescended testes (which may turn out to be ovaries) in boys
- Labial or inguinal (groin) masses (which may turn out to be testes) in girls
- Hypospadias (the opening of the penis is somewhere other than at the tip; in females, the urethra [urine canal] opens into the vagina)
- Otherwise unusual-appearing genitalia at birth
- Electrolyte abnormalities
- Delayed or absent puberty
- Unexpected changes at puberty

Exams and Tests

The following tests and exams may be done:

- Chromosome analysis
- Hormone levels (for example, testosterone level)
- Hormone stimulation tests
- Electrolyte tests
- Specific molecular testing
- Endoscopic exam (to verify the absence or presence of a vagina or cervix)
- Ultrasound or MRI to evaluate whether internal sex organs are present (for example, a uterus)

Treatment

Ideally, a team of health care professionals with expertise in intersex should work together to understand and treat the child with intersex and support the family.

Parents should understand controversies and changes in treating intersex in recent years. In the past, the prevailing opinion was that it was generally best to assign a gender as quickly as possible. This was often based on the external genitals rather than the chromosomal gender. Parents were told to have no ambiguity in their minds as to the gender of the child. Prompt surgery was often recommended. Ovarian or testicular tissue from the other gender would be removed. In general, it was considered easier to reconstruct female genitalia than functioning male genitalia, so if the "correct" choice was not clear, the child was often assigned to be a girl.

More recently, the opinion of many experts has shifted. Greater respect for the complexities of female sexual functioning has led them to conclude that suboptimal female genitalia may not be inherently better than suboptimal male genitalia, even if the reconstruction is "easier." In addition, other factors may be more important in gender satisfaction than functioning external genitals. Chromosomal, neural, hormonal, psychological, and behavioral factors can all influence gender identity.

Many experts now urge delaying definitive surgery for as long as is healthy, and ideally involving the child in the gender decision.

Clearly, intersex is a complex issue, and its treatment has short- and long-term consequences. The best answer will depend on many factors, including the specific cause of the intersex. It is best to take the time to understand the issues before rushing into a decision. An intersex support group may help acquaint families with the latest research, and may provide a community of other families, children, and adult individuals who have faced the same issues.

Support Groups

Support groups are very important for families dealing with intersex.

Different support groups may differ in their thoughts regarding this very sensitive topic. Look for one that supports your thoughts and feelings on the topic.

The following organizations provide further information:

- Association for X and Y chromosome variations: www.axysgenetic.org [http://www.axysgenetic.org]
- CARES Foundation: www.caresfoundation.org [http://www.caresfoundation.org]
- Congenital Adrenal Hyperplasia Education and Support Network: www.congenitaladrenalhyperplasia.org [http://www.congenitaladrenalhyperplasia.org]
- Hypospadias and Epispadias Association: www.heainfo.org [http://www.heainfo.org]
- Intersex Society of North America: www.isna.org [http://www.isna.org]
- Turner Syndrome Society of the United States: www.turnersyndrome.org

- XXYY Project: xxyysyndrome.org/main [http://xxyysyndrome.org/main]

Outlook (Prognosis)

Please see information on the individual conditions. The prognosis depends on the specific cause of intersex. With understanding, support, and appropriate treatment, overall outlook is excellent.

When to Contact a Medical Professional

If you notice that your child has unusual genitalia or sexual development, discuss this with your health care provider.

Alternative Names

Disorders of sex development; DSDs; Pseudohermaphroditism; Hermaphroditism; Hermaphrodite

References

Donohoue PA. Disorders of sex development. In: Kliegman RM, Stanton BF, St Geme JW III, Schor NF, eds. *Nelson Textbook of Pediatrics*. 20th ed. Philadelphia, PA: Elsevier; 2016:chap 588.

Wherrett DK. Approach to the infant with a suspected disorder of sex development. *Pediatr Clin North Am*. 2015;62(4):983-99. PMID: 26210628 www.ncbi.nlm.nih.gov/pubmed/26210628 [https://www.ncbi.nlm.nih.gov/pubmed/26210628].

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U.S. Department of Health and Human Services National Institutes of Health
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FACT SHEET

Intersex

FREE & EQUAL
UNITED NATIONS FOR LGBT EQUALITY

What does 'intersex' mean?

Intersex people are born with sex characteristics (including genitals, gonads and chromosome patterns) that do not fit typical binary notions of male or female bodies.

Intersex is an umbrella term used to describe a wide range of natural bodily variations. In some cases, intersex traits are visible at birth while in others, they are not apparent until puberty. Some chromosomal intersex variations may not be physically apparent at all.

According to experts, between 0.05% and 1.7% of the population is born with intersex traits – the upper estimate is similar to the number of red haired people.

Being intersex relates to biological sex characteristics, and is distinct from a person's sexual orientation or gender identity. An intersex person may be straight, gay, lesbian, bisexual or asexual, and may identify as female, male, both or neither.

Because their bodies are seen as different, intersex children and adults are often stigmatized and subjected to multiple human rights violations, including violations of their rights to health and physical integrity, to be free from torture and ill-treatment, and to equality and non-discrimination.

Physical integrity

It has become common practice to subject intersex children to unnecessary surgical and other procedures for the purpose of trying to make their appearance conform to binary sex stereotypes.

These often irreversible procedures can cause permanent infertility, pain, incontinence, loss of sexual sensation, and lifelong mental suffering, including depression. Regularly performed without the full, free and informed consent of the person concerned, who is frequently too young to be part of the decision-making, these procedures may violate their rights to physical integrity, to be free from torture and ill-treatment, and to live free from harmful practices.

Such procedures are frequently justified on the basis of cultural and gender norms and discriminatory beliefs about intersex people and their integration into society.

Discriminatory attitudes can never justify human rights violations, including forced treatment and violations of the right to physical integrity. States have a duty to combat harmful stereotypes and discrimination, rather than reinforcing them. Such procedures may sometimes also be justified on the basis of alleged health benefits, but these are often proposed on the basis of weak evidence and without discussing alternative solutions that protect physical integrity and respect autonomy.

Unfortunately, such beliefs and societal pressures are often reflected by doctors, as well as parents of intersex children, who may encourage and/or give their agreement to such procedures, despite the lack of medical indication, necessity or urgency, and despite the fact that such procedures may violate human rights standards. Agreement is frequently given in absence of information on the short and long-term consequences of such surgery and lack of contact with peers, including intersex adults and their families.

Many intersex adults exposed to such surgery as children emphasize the shame and stigma linked to attempts to erase their intersex traits, as well as significant physical and mental suffering, including as a result of extensive and painful scarring. Many also feel that they were forced into sex and gender categories that do not fit them.

Given their irreversible nature and impact on physical integrity and autonomy, such medically unnecessary, unsolicited surgery or treatment should be prohibited. Intersex children and their families should receive adequate counselling and support, including from peers.

Discrimination

Intersex persons are often subjected to discrimination and abuse if it becomes known that they are intersex, or if they are perceived not to conform to gender norms. Anti-discrimination laws do not typically ban discrimination against intersex persons, leaving them vulnerable to discriminatory practices in a range of settings, including access to health services, education, public services, employment and sports.

UNITED NATIONS HUMAN RIGHTS
OFFICE OF THE HIGH COMMISSIONER

Health-care professionals often lack the needed training, knowledge and understanding to take into account the specific health needs of intersex persons, provide appropriate healthcare, and respect the autonomy and rights of intersex persons to physical integrity and health.

Some intersex people also face barriers and discrimination if they wish to or need to amend sex markers on birth certificates and official documents.

Intersex athletes face a specific set of obstacles. There have been several cases of female intersex athletes who have been disqualified from sports competitions on the basis of their intersex traits. However, being intersex of itself does not entail better performance, whereas other physical variations that do affect performance, such as height and muscle development, are not subjected to such scrutiny and restrictions.

Protection and Remedy

Intersex people should be protected from violations of their rights. Whenever such violations occur, they should be investigated and alleged perpetrators prosecuted. Victims should have access to effective remedy, including redress and compensation.

Intersex people should also be consulted in the development of legislation and policies that impact on their rights.

Positive developments

In 2013, Australia adopted the Sex Discrimination Amendment (Sexual Orientation, Gender Identity and Intersex Status) Act – the first law to include intersex status as a stand-alone prohibited ground of discrimination. The Australian Senate has also carried out an official inquiry into the involuntary or coerced sterilization of intersex people.

In 2015, Malta adopted the Gender Identity, Gender Expression and Sex Characteristics Act – the first law to prohibit surgery and treatment on the sex characteristics of minors without informed consent. It also prohibits discrimination on the basis of sex characteristics.

Action points

States:

- Prohibit medically unnecessary surgery and procedures on the sex characteristics of intersex children, protect their physical integrity and respect their autonomy.
- Ensure that intersex people and their families receive adequate counselling and support, including from peers.
- Prohibit discrimination on the basis of intersex traits, characteristics or status, including in education, health care, employment, sports and access to public services, and address such discrimination through relevant anti-discrimination initiatives.
- Ensure that human rights violations against intersex people are investigated and alleged perpetrators prosecuted, and that victims of such violations have access to effective remedy, including redress and compensation.
- National human rights bodies should research and monitor the human rights situation of intersex people.
- Enact laws to provide for facilitated procedures to amend sex markers on the birth certificates and official documents of intersex people.
- Provide health care personnel with training on the health needs and human rights of intersex people and the appropriate advice and care to give to parents and intersex children, being respectful of the intersex person's autonomy, physical integrity and sex characteristics.
- Ensure that members of the judiciary, immigration officers, law enforcement, healthcare, education and other officials and personnel are trained to respect and provide equal treatment to intersex persons.
- Ensure that intersex people and organizations are consulted and participate in the development of research, legislation and policies that impact on their rights.

Media:

- Include the voices of intersex people and groups in newspaper, TV and radio coverage.
- Give an objective and balanced picture of intersex people and their human rights concerns.
- Do not make assumptions about the sexual orientation or gender identity of intersex people.

You, your friends and other individuals can make a difference too:

- Speak out when you see any form of discrimination or violence against intersex people.
- Remember that intersex people may have any sexual orientation and gender identity.

How common is intersex?

To answer this question in an uncontroversial way, you'd have to first get everyone to agree on **what counts as intersex** —and also to agree on what should count as strictly male or strictly female. That's hard to do. How small does a penis have to be before it counts as intersex? Do you count "sex chromosome" anomalies as intersex if there's no apparent external sexual ambiguity?[1] (Alice Dreger explores this question in greater depth in her book **Hermaphrodites and the Medical Invention of Sex**.)

Here's what we do know: If you ask experts at medical centers how often a child is born so noticeably atypical in terms of genitalia that a specialist in sex differentiation is called in, the number comes out to about 1 in 1500 to 1 in 2000 births. But a lot more people than that are born with subtler forms of sex anatomy variations, some of which won't show up until later in life.

Below we provide a summary of statistics drawn from an article by Brown University researcher Anne Fausto-Sterling.[2] The basis for that article was an extensive review of the medical literature from 1955 to 1998 aimed at producing numeric estimates for the frequency of sex variations. Note that the frequency of some of these conditions, such as congenital adrenal hyperplasia, differs for different populations. These statistics are approximations.

Not XX and not XY	one in 1,666 births
Klinefelter (XXY)	one in 1,000 births
Androgen insensitivity syndrome	one in 13,000 births
Partial androgen insensitivity syndrome	one in 130,000 births
Classical congenital adrenal hyperplasia	one in 13,000 births
Late onset adrenal hyperplasia	one in 66 individuals
Vaginal agenesis	one in 6,000 births
Ovotestes	one in 83,000 births
Idiopathic (no discernable medical cause)	one in 110,000 births
Iatrogenic (caused by medical treatment, for instance progestin administered to pregnant mother)	no estimate
5 alpha reductase deficiency	no estimate
Mixed gonadal dysgenesis	no estimate
Complete gonadal dysgenesis	one in 150,000 births
Hypospadias (urethral opening in perineum or along penile shaft)	one in 2,000 births
Hypospadias (urethral opening between corona and tip of glans penis)	one in 770 births
Total number of people whose bodies differ from standard male or female	one in 100 births
Total number of people receiving surgery to "normalize" genital appearance	one or two in 1,000 births

[1] Dreger, Alice Domurat. 1998. **Ambiguous Sex—or Ambivalent Medicine? Ethical Issues in the Treatment of Intersexuality**. Hastings Center Report, 28, 3: 24-35.

[2] Blackless, Melanie, Anthony Charuvastra, Amanda Derryck, Anne Fausto-Sterling, Karl Lauzanne, and Ellen Lee. 2000. **How sexually dimorphic are we? Review and synthesis.** *American Journal of Human Biology* 12:151-166.

We were recently asked to update these frequency figures, and a lively **discussion** arose between two staff members.

What is intersex? Intersex conditions

CULTURE

This is What Intersex Means

Katy Steinmetz
Nov 21, 2014

A longer version of LGBT is LGBTQQIA, which stands for lesbian, gay, bisexual, transgender, queer, questioning, intersex and allies. The last few letters tend to get far less attention than the first, but a woman who claimed she was dating the Olympic swimmer Michael Phelps at the time of his DUI recently has raised interest in the "I."

"The truth is I have been living with secrets my whole life," Taylor Lianne Chandler wrote on Facebook on Nov. 13. "I was born intersex and named David Roy Fitch at birth."

Intersex is a term that refers to someone whose anatomy or genetics at birth—the X and Y chromosomes that are usually XX for women and XY for men—do not correspond to the typical expectations for either sex. The "I" is distinct from the "T" for transgender people, who are typically born with a biological sex that fits the norm for male or female and then grow up to identify with the opposite gender. Intersex babies are not obviously male or female to begin with, according to society's general rules about what one's physical characteristics and chromosomal makeup are supposed to signify.

As University of Oregon professor and intersex expert Elizabeth Reis writes in her book *Bodies in Doubt*, "In the United States and most other places, humans are men or they are women; they may not be neither or both. Yet not all bodies are clearly male or female." That may mean a child has typical female chromosomes and ovaries but external bodies parts of a male. Or it could mean the body parts that a doctor typically looks to when declaring a baby to be a girl or boy are incompletely formed, or ambiguous. Sometimes it's clear in the delivery room, sometimes intersex people don't become aware of their status until they are teenagers and puberty doesn't happen as expected.

Performing surgery on an intersex baby is controversial. In South Carolina, the parents of an adopted intersex child are suing a hospital and its employees for surgically assigning "M.C.'s" sex as female at 16-months-old. Now around 10 years old, the child identifies as a boy. "Genital 'normalizing' surgery does not create or cement a gender identity; it just takes tissue away that the patient may want later," writes the Intersex Society of North America in their position statement. Some in the intersex community choose not to have any

medically unnecessary surgeries to change how they were born, even after they are old enough to identify their own gender and sexual orientation.

Though it's hard to say exactly how common being intersex is (since it's debatable which people belong under that umbrella term), medical experts say that genital anomalies occur in about 1 in 2,000 babies.

It's worth noting that the word *hermaphrodite* is considered insensitive and stigmatizing by many who see it as "vague, demeaning, and sensationalistic, conjuring mythic images of monsters and freaks," as Reis writes. Some parents have also balked at the word *intersex*, pushed by activists in the 1990s, feeling it suggests their child has a third gender and can not be a girl or a boy. In the medical establishment, the wide variety of conditions that might be referred to as *intersex* are typically referred to as *disorders of sex development*. Reis has advocated shifting that to *divergence of sex development*, to avoid the connotations of *disorder*, much as *gender identity disorder* was rebranded *gender dysphoria* by medical professionals addressing transgender people.

NEWS FEATURE

SEX REDEFINED

THE IDEA OF TWO SEXES IS SIMPLISTIC. BIOLOGISTS NOW THINK THERE IS A WIDER SPECTRUM THAN THAT.

BY CLAIRE AINSWORTH

As a clinical geneticist, Paul James is accustomed to discussing some of the most delicate issues with his patients. But in early 2010, he found himself having a particularly awkward conversation about sex.

A 46-year-old pregnant woman had visited his clinic at the Royal Melbourne Hospital in Australia to hear the results of an amniocentesis test to screen her baby's chromosomes for abnormalities. The baby was fine — but follow-up tests had revealed something astonishing about the mother. Her body was built of cells from two individuals, probably from twin embryos that had merged in her own mother's womb. And there was more. One set of cells carried two X chromosomes, the complement that typically makes a person female; the other had an X and a Y. Halfway through her fifth decade and pregnant with her third child, the woman learned for the first time that a large part of her body was chromosomally male[1]. "That's kind of science-fiction material for someone who just came in for an amniocentesis," says James.

Sex can be much more complicated than it at first seems. According to the simple scenario, the presence or absence of a Y chromosome is what counts: with it, you are male, and without it, you are female. But doctors have long known that some people straddle the boundary — their sex chromosomes say one thing, but their gonads (ovaries or testes) or sexual anatomy say another. Parents of children with these kinds of conditions — known as intersex conditions, or differences or disorders of sex development (DSDs) — often face difficult decisions about whether to bring up their child as a boy or a girl. Some researchers now say that as many as 1 person in 100 has some form of DSD[2].

When genetics is taken into consideration, the boundary between the sexes becomes even blurrier. Scientists have identified many of the genes involved in the main forms of DSD, and have uncovered variations in these genes that have subtle effects on a person's anatomical or physiological sex. What's more, new technologies in DNA sequencing and cell biology are revealing that almost everyone is, to varying degrees, a patchwork of genetically distinct cells, some with a sex that might not match that of the rest of their body. Some studies even suggest that the sex of each cell drives its behaviour, through a complicated network of molecular interactions. "I think there's much greater diversity within male or female, and there is certainly an area of overlap where some people can't easily define themselves within the binary structure," says John Achermann, who studies sex development and endocrinology at University College London's Institute of Child Health.

These discoveries do not sit well in a world in which sex is still defined in binary terms. Few legal systems allow for any ambiguity in biological sex, and a person's legal rights and social status can be heavily influenced by whether their birth certificate says male or female.

"The main problem with a strong dichotomy is that there are intermediate cases that push the limits and ask us to figure out exactly where the dividing line is between males and females," says Arthur Arnold at the University of California, Los Angeles, who studies biological sex differences. "And that's often a very difficult problem, because sex can be defined a number of ways."

THE START OF SEX

That the two sexes are physically different is obvious, but at the start of life, it is not. Five weeks into development, a human embryo has the potential to form both male and female anatomy. Next to the developing kidneys, two bulges known as the gonadal ridges emerge alongside two pairs of

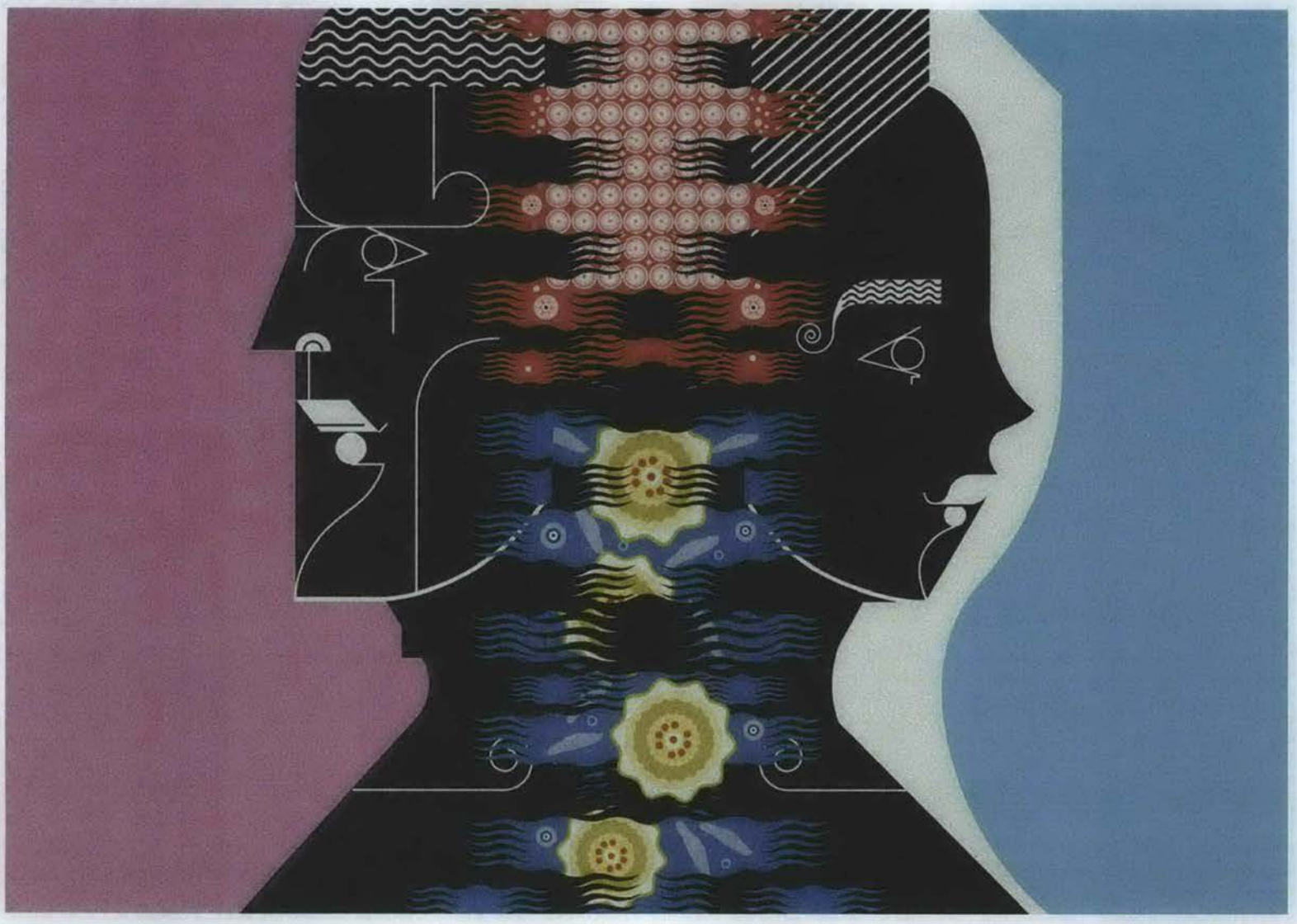

ILLUSTRATION BY JONNY WAN

ducts, one of which can form the uterus and Fallopian tubes, and the other the male internal genital plumbing: the epididymes, vas deferentia and seminal vesicles. At six weeks, the gonad switches on the developmental pathway to become an ovary or a testis. If a testis develops, it secretes testosterone, which supports the development of the male ducts. It also makes other hormones that force the presumptive uterus and Fallopian tubes to shrink away. If the gonad becomes an ovary, it makes oestrogen, and the lack of testosterone causes the male plumbing to wither. The sex hormones also dictate the development of the external genitalia, and they come into play once more at puberty, triggering the development of secondary sexual characteristics such as breasts or facial hair.

Changes to any of these processes can have dramatic effects on an individual's sex. Gene mutations affecting gonad development can result in a person with XY chromosomes developing typically female characteristics, whereas alterations in hormone signalling can cause XX individuals to develop along male lines.

For many years, scientists believed that female development was the default programme, and that male development was actively switched on by the presence of a particular gene on the Y chromosome. In 1990, researchers made headlines when they uncovered the identity of this gene[3,4], which they called *SRY*. Just by itself, this gene can switch the gonad from ovarian to testicular development. For example, XX individuals who carry a fragment of the Y chromosome that contains *SRY* develop as males.

By the turn of the millennium, however, the idea of femaleness being a passive default option had been toppled by the discovery of genes that actively promote ovarian development and suppress the testicular programme — such as one called *WNT4*.

NATURE.COM
For a podcast on the sex spectrum, see:
go.nature.com/xowzq5

XY individuals with extra copies of this gene can develop atypical genitals and gonads, and a rudimentary uterus and Fallopian tubes[5]. In 2011, researchers showed[6] that if another key ovarian gene, *RSPO1*, is not working normally, it causes XX people to develop an ovotestis — a gonad with areas of both ovarian and testicular development.

These discoveries have pointed to a complex process of sex determination, in which the identity of the gonad emerges from a contest between two opposing networks of gene activity. Changes in the activity or amounts of molecules (such as WNT4) in the networks can tip the balance towards or away from the sex seemingly spelled out by the chromosomes. "It has been, in a sense, a philosophical change in our way of looking at sex; that it's a balance," says Eric Vilain, a clinician and the director of the Center for Gender-Based Biology at the University of California, Los Angeles. "It's more of a systems-biology view of the world of sex."

BATTLE OF THE SEXES

According to some scientists, that balance can shift long after development is over. Studies in mice suggest that the gonad teeters between being male and female throughout life, its identity requiring constant maintenance. In 2009, researchers reported[7] deactivating an ovarian gene called *Foxl2* in adult female mice; they found that the granulosa cells that support the development of eggs transformed into Sertoli cells, which support sperm development. Two years later, a separate team showed[8] the opposite: that inactivating a gene called *Dmrt1* could turn adult testicular cells into ovarian ones. "That was the big shock, the fact that it was going on post-natally," says Vincent Harley, a geneticist who studies gonad development at the MIMR-PHI Institute for Medical Research in Melbourne.

The gonad is not the only source of diversity in sex. A number of DSDs are caused by changes in the machinery that responds to hormonal

THE SEX SPECTRUM

A typical male has XY chromosomes, and a typical female has XX. But owing to genetic variation or chance events in development, some people do not fit neatly into either category. Some are classed as having differences or disorders of sex development (DSDs), in which their sex chromosomes do not match their sexual anatomy.

	Typical male	Subtle variations	Moderate variations	46,XY DSD
Chromosomes	XY	XY	XY	XY
Gonads	Testes	Testes	Testes	Testes
Genitals	Male internal and external genitals	Male internal and external genitals	Male external genitals with anatomical variations such as urethral opening on underside of penis.	Often ambiguous
Other characteristics/ examples	Male secondary sexual characteristics	Subtle differences such as low sperm production. Some caused by variation in sex-development genes.	Affects 1 in 250–400 births.	The hormonal disorder persistent Müllerian duct syndrome results in male external genitals and testes, but also a womb and Fallopian tubes.

signals from the gonads and other glands. Complete androgen insensitivity syndrome, or CAIS, for example, arises when a person's cells are deaf to male sex hormones, usually because the receptors that respond to the hormones are not working. People with CAIS have Y chromosomes and internal testes, but their external genitalia are female, and they develop as females at puberty.

Conditions such as these meet the medical definition of DSDs, in which an individual's anatomical sex seems to be at odds with their chromosomal or gonadal sex. But they are rare — affecting about 1 in 4,500 people[9]. Some researchers now say that the definition should be widened to include subtle variations of anatomy such as mild hypospadias, in which a man's urethral opening is on the underside of his penis rather than at the tip. The most inclusive definitions point to the figure of 1 in 100 people having some form of DSD, says Vilain (see 'The sex spectrum').

But beyond this, there could be even more variation. Since the 1990s, researchers have identified more than 25 genes involved in DSDs, and next-generation DNA sequencing in the past few years has uncovered a wide range of variations in these genes that have mild effects on individuals, rather than causing DSDs. "Biologically, it's a spectrum," says Vilain.

A DSD called congenital adrenal hyperplasia (CAH), for example, causes the body to produce excessive amounts of male sex hormones; XX individuals with this condition are born with ambiguous genitalia (an enlarged clitoris and fused labia that resemble a scrotum). It is usually caused by a severe deficiency in an enzyme called 21-hydroxylase. But women carrying mutations that result in a milder deficiency develop a 'non-classical' form of CAH, which affects about 1 in 1,000 individuals; they may have male-like facial and body hair, irregular periods or fertility problems — or they might have no obvious symptoms at all. Another gene, *NR5A1*, is currently fascinating researchers because variations in it cause a wide range of effects[10], from underdeveloped gonads to mild hypospadias in men, and premature menopause in women.

SURGEONS DISCOVERED THAT THE MAN HAD A WOMB. HE WAS 70.

Many people never discover their condition unless they seek help for infertility, or discover it through some other brush with medicine. Last year, for example, surgeons reported that they had been operating on a hernia in a man, when they discovered that he had a womb[11]. The man was 70, and had fathered four children.

CELLULAR SEX

Studies of DSDs have shown that sex is no simple dichotomy. But things become even more complex when scientists zoom in to look at individual cells. The common assumption that every cell contains the same set of genes is untrue. Some people have mosaicism: they develop from a single fertilized egg but become a patchwork of cells with different genetic make-ups. This can happen when sex chromosomes are doled out unevenly between dividing cells during early embryonic development. For example, an embryo that starts off as XY can lose a Y chromosome from a subset of its cells. If most cells end up as XY, the result is a physically typical male, but if most cells are X, the result is a female with a condition called Turner's syndrome, which tends to result in restricted height and underdeveloped ovaries. This kind of mosaicism is rare, affecting about 1 in 15,000 people.

The effects of sex-chromosome mosaicism range from the prosaic to the extraordinary. A few cases have been documented in which a mosaic XXY embryo became a mix of two cell types — some with two X chromosomes and some with two Xs and a Y — and then split early in development[12]. This results in 'identical' twins of different sexes.

There is a second way in which a person can end up with cells of different chromosomal sexes. James's patient was a chimaera: a person who develops from a mixture of two fertilized eggs, usually owing to a merger between embryonic twins in the womb. This kind of chimaerism resulting in a DSD is extremely rare, representing about 1% of all DSD cases.

Another form of chimaerism, however, is now known to be widespread. Termed microchimaerism, it happens when stem cells from a fetus cross the placenta into the mother's body, and vice versa. It was first identified in the early 1970s — but the big surprise came more than two decades later, when researchers discovered how long these crossover cells survive, even though they are foreign tissue that the body should, in theory, reject. A study in 1996 recorded women with fetal cells in their blood as many as 27 years after giving birth[13]; another found that maternal cells remain in children up to adulthood[14]. This type of work has further blurred the sex divide, because it means that men often carry cells from their mothers, and women who have been pregnant with a male fetus can carry a smattering of its discarded cells.

Microchimaeric cells have been found in many tissues. In 2012, for example, immunologist Lee Nelson and her team at the University of Washington in Seattle found XY cells in post-mortem samples of women's brains[15]. The oldest woman carrying male DNA was 94 years old. Other studies have shown that these immigrant cells are not idle; they integrate into their new environment and acquire specialized functions, including (in mice at least) forming neurons in the brain[16]. But what is not known is how a peppering of male cells in a female, or vice versa, affects the health or characteristics of a tissue — for example, whether it makes the tissue more susceptible to diseases more common in the opposite sex. "I think that's a great question," says Nelson, "and it is essentially entirely unaddressed." In terms of human behaviour, the consensus is that a few male microchimaeric cells in the brain seem unlikely to have a major effect on a woman.

Scientists are now finding that XX and XY cells behave in different ways, and that this can be independent of the action of sex hormones. "To tell you the truth, it's actually kind of surprising how big an effect of sex chromosomes we've been able to see," says Arnold. He and his colleagues have shown[17] that the dose of X chromosomes in a mouse's body can affect its metabolism, and studies in a lab dish suggest[18] that XX and XY cells behave differently on a molecular level, for example with different metabolic responses to stress. The next challenge, says

	Ovotesticular DSD	46,XX testicular DSD	Moderate variations	Subtle variations	Typical female
Chromosomes	XX, XY or mix of both	XX	XX	XX	XX
Gonads	Both ovarian and testicular tissue	Small testes	Ovaries	Ovaries	Ovaries
Genitals	Ambiguous	Male external genitals	Female internal and external genitals	Female internal and external genitals	Female internal and external genitals
Other characteristics/ examples	Rare reports of predominantly XY people conceiving and bearing a healthy child.	Usually caused by presence of male sex-determining gene *SRY*.	Variations in sex development such as premature shutdown of ovaries. Some caused by variation in sex-development genes.	Subtle differences such as excess male sex hormones or polycystic ovaries.	Female secondary sexual characteristics

Arnold, is to uncover the mechanisms. His team is studying the handful of X-chromosome genes now known to be more active in females than in males. "I actually think that there are more sex differences than we know of," says Arnold.

BEYOND THE BINARY

Biologists may have been building a more nuanced view of sex, but society has yet to catch up. True, more than half a century of activism from members of the lesbian, gay, bisexual and transgender community has softened social attitudes to sexual orientation and gender. Many societies are now comfortable with men and women crossing conventional societal boundaries in their choice of appearance, career and sexual partner. But when it comes to sex, there is still intense social pressure to conform to the binary model.

This pressure has meant that people born with clear DSDs often undergo surgery to 'normalize' their genitals. Such surgery is controversial because it is usually performed on babies, who are too young to consent, and risks assigning a sex at odds with the child's ultimate gender identity — their sense of their own gender. Intersex advocacy groups have therefore argued that doctors and parents should at least wait until a child is old enough to communicate their gender identity, which typically manifests around the age of three, or old enough to decide whether they want surgery at all.

This issue was brought into focus by a lawsuit filed in South Carolina in May 2013 by the adoptive parents of a child known as MC, who was born with ovotesticular DSD, a condition that produces ambiguous genitalia and gonads with both ovarian and testicular tissue. When MC was 16 months old, doctors performed surgery to assign the child as female — but MC, who is now eight years old, went on to develop a male gender identity. Because he was in state care at the time of his treatment, the lawsuit alleged not only that the surgery constituted medical malpractice, but also that the state denied him his constitutional right to bodily integrity and his right to reproduce. Last month, a court decision prevented the federal case from going to trial, but a state case is ongoing.

"This is potentially a critically important decision for children born with intersex traits," says Julie Greenberg, a specialist in legal issues relating to gender and sex at Thomas Jefferson School of Law in San Diego, California. The suit will hopefully encourage doctors in the United States to refrain from performing operations on infants with DSDs when there are questions about their medical necessity, she says. It could raise awareness about "the emotional and physical struggles intersex people are forced to endure because doctors wanted to 'help' us fit in," says Georgiann Davis, a sociologist who studies issues surrounding intersex traits and gender at the University of Nevada, Las Vegas, who was born with CAIS.

Doctors and scientists are sympathetic to these concerns, but the MC case also makes some uneasy — because they know how much is still to be learned about the biology of sex[19]. They think that changing medical practice by legal ruling is not ideal, and would like to see more data collected on outcomes such as quality of life and sexual function to help decide the best course of action for people with DSDs — something that researchers are starting to do.

Diagnoses of DSDs once relied on hormone tests, anatomical inspections and imaging, followed by painstaking tests of one gene at a time. Now, advances in genetic techniques mean that teams can analyse multiple genes at once, aiming straight for a genetic diagnosis and making the process less stressful for families. Vilain, for example, is using whole-exome sequencing — which sequences the protein-coding regions of a person's entire genome — on XY people with DSDs. Last year, his team showed[20] that exome sequencing could offer a probable diagnosis in 35% of the study participants whose genetic cause had been unknown.

Vilain, Harley and Achermann say that doctors are taking an increasingly circumspect attitude to genital surgery. Children with DSDs are treated by multidisciplinary teams that aim to tailor management and support to each individual and their family, but this usually involves raising a child as male or female even if no surgery is done. Scientists and advocacy groups mostly agree on this, says Vilain: "It might be difficult for children to be raised in a gender that just does not exist out there." In most countries, it is legally impossible to be anything but male or female.

Yet if biologists continue to show that sex is a spectrum, then society and state will have to grapple with the consequences, and work out where and how to draw the line. Many transgender and intersex activists dream of a world where a person's sex or gender is irrelevant. Although some governments are moving in this direction, Greenberg is pessimistic about the prospects of realizing this dream — in the United States, at least. "I think to get rid of gender markers altogether or to allow a third, indeterminate marker, is going to be difficult."

So if the law requires that a person is male or female, should that sex be assigned by anatomy, hormones, cells or chromosomes, and what should be done if they clash? "My feeling is that since there is not one biological parameter that takes over every other parameter, at the end of the day, gender identity seems to be the most reasonable parameter," says Vilain. In other words, if you want to know whether someone is male or female, it may be best just to ask. ■

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1. James, P. A., Rose, K., Francis, D. & Norris, F. *Am. J. Med. Genet. A* **155,** 2484–2488 (2011).
2. Arboleda, V. A., Sandberg, D. E. & Vilain, E. *Nature Rev. Endocrinol.* **10,** 603–615 (2014).
3. Sinclair, A. H. *et al. Nature* **346,** 240–244 (1990).
4. Berta, P. *et al. Nature* **348,** 448–450 (1990).
5. Jordan, B. K. *et al. Am. J. Hum. Genet.* **68,** 1102–1109 (2001).
6. Tomaselli, S. *et al. PLoS ONE* **6,** e16366 (2011).
7. Uhlenhaut, N. H. *et al. Cell* **139,** 1130–1142 (2009).
8. Matson, C. K. *et al. Nature* **476,** 101–104 (2011).
9. Hughes, I. A., Houk, C., Ahmed, S. F., Lee, P. A. & LWPES1/ESPE2 Consensus Group *Arch. Dis. Child.* **91,** 554–563 (2006).
10. El-Khairi, R. & Achermann, J. C. *Semin. Reprod. Med.* **30,** 374–381 (2012).
11. Sherwani, A. Y. *et al. Int. J. Surg. Case Rep.* **5,** 1285–1287 (2014).
12. Tachon, G. *et al. Hum. Reprod.* **29,** 2814–2820 (2014).
13. Bianchi, D. W., Zickwolf, G. K., Weil, G. J., Sylvester, S. & DeMaria, M. A. *Proc. Natl Acad. Sci. USA* **93,** 705–708 (1996).
14. Maloney, S. *et al. J. Clin. Invest.* **104,** 41–47 (1999).
15. Chan, W. F. N. *et al. PLoS ONE* **7,** e45592 (2012).
16. Zeng, X. X. *et al. Stem Cells Dev.* **19,** 1819–1830 (2010.
17. Link, J. C., Chen, X., Arnold, A. P. & Reue, K. *Adipocyte* **2,** 74–79 (2013).
18. Penaloza, C. *et al. FASEB J.* **23,** 1869–1879 (2009).
19. Warne, G. L. *Sex Dev.* **2,** 268–277 (2008).
20. Baxter, R. M. *et al. J. Clin. Endocrinol. Metab.* **100,** E333–E344 (2014).

The Harry Benjamin International Gender Dysphoria Association's Standards Of Care For Gender Identity Disorders, Sixth Version

February, 2001

Committee Members: Walter Meyer III M.D. (Chairperson), Walter O. Bockting Ph.D., Peggy Cohen-Kettenis Ph.D., Eli Coleman Ph.D., Domenico DiCeglie M.D., Holly Devor Ph.D., Louis Gooren M.D., Ph.D., J. Joris Hage M.D., Sheila Kirk M.D., Bram Kuiper Ph.D., Donald Laub M.D., Anne Lawrence M.D., Yvon Menard M.D., Stan Monstrey M.D., Jude Patton PA-C, Leah Schaefer Ed.D., Alice Webb D.H.S., Connie Christine Wheeler Ph.D.

This is the sixth version of the Standards of Care since the original 1979 document.
Previous revisions were in 1980, 1981, 1990, and 1998.

Table of Contents:

I. Introductory Concepts

The Purpose of the Standards of Care. The major purpose of the Standards of Care (SOC) is to articulate this international organization's professional consensus about the psychiatric, psychological, medical, and surgical management of gender identity disorders. Professionals may use this document to understand the parameters within which they may offer assistance to those with these conditions. Persons with gender identity disorders, their families, and social institutions may use the SOC to understand the current thinking of professionals. All readers should be aware of the limitations of knowledge in this area and of the hope that some of the clinical uncertainties will be resolved in the future through scientific investigation.

The Overarching Treatment Goal. The general goal of psychotherapeutic, endocrine, or surgical therapy for persons with gender identity disorders is lasting personal comfort with the gendered self in order to maximize overall psychological well-being and self-fulfillment.

The Standards of Care Are Clinical Guidelines. The SOC are intended to provide flexible directions for the treatment of persons with gender identity disorders. When eligibility

requirements are stated they are meant to be minimum requirements. Individual professionals and organized programs may modify them. Clinical departures from these guidelines may come about because of a patient's unique anatomic, social, or psychological situation, an experienced professional's evolving method of handling a common situation, or a research protocol. These departures should be recognized as such, explained to the patient, and documented both for legal protection and so that the short and long term results can be retrieved to help the field to evolve.

The Clinical Threshold. A clinical threshold is passed when concerns, uncertainties, and questions about gender identity persist during a person's development, become so intense as to seem to be the most important aspect of a person's life, or prevent the establishment of a relatively unconflicted gender identity. The person's struggles are then variously informally referred to as a gender identity problem, gender dysphoria, a gender problem, a gender concern, gender distress, gender conflict, or transsexualism. Such struggles are known to occur from the preschool years to old age and have many alternate forms. These reflect various degrees of personal dissatisfaction with sexual identity, sex and gender demarcating body characteristics, gender roles, gender identity, and the perceptions of others. When dissatisfied individuals meet specified criteria in one of two official nomenclatures--the International Classification of Diseases-10 (ICD-10) or the Diagnostic and Statistical Manual of Mental Disorders--Fourth Edition (DSM-IV)--they are formally designated as suffering from a gender identity disorder (GID). Some persons with GID exceed another threshold--they persistently possess a wish for surgical transformation of their bodies.

Two Primary Populations with GID Exist -- Biological Males and Biological Females. The sex of a patient always is a significant factor in the management of GID. Clinicians need to separately consider the biologic, social, psychological, and economic dilemmas of each sex. All patients, however, should follow the SOC.

II. Epidemiological Considerations

Prevalence. When the gender identity disorders first came to professional attention, clinical perspectives were largely focused on how to identify candidates for sex reassignment surgery. As the field matured, professionals recognized that some persons with bona fide gender identity disorders neither desired nor were candidates for sex reassignment surgery. The earliest estimates of prevalence for transsexualism in adults were 1 in 37,000 males and 1 in 107,000 females. The most recent prevalence information from the Netherlands for the transsexual end of the gender identity disorder spectrum is 1 in 11,900 males and 1 in 30,400 females. Four observations, not yet firmly supported by systematic study, increase the likelihood of an even higher prevalence: 1) unrecognized gender problems are occasionally diagnosed when patients are seen with anxiety, depression, bipolar disorder, conduct disorder, substance abuse, dissociative identity disorders, borderline personality disorder, other sexual disorders and intersexed conditions; 2) some nonpatient male transvestites, female impersonators, transgender people, and male and female homosexuals may have a form of gender identity disorder; 3) the intensity of some persons' gender identity disorders fluctuates below and above a clinical threshold; 4) gender variance among female-bodied individuals tends to be relatively invisible to the culture, particularly to mental health professionals and scientists.

Natural History of Gender Identity Disorders. Ideally, prospective data about the natural history of gender identity struggles would inform all treatment decisions. These are lacking, except for the demonstration that, without therapy, most boys and girls with gender identity disorders outgrow their wish to change sex and gender. After the diagnosis of GID is made the therapeutic approach usually includes three elements or phases (sometimes labeled triadic therapy): a real-life experience in the desired role, hormones of the desired gender, and surgery to change the genitalia and other sex characteristics. Five less firmly scientifically established observations prevent clinicians from prescribing the triadic therapy based on diagnosis alone: 1) some carefully diagnosed persons spontaneously change their aspirations; 2) others make more comfortable accommodations to their gender identities without medical interventions; 3) others give up their wish to follow the triadic sequence during psychotherapy; 4) some gender identity clinics have an unexplained high drop out rate; and 5) the percentage of persons who are not benefited from the triadic therapy varies significantly from study to study. Many persons with GID will desire all three elements of triadic therapy. Typically, triadic therapy takes place in the order of hormones = = > real-life experience = = > surgery, or sometimes: real-life experience = = > hormones = = > surgery. For some biologic females, the preferred sequence may be hormones = = > breast surgery = = > real-life experience. However, the diagnosis of GID invites the consideration of a variety of therapeutic options, only one of which is the complete therapeutic triad. Clinicians have increasingly become aware that not all persons with gender identity disorders need or want all three elements of triadic therapy.

Cultural Differences in Gender Identity Variance throughout the World. Even if epidemiological studies established that a similar base rate of gender identity disorders existed all over the world, it is likely that cultural differences from one country to another would alter the behavioral expressions of these conditions. Moreover, access to treatment, cost of treatment, the therapies offered and the social attitudes towards gender variant people and the professionals who deliver care differ broadly from place to place. While in most countries, crossing gender boundaries usually generates moral censure rather than compassion, there are striking examples in certain cultures of cross-gendered behaviors (e.g., in spiritual leaders) that are not stigmatized.

III. Diagnostic Nomenclature

The Five Elements of Clinical Work. Professional involvement with patients with gender identity disorders involves any of the following: diagnostic assessment, psychotherapy, real-life experience, hormone therapy, and surgical therapy. This section provides a background on diagnostic assessment.

The Development of a Nomenclature. The term *transexxual* emerged into professional and public usage in the 1950s as a means of designating a person who aspired to or actually lived in the anatomically contrary gender role, whether or not hormones had been administered or surgery had been performed. During the 1960s and 1970s, clinicians used the term *true transsexual*. The true transsexual was thought to be a person with a characteristic path of atypical gender identity development that predicted an improved life from a treatment sequence that culminated in genital surgery. True transsexuals were thought to have: 1) cross-gender identifications that were consistently expressed behaviorally in childhood, adolescence, and

adulthood; 2) minimal or no sexual arousal to cross-dressing; and 3) no heterosexual interest, relative to their anatomic sex. True transsexuals could be of either sex. True transsexual males were distinguished from males who arrived at the desire to change sex and gender via a reasonably masculine behavioral developmental pathway. Belief in the true transsexual concept for males dissipated when it was realized that such patients were rarely encountered, and thatsome of the original true transsexuals had falsified their histories to make their stories match the earliest theories about the disorder. The concept of true transsexual females never created diagnostic uncertainties, largely because patient histories were relatively consistent and gender variant behaviors such as female cross-dressing remained unseen by clinicians. The term "gender dysphoria syndrome" was later adopted to designate the presence of a gender problem in either sex until psychiatry developed an official nomenclature.

The diagnosis of Transsexualism was introduced in the DSM-III in 1980 for gender dysphoric individuals who demonstrated at least two years of continuous interest in transforming the sex of their bodies and their social gender status. Others with gender dysphoria could be diagnosed as Gender Identity Disorder of Adolescence or Adulthood, Nontranssexual Type; or Gender Identity Disorder Not Otherwise Specified (GIDNOS). These diagnostic terms were usually ignored by the media, which used the term transsexual for any person who wanted to change his/her sex and gender.

The DSM-IV. In 1994, the DSM-IV committee replaced the diagnosis of Transsexualism with Gender Identity Disorder. Depending on their age, those with a strong and persistent cross-gender identification and a persistent discomfort with their sex or a sense of inappropriateness in the gender role of that sex were to be diagnosed as Gender Identity Disorder of Childhood (302.6), Adolescence, or Adulthood (302.85). For persons who did not meet these criteria, Gender Identity Disorder Not Otherwise Specified (GIDNOS)(302.6) was to be used. This category included a variety of individuals, including those who desired only castration or penectomy without a desire to develop breasts, those who wished hormone therapy and mastectomy without genital reconstruction, those with a congenital intersex condition, those with transient stress-related cross-dressing, and those with considerable ambivalence about giving up their gender status. Patients diagnosed with GID and GIDNOS were to be subclassified according to the sexual orientation: attracted to males; attracted to females; attracted to both; or attracted to neither. This subclassification was intended to assist in determining, over time, whether individuals of one sexual orientation or another experienced better outcomes using particular therapeutic approaches; it was **not** intended to guide treatment decisions.

Between the publication of DSM-III and DSM-IV, the term "transgender" began to be used in various ways. Some employed it to refer to those with unusual gender identities in a value-free manner -- that is, without a connotation of psychopathology. Some people informally used the term to refer to any person with any type of gender identity issues. Transgender is not a formal diagnosis, but many professionals and members of the public found it easier to use informally than GIDNOS, which is a formal diagnosis.

The ICD-10. The ICD-10 now provides five diagnoses for the gender identity disorders (F64):

Transsexualism (F64.0) has three criteria:

1. The desire to live and be accepted as a member of the opposite sex, usually accompanied by the wish to make his or her body as congruent as possible with the preferred sex through surgery and hormone treatment;
2. The transsexual identity has been present persistently for at least two years;
3. The disorder is not a symptom of another mental disorder or a chromosomal abnormality.

Dual-role Transvestism (F64.1) has three criteria:
1. The individual wears clothes of the opposite sex in order to experience temporary membership in the opposite sex;
2. There is no sexual motivation for the cross-dressing;
3. The individual has no desire for a permanent change to the opposite sex.

Gender Identity Disorder of Childhood (64.2) has separate criteria for girls and for boys.
For girls:

1. The individual shows persistent and intense distress about being a girl, and has a stated desire to be a boy (not merely a desire for any perceived cultural advantages to being a boy) or insists that she is a boy;
2. Either of the following must be present:
    a. Persistent marked aversion to normative feminine clothing and insistence on wearing stereotypical masculine clothing;
    b. Persistent repudiation of female anatomical structures, as evidenced by at least one of the following:
        1. An assertion that she has, or will grow, a penis;
        2. Rejection of urination in a sitting position;
        3. Assertion that she does not want to grow breasts or menstruate.
3. The girl has not yet reached puberty;
4. The disorder must have been present for at least 6 months.

For boys:

1. The individual shows persistent and intense distress about being a boy, and has a desire to be a girl, or, more rarely, insists that he is a girl.
2. Either of the following must be present:
    a. Preoccupation with stereotypic female activities, as shown by a preference for either cross-dressing or simulating female attire, or by an intense desire to participate in the games and pastimes of girls and rejection of stereotypical male toys, games, and activities;
    b. Persistent repudiation of male anatomical structures, as evidenced by at least one of the following repeated assertions:
        1. That he will grow up to become a woman (not merely in the role);
        2. That his penis or testes are disgusting or will disappear;
        3. That it would be better not to have a penis or testes.
3. The boy has not yet reached puberty;
4. The disorder must have been present for at least 6 months.

Other Gender Identity Disorders (F64.8) has no specific criteria.

Gender Identity Disorder, Unspecified has no specific criteria.

Either of the previous two diagnoses could be used for those with an intersexed condition.

The purpose of the DSM-IV and ICD-10 is to guide treatment and research. Different professional groups created these nomenclatures through consensus processes at different times. There is an expectation that the differences between the systems will be eliminated in the future. At this point, the specific diagnoses are based more on clinical reasoning than on scientific investigation.

Are Gender Identity Disorders Mental Disorders? To qualify as a mental disorder, a behavioral pattern must result in a significant adaptive disadvantage to the person or cause personal mental suffering. The DSM-IV and ICD-10 have defined hundreds of mental disorders which vary in onset, duration, pathogenesis, functional disability, and treatability. The designation of gender identity disorders as mental disorders is not a license for stigmatization, or for the deprivation of gender patients' civil rights. The use of a formal diagnosis is often important in offering relief, providing health insurance coverage, and guiding research to provide more effective future treatments.

IV. The Mental Health Professional

The Ten Tasks of the Mental Health Professional. Mental health professionals (MHPs) who work with individuals with gender identity disorders may be regularly called upon to carry out many of these responsibilities:

1. To accurately diagnose the individual's gender disorder;
2. To accurately diagnose any co-morbid psychiatric conditions and see to their appropriate treatment;
3. To counsel the individual about the range of treatment options and their implications;
4. To engage in psychotherapy;
5. To ascertain eligibility and readiness for hormone and surgical therapy;
6. To make formal recommendations to medical and surgical colleagues;
7. To document their patient's relevant history in a letter of recommendation;
8. To be a colleague on a team of professionals with an interest in the gender identity disorders;
9. To educate family members, employers, and institutions about gender identity disorders;
10. To be available for follow-up of previously seen gender patients.

The Adult-Specialist. The education of the mental health professional who specializes in adult gender identity disorders rests upon basic general clinical competence in diagnosis and treatment of mental or emotional disorders. Clinical training may occur within any formally credentialing discipline -- for example, psychology, psychiatry, social work, counseling, or nursing. The following are the recommended minimal credentials for special competence with the gender identity disorders:

1. A master's degree or its equivalent in a clinical behavioral science field. This or a more advanced degree should be granted by an institution accredited by a recognized national

or regional accrediting board. The mental health professional should have documented credentials from a proper training facility and a licensing board.
2. Specialized training and competence in the assessment of the DSM-IV/ICD-10 Sexual Disorders (not simply gender identity disorders).
3. Documented supervised training and competence in psychotherapy.
4. Continuing education in the treatment of gender identity disorders, which may include attendance at professional meetings, workshops, or seminars or participating in research related to gender identity issues.

The Child-Specialist. The professional who evaluates and offers therapy for a child or early adolescent with GID should have been trained in childhood and adolescent developmental psychopathology. The professional should be competent in diagnosing and treating the ordinary problems of children and adolescents. These requirements are in addition to the adult-specialist requirement.

The Differences between Eligibility and Readiness. The SOC provide recommendations for eligibility requirements for hormones and surgery. Without first meeting these recommended eligibility requirements, the patient and the therapist should not request hormones or surgery. An example of an eligibility requirement is: a person must live full time in the preferred gender for twelve months prior to genital surgery. To meet this criterion, the professional needs to document that the real-life experience has occurred for this duration. Meeting readiness criteria -- further consolidation of the evolving gender identity or improving mental health in the new or confirmed gender role -- is more complicated, because it rests upon the clinician's and the patient's judgment.

The Mental Health Professional's Relationship to the Prescribing Physician and Surgeon. Mental health professionals who recommend hormonal and surgical therapy share the legal and ethical responsibility for that decision with the physician who undertakes the treatment. Hormonal treatment can often alleviate anxiety and depression in people without the use of additional psychotropic medications. Some individuals, however, need psychotropic medication prior to, or concurrent with, taking hormones or having surgery. The mental health professional is expected to make this assessment, and see that the appropriate psychotropic medications are offered to the patient. The presence of psychiatric co-morbidities does not necessarily preclude hormonal or surgical treatment, but some diagnoses pose difficult treatment dilemmas and may delay or preclude the use of either treatment.

The Mental Health Professional's Documentation Letter for Hormone Therapy or Surgery Should Succinctly Specify:

1. The patient's general identifying characteristics;
2. The initial and evolving gender, sexual, and other psychiatric diagnoses;
3. The duration of their professional relationship including the type of psychotherapy or evaluation that the patient underwent;
4. The eligibility criteria that have been met and the mental health professional's rationale for hormone therapy or surgery;
5. The degree to which the patient has followed the Standards of Care to date and the likelihood of future compliance;
6. Whether the author of the report is part of a gender team;

7. That the sender welcomes a phone call to verify the fact that the mental health professional actually wrote the letter as described in this document.

The organization and completeness of these letters provide the hormone-prescribing physician and the surgeon an important degree of assurance that mental health professional is knowledgeable and competent concerning gender identity disorders.

One Letter is Required for Instituting Hormone Therapy, or for Breast Surgery. One letter from a mental health professional, including the above seven points, written to the physician who will be responsible for the patient's medical treatment, is sufficient for instituting hormone therapy or for a referral for breast surgery (e.g., mastectomy, chest reconstruction, or augmentation mammoplasty).

Two Letters are Generally Required for Genital Surgery. Genital surgery for biologic males may include orchiectomy, penectomy, clitoroplasty, labiaplasty or creation of a neovagina; for biologic females it may include hysterectomy, salpingo-oophorectomy, vaginectomy, metoidioplasty, scrotoplasty, urethroplasty, placement of testicular prostheses, or creation of a neophallus.

It is ideal if mental health professionals conduct their tasks and periodically report on these processes as part of a team of other mental health professionals and nonpsychiatric physicians. One letter to the physician performing genital surgery will generally suffice as long as two mental health professionals sign it.

More commonly, however, letters of recommendation are from mental health professionals who work alone without colleagues experienced with gender identity disorders. Because professionals working independently may not have the benefit of ongoing professional consultation on gender cases, two letters of recommendation are required prior to initiating genital surgery. If the first letter is from a person with a master's degree, the second letter should be from a psychiatrist or a Ph.D. clinical psychologist, who can be expected to adequately evaluate co-morbid psychiatric conditions. If the first letter is from the patient's psychotherapist, the second letter should be from a person who has only played an evaluative role for the patient. Each letter, however, is expected to cover the same topics. At least one of the letters should be an extensive report. The second letter writer, having read the first letter, may choose to offer a briefer summary and an agreement with the recommendation.

V. Assessment and Treatment of Children and Adolescents

Phenomenology. Gender identity disorders in children and adolescents are different from those seen in adults, in that a rapid and dramatic developmental process (physical, psychological and sexual) is involved. Gender identity disorders in children and adolescents are complex conditions. The young person may experience his or her phenotype sex as inconsistent with his or her own sense of gender identity. Intense distress is often experienced, particularly in adolescence, and there are frequently associated emotional and behavioral difficulties. There is greater fluidity and variability in outcomes, especially in pre-pubertal children. Only a few

gender variant youths become transsexual, although many eventually develop a homosexual orientation.

Commonly seen features of gender identity conflicts in children and adolescents include a stated desire to be the other sex; cross dressing; play with games and toys usually associated with the gender with which the child identifies; avoidance of the clothing, demeanor and play normally associated with the child's sex and gender of assignment; preference for playmates or friends of the sex and gender with which the child identifies; and dislike of bodily sex characteristics and functions. Gender identity disorders are more often diagnosed in boys.

Phenomenologically, there is a qualitative difference between the way children and adolescents present their sex and gender predicaments, and the presentation of delusions or other psychotic symptoms. Delusional beliefs about their body or gender can occur in psychotic conditions but they can be distinguished from the phenomenon of a gender identity disorder. Gender identity disorders in childhood are not equivalent to those in adulthood and the former do not inevitably lead to the latter. The younger the child the less certain and perhaps more malleable the outcome.

Psychological and Social Interventions. The task of the child-specialist mental health professional is to provide assessment and treatment that broadly conforms to the following guidelines:

1. The professional should recognize and accept the gender identity problem. Acceptance and removal of secrecy can bring considerable relief.
2. The assessment should explore the nature and characteristics of the child's or adolescent's gender identity. A complete psychodiagnostic and psychiatric assessment should be performed. A complete assessment should include a family evaluation, because other emotional and behavioral problems are very common, and unresolved issues in the child's environment are often present.
3. Therapy should focus on ameliorating any comorbid problems in the child's life, and on reducing distress the child experiences from his or her gender identity problem and other difficulties. The child and family should be supported in making difficult decisions regarding the extent to which to allow the child to assume a gender role consistent with his or her gender identity. This includes issues of whether to inform others of the child's situation, and how others in the child's life should respond; for example, whether the child should attend school using a name and clothing opposite to his or her sex of assignment. They should also be supported in tolerating uncertainty and anxiety in relation to the child's gender expression and how best to manage it. Professional network meetings can be very useful in finding appropriate solutions to these problems.

Physical Interventions. Before any physical intervention is considered, extensive exploration of psychological, family and social issues should be undertaken. Physical interventions should be addressed in the context of adolescent development. Adolescents' gender identity development can rapidly and unexpectedly evolve. An adolescent shift toward gender conformity can occur primarily to please the family, and may not persist or reflect a permanent change in gender identity. Identity beliefs in adolescents may become firmly held and strongly expressed, giving a false impression of irreversibility; more fluidity may return at a later stage. For these reasons, irreversible physical interventions should be delayed as long as is clinically appropriate. Pressure for physical interventions because of an adolescent's level of distress can be great and in such

circumstances a referral to a child and adolescent multi-disciplinary specialty service should be considered, in locations where these exist.

Physical interventions fall into three categories or stages:

1. Fully reversible interventions. These involve the use of LHRH agonists or medroxyprogesterone to suppress estrogen or testosterone production, and consequently to delay the physical changes of puberty.
2. Partially reversible interventions. These include hormonal interventions that masculinize or feminize the body, such as administration of testosterone to biologic females and estrogen to biologic males. Reversal may involve surgical intervention.
3. Irreversible interventions. These are surgical procedures.

A staged process is recommended to keep options open through the first two stages. Moving from one state to another should not occur until there has been adequate time for the young person and his/her family to assimilate fully the effects of earlier interventions.

Fully Reversible Interventions. Adolescents may be eligible for puberty-delaying hormones as soon as pubertal changes have begun. In order for the adolescent and his or her parents to make an informed decision about pubertal delay, it is recommended that the adolescent experience the onset of puberty in his or her biologic sex, at least to Tanner Stage Two. If for clinical reasons it is thought to be in the patient's interest to intervene earlier, this must be managed with pediatric endocrinological advice and more than one psychiatric opinion.

Two goals justify this intervention: a) to gain time to further explore the gender identity and other developmental issues in psychotherapy; and b) to make passing easier if the adolescent continues to pursue sex and gender change. In order to provide puberty delaying hormones to an adolescent, the following criteria must be met:

1. throughout childhood the adolescent has demonstrated an intense pattern of cross-sex and cross-gender identity and aversion to expected gender role behaviors;
2. sex and gender discomfort has significantly increased with the onset of puberty;
3. the family consents and participates in the therapy.

Biologic males should be treated with LHRH agonists (which stop LH secretion and therefore testosterone secretion), or with progestins or antiandrogens (which block testosterone secretion or neutralize testosterone action). Biologic females should be treated with LHRH agonists or with sufficient progestins (which stop the production of estrogens and progesterone) to stop menstruation.

Partially Reversible Interventions. Adolescents may be eligible to begin masculinizing or feminizing hormone therapy as early as age 16, preferably with parental consent. In many countries 16-year olds are legal adults for medical decision making, and do not require parental consent.

Mental health professional involvement is an eligibility requirement for triadic therapy during adolescence. For the implementation of the real-life experience or hormone therapy, the mental health professional should be involved with the patient and family for a minimum of six months. While the number of sessions during this six-month period rests upon the clinician's judgment,

the intent is that hormones and the real-life experience be thoughtfully and recurrently considered over time. In those patients who have already begun the real-life experience prior to being seen, the professional should work closely with them and their families with the thoughtful recurrent consideration of what is happening over time.

Irreversible Interventions. Any surgical intervention should not be carried out prior to adulthood, or prior to a real-life experience of at least two years in the gender role of the sex with which the adolescent identifies. The threshold of 18 should be seen as an eligibility criterion and not an indication in itself for active intervention.

VI. Psychotherapy with Adults

A Basic Observation. Many adults with gender identity disorder find comfortable, effective ways of living that do not involve all the components of the triadic treatment sequence. While some individuals manage to do this on their own, psychotherapy can be very helpful in bringing about the discovery and maturational processes that enable self-comfort.

Psychotherapy is Not an Absolute Requirement for Triadic Therapy. Not every adult gender patient requires psychotherapy in order to proceed with hormone therapy, the real-life experience, hormones, or surgery. Individual programs vary to the extent that they perceive a need for psychotherapy. When the mental health professional's initial assessment leads to a recommendation for psychotherapy, the clinician should specify the goals of treatment, and estimate its frequency and duration. There is no required minimum number of psychotherapy sessions prior to hormone therapy, the real-life experience, or surgery, for three reasons: 1) patients differ widely in their abilities to attain similar goals in a specified time; 2) a minimum number of sessions tends to be construed as a hurdle, which discourages the genuine opportunity for personal growth; 3) the mental health professional can be an important support to the patient throughout all phases of gender transition. Individual programs may set eligibility criteria to some minimum number of sessions or months of psychotherapy.

The mental health professional who conducts the initial evaluation need not be the psychotherapist. If members of a gender team do not do psychotherapy, the psychotherapist should be informed that a letter describing the patient's therapy might be requested so the patient can proceed with the next phase of treatment.

Goals of Psychotherapy. Psychotherapy often provides education about a range of options not previously seriously considered by the patient. It emphasizes the need to set realistic life goals for work and relationships, and it seeks to define and alleviate the patient's conflicts that may have undermined a stable lifestyle.

The Therapeutic Relationship. The establishment of a reliable trusting relationship with the patient is the first step toward successful work as a mental health professional. This is usually accomplished by competent nonjudgmental exploration of the gender issues with the patient during the initial diagnostic evaluation. Other issues may be better dealt with later, after the person feels that the clinician is interested in and understands their gender identity concerns.

Ideally, the clinician's work is with the whole of the person's complexity. The goals of therapy are to help the person to live more comfortably within a gender identity and to deal effectively with non-gender issues. The clinician often attempts to facilitate the capacity to work and to establish or maintain supportive relationships. Even when these initial goals are attained, mental health professionals should discuss the likelihood that no educational, psychotherapeutic, medical, or surgical therapy can permanently eradicate all vestiges of the person's original sex assignment and previous gendered experience.

Processes of Psychotherapy. Psychotherapy is a series of interactive communications between a therapist who is knowledgeable about how people suffer emotionally and how this may be alleviated, and a patient who is experiencing distress. Typically, psychotherapy consists of regularly held 50-minutes sessions. The psychotherapy sessions initiate a developmental process. They enable the patient's history to be appreciated, current dilemmas to be understood, and unrealistic ideas and maladaptive behaviors to be identified. Psychotherapy is not intended to cure the gender identity disorder. Its usual goal is a long-term stable life style with realistic chances for success in relationships, education, work, and gender identity expression. Gender distress often intensifies relationship, work, and educational dilemmas.

The therapist should make clear that it is the patient's right to choose among many options. The patient can experiment over time with alternative approaches. Ideally, psychotherapy is a collaborative effort. The therapist must be certain that the patient understands the concepts of eligibility and readiness, because the therapist and patient must cooperate in defining the patient's problems, and in assessing progress in dealing with them. Collaboration can prevent a stalemate between a therapist who seems needlessly withholding of a recommendation, and a patient who seems too profoundly distrusting to freely share thoughts, feelings, events, and relationships.

Patients may benefit from psychotherapy at every stage of gender evolution. This includes the post-surgical period, when the anatomic obstacles to gender comfort have been removed, but the person may continue to feel a lack of genuine comfort and skill in living in the new gender role.

Options for Gender Adaptation. The activities and processes that are listed below have, in various combinations, helped people to find more personal comfort. These adaptations may evolve spontaneously and during psychotherapy. Finding new gender adaptations does not mean that the person may not in the future elect to pursue hormone therapy, the real-life experience, or genital surgery.

Activities:

Biological Males:

1. Cross-dressing: unobtrusively with undergarments; unisexually; or in a feminine fashion;
2. Changing the body through: hair removal through electrolysis or body waxing; minor plastic cosmetic surgical procedures;
3. Increasing grooming, wardrobe, and vocal expression skills.

Biological Females:

1. Cross-dressing: unobtrusively with undergarments, unisexually, or in a masculine fashion;
2. Changing the body through breast binding, weight lifting, applying theatrical facial hair;

3. Padding underpants or wearing a penile prosthesis.

Both Genders:

1. Learning about transgender phenomena from: support groups and gender networks, communication with peers via the Internet, studying these Standards of Care, relevant lay and professional literatures about legal rights pertaining to work, relationships, and public cross-dressing;
2. Involvement in recreational activities of the desired gender;
3. Episodic cross-gender living.

Processes:

1. Acceptance of personal homosexual or bisexual fantasies and behaviors (orientation) as distinct from gender identity and gender role aspirations;
2. Acceptance of the need to maintain a job, provide for the emotional needs of children, honor a spousal commitment, or not to distress a family member as currently having a higher priority than the personal wish for constant cross-gender expression;
3. Integration of male and female gender awareness into daily living;
4. Identification of the triggers for increased cross-gender yearnings and effectively attending to them; for instance, developing better self-protective, self-assertive, and vocational skills to advance at work and resolve interpersonal struggles to strengthen key relationships.

VII. Requirements for Hormone Therapy for Adults

Reasons for Hormone Therapy. Cross-sex hormonal treatments play an important role in the anatomical and psychological gender transition process for properly selected adults with gender identity disorders. Hormones are often medically necessary for successful living in the new gender. They improve the quality of life and limit psychiatric co-morbidity, which often accompanies lack of treatment. When physicians administer androgens to biologic females and estrogens, progesterone, and testosterone-blocking agents to biologic males, patients feel and appear more like members of their preferred gender.

Eligibility Criteria. The administration of hormones is not to be lightly undertaken because of their medical and social risks. Three criteria exist.

1. Age 18 years;
2. Demonstrable knowledge of what hormones medically can and cannot do and their social benefits and risks;
3. Either:
   a. A documented real-life experience of at least three months prior to the administration of hormones; or
   b. A period of psychotherapy of a duration specified by the mental health professional after the initial evaluation (usually a minimum of three months).

In selected circumstances, it can be acceptable to provide hormones to patients who have not fulfilled criterion 3 – for example, to facilitate the provision of monitored therapy using hormones of known quality, as an alternative to black-market or unsupervised hormone use.

Readiness Criteria. Three criteria exist:

1. The patient has had further consolidation of gender identity during the real-life experience or psychotherapy;
2. The patient has made some progress in mastering other identified problems leading to improving or continuing stable mental health (this implies satisfactory control of problems such as sociopathy, substance abuse, psychosis and suicidality;
3. The patient is likely to take hormones in a responsible manner.

Can Hormones Be Given To Those Who Do Not Want Surgery or a Real-life Experience? Yes, but after diagnosis and psychotherapy with a qualified mental health professional following minimal standards listed above. Hormone therapy can provide significant comfort to gender patients who do not wish to cross live or undergo surgery, or who are unable to do so. In some patients, hormone therapy alone may provide sufficient symptomatic relief to obviate the need for cross living or surgery.

Hormone Therapy and Medical Care for Incarcerated Persons. Persons who are receiving treatment for gender identity disorders should continue to receive appropriate treatment following these Standards of Care after incarceration. For example, those who are receiving psychotherapy and/or cross-sex hormonal treatments should be allowed to continue this medically necessary treatment to prevent or limit emotional lability, undesired regression of hormonally-induced physical effects and the sense of desperation that may lead to depression, anxiety and suicidality. Prisoners who are subject to rapid withdrawal of cross-sex hormones are particularly at risk for psychiatric symptoms and self-injurious behaviors. Medical monitoring of hormonal treatment as described in these Standards should also be provided. Housing for transgendered prisoners should take into account their transition status and their personal safety.

VIII. Effects of Hormone Therapy in Adults

The maximum physical effects of hormones may not be evident until two years of continuous treatment. Heredity limits the tissue response to hormones and this cannot be overcome by increasing dosage. The degree of effects actually attained varies from patient to patient.

Desired Effects of Hormones. Biologic males treated with estrogens can realistically expect treatment to result in: breast growth, some redistribution of body fat to approximate a female body habitus, decreased upper body strength, softening of skin, decrease in body hair, slowing or stopping the loss of scalp hair, decreased fertility and testicular size, and less frequent, less firm erections. Most of these changes are reversible, although breast enlargement will not completely reverse after discontinuation of treatment.

Biologic females treated with testosterone can expect the following permanent changes: a deepening of the voice, clitoral enlargement, mild breast atrophy, increased facial and body hair and male pattern baldness. Reversible changes include increased upper body strength, weight gain, increased social and sexual interest and arousability, and decreased hip fat.

Potential Negative Medical Side Effects. Patients with medical problems or otherwise at risk for cardiovascular disease may be more likely to experience serious or fatal consequences of cross-sex hormonal treatments. For example, cigarette smoking, obesity, advanced age, heart disease, hypertension, clotting abnormalities, malignancy, and some endocrine abnormalities may increase side effects and risks for hormonal treatment. Therefore, some patients may not be able to tolerate cross-sex hormones. However, hormones can provide health benefits as well as risks. Risk-benefit ratios should be considered collaboratively by the patient and prescribing physician.

Side effects in biologic males treated with estrogens and progestins may include increased propensity to blood clotting (venous thrombosis with a risk of fatal pulmonary embolism), development of benign pituitary prolactinomas, infertility, weight gain, emotional lability, liver disease, gallstone formation, somnolence, hypertension, and diabetes mellitus.

Side effects in biologic females treated with testosterone may include infertility, acne, emotional lability, increases in sexual desire, shift of lipid profiles to male patterns which increase the risk of cardiovascular disease, and the potential to develop benign and malignant liver tumors and hepatic dysfunction.

The Prescribing Physician's Responsibilities. Hormones are to be prescribed by a physician, and should not be administered without adequate psychological and medical assessment before and during treatment. Patients who do not understand the eligibility and readiness requirements and who are unaware of the SOC should be informed of them. This may be a good indication for a referral to a mental health professional experienced with gender identity disorders.
The physician providing hormonal treatment and medical monitoring need not be a specialist in endocrinology, but should become well-versed in the relevant medical and psychological aspects of treating persons with gender identity disorders.

After a thorough medical history, physical examination, and laboratory examination, the physician should again review the likely effects and side effects of hormone treatment, including the potential for serious, life-threatening consequences. The patient must have the capacity to appreciate the risks and benefits of treatment, have his/her questions answered, and agree to medical monitoring of treatment. The medical record must contain a written informed consent document reflecting a discussion of the risks and benefits of hormone therapy.

Physicians have a wide latitude in what hormone preparations they may prescribe and what routes of administration they may select for individual patients. Viable options include oral, injectable, and transdermal delivery systems. The use of transdermal estrogen patches should be considered for males over 40 years of age or those with clotting abnormalities or a history of venous thrombosis. Transdermal testosterone is useful in females who do not want to take injections. In the absence of any other medical, surgical, or psychiatric conditions, basic medical monitoring should include: serial physical examinations relevant to treatment effects and side effects, vital sign measurements before and during treatment, weight measurements, and laboratory assessment. Gender patients, whether on hormones or not, should be screened for pelvic malignancies as are other persons.

For those receiving estrogens, the minimum laboratory assessment should consist of a pretreatment free testosterone level, fasting glucose, liver function tests, and complete blood count with reassessment at 6 and 12 months and annually thereafter. A pretreatment prolactin level should be obtained and repeated at 1, 2, and 3 years. If hyperprolactemia does not occur during this time, no further measurements are necessary. Biologic males undergoing estrogen treatment should be monitored for breast cancer and encouraged to engage in routine self-examination. As they age, they should be monitored for prostatic cancer.

For those receiving androgens, the minimum laboratory assessment should consist of pretreatment liver function tests and complete blood count with reassessment at 6 months, 12 months, and yearly thereafter. Yearly palpation of the liver should be considered. Females who have undergone mastectomies and who have a family history of breast cancer should be monitored for this disease.

Physicians may provide their patients with a brief written statement indicating that the person is under medical supervision, which includes cross-sex hormone therapy. During the early phases of hormone treatment, the patient may be encouraged to carry this statement at all times to help prevent difficulties with the police and other authorities.

Reductions in Hormone Doses After Gonadectomy. Estrogen doses in post-orchiectomy patients can often be reduced by 1/3 to ½ and still maintain feminization. Reductions in testosterone doses post-oophorectomy should be considered, taking into account the risks of osteoporosis. Lifelong maintenance treatment is usually required in all gender patients.

The Misuse of Hormones. Some individuals obtain hormones without prescription from friends, family members, and pharmacies in other countries. Medically unmonitored hormone use can expose the person to greater medical risk. Persons taking medically monitored hormones have been known to take additional doses of illicitly obtained hormones without their physician's knowledge. Mental health professionals and prescribing physicians should make an effort to encourage compliance with recommended dosages, in order to limit morbidity. It is ethical for physicians to discontinue treatment of patients who do not comply with prescribed treatment regimens.

Other Potential Benefits of Hormones. Hormonal treatment, when medically tolerated, should precede any genital surgical interventions. Satisfaction with the hormone's effects consolidates the person's identity as a member of the preferred sex and gender and further adds to the conviction to proceed. Dissatisfaction with hormonal effects may signal ambivalence about proceeding to surgical interventions. In biologic males, hormones alone often generate adequate breast development, precluding the need for augmentation mammaplasty. Some patients who receive hormonal treatment will not desire genital or other surgical interventions.

The Use of Antiandrogens and Sequential Therapy. Antiandrogens can be used as adjunctive treatments in biologic males receiving estrogens, though they are not always necessary to achieve feminization. In some patients, antiandrogens may more profoundly suppress the production of testosterone, enabling a lower dose of estrogen to be used when adverse estrogen side effects are anticipated.

Feminization does not require sequential therapy. Attempts to mimic the menstrual cycle by prescribing interrupted estrogen therapy or substituting progesterone for estrogen during part of the month are not necessary to achieve feminization.

Informed Consent. Hormonal treatment should be provided only to those who are legally able to provide informed consent. This includes persons who have been declared by a court to be emancipated minors and incarcerated persons who are considered competent to participate in their medical decisions. For adolescents, informed consent needs to include the minor patient's assent and the written informed consent of a parent or legal guardian.

Reproductive Options. Informed consent implies that the patient understands that hormone administration limits fertility and that the removal of sexual organs prevents the capacity to reproduce. Cases are known of persons who have received hormone therapy and sex reassignment surgery who later regretted their inability to parent genetically related children. The mental health professional recommending hormone therapy, and the physician prescribing such therapy, should discuss reproductive options with the patient prior to starting hormone therapy. Biologic males, especially those who have not already reproduced, should be informed about sperm preservation options, and encouraged to consider banking sperm prior to hormone therapy. Biologic females do not presently have readily available options for gamete preservation, other than cryopreservation of fertilized embryos. However, they should be informed about reproductive issues, including this option. As other options become available, these should be presented.

IX. The Real-Life Experience

The act of fully adopting a new or evolving gender role or gender presentation in everyday life is known as the real-life experience. The real-life experience is essential to the transition to the gender role that is congruent with the patient's gender identity. Since changing one's gender presentation has immediate profound personal and social consequences, the decision to do so should be preceded by an awareness of what the familial, vocational, interpersonal, educational, economic, and legal consequences are likely to be. Professionals have a responsibility to discuss these predictable consequences with their patients. Change of gender role and presentation can be an important factor in employment discrimination, divorce, marital problems, and the restriction or loss of visitation rights with children. These represent external reality issues that must be confronted for success in the new gender presentation. These consequences may be quite different from what the patient imagined prior to undertaking the real-life experiences. However, not all changes are negative.

Parameters of the Real-Life Experience. When clinicians assess the quality of a person's real-life experience in the desired gender, the following abilities are reviewed:

1. To maintain full or part-time employment;
2. To function as a student;
3. To function in community-based volunteer activity;
4. To undertake some combination of items 1-3;
5. To acquire a (legal) gender-identity-appropriate first name;

6. To provide documentation that persons other than the therapist know that the patient functions in the desired gender role.

Real-Life Experience versus Real-Life Test. Although professionals may recommend living in the desired gender, the decision as to when and how to begin the real-life experience remains the person's responsibility. Some begin the real-life experience and decide that this often imagined life direction is not in their best interest. Professionals sometimes construe the real-life experience as the real-life test of the ultimate diagnosis. If patients prosper in the preferred gender, they are confirmed as "transsexual," but if they decided against continuing, they "must not have been." This reasoning is a confusion of the forces that enable successful adaptation with the presence of a gender identity disorder. The real-life experience tests the person's resolve, the capacity to function in the preferred gender, and the adequacy of social, economic, and psychological supports. It assists both the patient and the mental health professional in their judgments about how to proceed. Diagnosis, although always open for reconsideration, precedes a recommendation for patients to embark on the real-life experience. When the patient is successful in the real-life experience, both the mental health professional and the patient gain confidence about undertaking further steps.

Removal of Beard and other Unwanted Hair for the Male to Female Patient. Beard density is not significantly slowed by cross-sex hormone administration. Facial hair removal via electrolysis is a generally safe, time-consuming process that often facilitates the real-life experience for biologic males. Side effects include discomfort during and immediately after the procedure and less frequently hypo-or hyper pigmentation, scarring, and folliculitis. Formal medical approval for hair removal is not necessary; electrolysis may be begun whenever the patient deems it prudent. It is usually recommended prior to commencing the real-life experience, because the beard must grow out to visible lengths to be removed. Many patients will require two years of regular treatments to effectively eradicate their facial hair. Hair removal by laser is a new alternative approach, but experience with it is limited.

X. Surgery

Sex Reassignment is Effective and Medically Indicated in Severe GID. In persons diagnosed with transsexualism or profound GID, sex reassignment surgery, along with hormone therapy and real-life experience, is a treatment that has proven to be effective. Such a therapeutic regimen, when prescribed or recommended by qualified practitioners, is medically indicated and medically necessary. Sex reassignment is not "experimental," "investigational," "elective," "cosmetic," or optional in any meaningful sense. It constitutes very effective and appropriate treatment for transsexualism or profound GID.

How to Deal with Ethical Questions Concerning Sex Reassignment Surgery. Many persons, including some medical professionals, object on ethical grounds to surgery for GID. In ordinary surgical practice, pathological tissues are removed in order to restore disturbed functions, or alterations are made to body features to improve the patient's self image. Among those who object to sex reassignment surgery, these conditions are not thought to present when surgery is performed for persons with gender identity disorders. It is important that professionals dealing

with patients with gender identity disorders feel comfortable about altering anatomically normal structures. In order to understand how surgery can alleviate the psychological discomfort of patients diagnosed with gender identity disorders, professionals need to listen to these patients discuss their life histories and dilemmas. The resistance against performing surgery on the ethical basis of "above all do no harm" should be respected, discussed, and met with the opportunity to learn from patients themselves about the psychological distress of having profound gender identity disorder.

It is unethical to deny availability or eligibility for sex reassignment surgeries or hormone therapy solely on the basis of blood seropositivity for blood-borne infections such as HIV, or hepatitis B or C, etc.

The Surgeon's Relationship with the Physician Prescribing Hormones and the Mental Health Professional. The surgeon is not merely a technician hired to perform a procedure. The surgeon is part of the team of clinicians participating in a long-term treatment process. The patient often feels an immense positive regard for the surgeon, which ideally will enable long-term follow-up care. Because of his or her responsibility to the patient, the surgeon must understand the diagnosis that has led to the recommendation for genital surgery. Surgeons should have a chance to speak at length with their patients to satisfy themselves that the patient is likely to benefit from the procedures. Ideally, the surgeon should have a close working relationship with the other professionals who have been actively involved in the patient's psychological and medical care. This is best accomplished by belonging to an interdisciplinary team of professionals who specialize in gender identity disorders. Such gender teams do not exist everywhere, however. At the very least, the surgeon needs to be assured that the mental health professional and physician prescribing hormones are reputable professionals with specialized experience with gender identity disorders. This is often reflected in the quality of the documentation letters. Since fictitious and falsified letters have occasionally been presented, surgeons should personally communicate with at least one of the mental health professionals to verify the authenticity of their letters.

Prior to performing any surgical procedures, the surgeon should have all medical conditions appropriately monitored and the effects of the hormonal treatment upon the liver and other organ systems investigated. This can be done alone or in conjunction with medical colleagues. Since pre-existing conditions may complicate genital reconstructive surgeries, surgeons must also be competent in urological diagnosis. The medical record should contain written informed consent for the particular surgery to be performed.

XI. Breast Surgery

Breast augmentation and removal are common operations, easily obtainable by the general public for a variety of indications. Reasons for these operations range from cosmetic indications to cancer. Although breast appearance is definitely important as a secondary sex characteristic, breast size or presence are not involved in the legal definitions of sex and gender and are not important for reproduction. The performance of breast operations should be considered with the

same reservations as beginning hormonal therapy. Both produce relatively irreversible changes to the body.

The approach for male-to-female patients is different than for female-to-male patients. For female-to-male patients, a mastectomy procedure is usually the first surgery performed for success in gender presentation as a man; and for some patients it is the only surgery undertaken. When the amount of breast tissue removed requires skin removal, a scar will result and the patient should be so informed. Female-to-male patients may have surgery at the same time they begin hormones. For male-to-female patients, augmentation mammoplasty may be performed if the physician prescribing hormones and the surgeon have documented that breast enlargement after undergoing hormone treatment for 18 months is not sufficient for comfort in the social gender role.

XII. Genital Surgery

Eligibility Criteria. These minimum eligibility criteria for various genital surgeries equally apply to biologic males and females seeking genital surgery. They are:

1. Legal age of majority in the patient's nation;
2. Usually 12 months of continuous hormonal therapy for those without a medical contraindication (see below, "Can Surgery Be Performed Without Hormones and the Real-life Experience");
3. 12 months of successful continuous full time real-life experience. Periods of returning to the original gender may indicate ambivalence about proceeding and generally should not be used to fulfill this criterion;
4. If required by the mental health professional, regular responsible participation in psychotherapy throughout the real-life experience at a frequency determined jointly by the patient and the mental health professional. Psychotherapy per se is not an absolute eligibility criterion for surgery;
5. Demonstrable knowledge of the cost, required lengths of hospitalizations, likely complications, and post surgical rehabilitation requirements of various surgical approaches;
6. Awareness of different competent surgeons.

Readiness Criteria. The readiness criteria include:

1. Demonstrable progress in consolidating one's gender identity;
2. Demonstrable progress in dealing with work, family, and interpersonal issues resulting in a significantly better state of mental health; this implies satisfactory control of problems such as sociopathy, substance abuse, psychosis, suicidality, for instance).

Can Surgery Be Provided Without Hormones and the Real-life Experience? Individuals cannot receive genital surgery without meeting the eligibility criteria. Genital surgery is a treatment for a diagnosed gender identity disorder, and should undertaken only after careful evaluation. Genital surgery is not a right that must be granted upon request. The SOC provide for an individual approach for every patient; but this does not mean that the general guidelines, which specify treatment consisting of diagnostic evaluation, possible psychotherapy, hormones,

and real-life experience, can be ignored. However, if a person has lived convincingly as a member of the preferred gender for a long period of time and is assessed to be a psychologically healthy after a requisite period of psychotherapy, there is no inherent reason that he or she must take hormones prior to genital surgery.

Conditions under which Surgery May Occur. Genital surgical treatments for persons with a diagnosis of gender identity disorder are not merely another set of elective procedures. Typical elective procedures only involve a private mutually consenting contract between a patient and a surgeon. Genital surgeries for individuals diagnosed as having GID are to be undertaken only after a comprehensive evaluation by a qualified mental health professional. Genital surgery may be performed once written documentation that a comprehensive evaluation has occurred and that the person has met the eligibility and readiness criteria. By following this procedure, the mental health professional, the surgeon and the patient share responsibility of the decision to make irreversible changes to the body.

Requirements for the Surgeon Performing Genital Reconstruction. The surgeon should be a urologist, gynecologist, plastic surgeon or general surgeon, and Board-Certified as such by a nationally known and reputable association. The surgeon should have specialized competence in genital reconstructive techniques as indicated by documented supervised training with a more experienced surgeon. Even experienced surgeons in this field must be willing to have their therapeutic skills reviewed by their peers. Surgeons should attend professional meetings where new techniques are presented.

Ideally, the surgeon should be knowledgeable about more than one of the surgical techniques for genital reconstruction so that he or she, in consultation with the patient, will be able to choose the ideal technique for the individual patient. When surgeons are skilled in a single technique, they should so inform their patients and refer those who do not want or are unsuitable for this procedure to another surgeon.

Genital Surgery for the Male-to-Female Patient. Genital surgical procedures may include orchiectomy, penectomy, vaginoplasty, clitoroplasty, and labiaplasty. These procedures require skilled surgery and postoperative care. Techniques include penile skin inversion, pedicled rectosigmoid transplant, or free skin graft to line the neovagina. Sexual sensation is an important objective in vaginoplasty, along with creation of a functional vagina and acceptable cosmesis.

Other Surgery for the Male-to-Female Patient. Other surgeries that may be performed to assist feminization include reduction thyroid chondroplasty, suction-assisted lipoplasty of the waist, rhinoplasty, facial bone reduction, face-lift, and blepharoplasty. These do not require letters of recommendation from mental health professionals.
There are concerns about the safety and effectiveness of voice modification surgery and more follow-up research should be done prior to widespread use of this procedure. In order to protect their vocal cords, patients who elect this procedure should do so after all other surgeries requiring general anesthesia with intubation are completed.

Genital Surgery for the Female-to-Male Patient. Genital surgical procedures may include hysterectomy, salpingo-oophorectomy, vaginectomy, metoidioplasty, scrotoplasty, urethroplasty, placement of testicular prostheses, and phalloplasty. Current operative techniques for

phalloplasty are varied. The choice of techniques may be restricted by anatomical or surgical considerations. If the objectives of phalloplasty are a neophallus of good appearance, standing micturition, sexual sensation, and/or coital ability, the patient should be clearly informed that there are several separate stages of surgery and frequent technical difficulties which may require additional operations. Even metoidioplasty, which in theory is a one-stage procedure for construction of a microphallus, often requires more than one surgery. The plethora of techniques for penis construction indicates that further technical development is necessary.

Other Surgery for the Female-to-Male Patient. Other surgeries that may be performed to assist masculinization include liposuction to reduce fat in hips, thighs and buttocks.

XIII. Post-Transition Follow-up

Long-term postoperative follow-up is encouraged in that it is one of the factors associated with a good psychosocial outcome. Follow-up is important to the patient's subsequent anatomic and medical health and to the surgeon's knowledge about the benefits and limitations of surgery. Long-term follow-up with the surgeon is recommended in all patients to ensure an optimal surgical outcome. Surgeons who operate on patients who are coming from long distances should include personal follow-up in their care plan and attempt to ensure affordable, local, long-term aftercare in the patient's geographic region. Postoperative patients may also sometimes exclude themselves from follow-up with the physician prescribing hormones, not recognizing that these physicians are best able to prevent, diagnose and treat possible long term medical conditions that are unique to hormonally and surgically treated patients. Postoperative patients should undergo regular medical screening according to recommended guidelines for their age. The need for follow-up extends to the mental health professional, who having spent a longer period of time with the patient than any other professional, is in an excellent position to assist in any post-operative adjustment difficulties.

LEADING ARTICLE

Consensus statement on management of intersex disorders

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1ST ONLINE

Management of intersex disorders

The birth of an intersex child prompts a long term management strategy that involves a myriad of professionals working with the family. It is estimated that genital anomalies occur in 1 in 4500 births. There has been progress in diagnosis, surgical techniques, understanding psychosocial issues, and recognising and accepting the place of patient advocacy. The Lawson Wilkins Pediatric Endocrine Society (LWPES) and the European Society for Paediatric Endocrinology (ESPE) considered it timely to review the management of intersex disorders from a broad perspective, to review data on longer term outcome, and to formulate proposals for future studies. The methodology comprised establishing several working groups whose membership was drawn from 50 international experts in the field. The groups prepared prior written responses to a defined set of questions resulting from an evidence based review of published reports. At a subsequent gathering of participants, a framework for a consensus document was agreed. This paper constitutes its final form.

NOMENCLATURE AND DEFINITIONS

Advances in identification of molecular genetic causes of abnormal sex with heightened awareness of ethical issues and patient advocacy concerns necessitate a re-examination of nomenclature.[1] Terms such as intersex, pseudohermaphroditism, hermaphroditism, sex reversal, and gender based diagnostic labels are particularly controversial. These terms are perceived as potentially pejorative by patients,[2] and can be confusing to practitioners and parents alike. The term "disorders of sex development" (DSD) is proposed, as defined by congenital conditions in which development of chromosomal, gonadal, or anatomical sex is atypical.

The proposed changes in terminology are summarised in table 1. A modern lexicon is needed to integrate progress in molecular genetic aspects of sex development. As outcome data in individuals with DSD are limited, it is essential to employ precision when applying definitions and diagnostic labels.[3 4] It is also appropriate to use terminology that is sensitive to the concerns of patients. The ideal nomenclature should be sufficiently flexible to incorporate new information yet robust enough to maintain a consistent framework. Terms should be descriptive and reflect genetic aetiology when available, and accommodate the spectrum of phenotypical variation. Clinicians and scientists must value its use and it must be understandable to patients and their families. An example of how the proposed nomenclature could be applied in a classification of DSD is shown in table 2.

Psychosexual development is traditionally conceptualised as three components. Gender identity refers to a person's self representation as male or female (with the caveat that some individuals may not identify exclusively with either). Gender role (sex-typical behaviours) describes the psychological characteristics that are sexually dimorphic within the general population, such as toy preferences and physical aggression. Sexual orientation refers to the direction(s) of erotic interest (heterosexual, bisexual, homosexual) and includes behaviour, fantasies, and attractions. Psychosexual development is influenced by multiple factors such as exposure to androgens, sex chromosome genes, and brain structure, as well as social circumstance and family dynamics.

Gender dissatisfaction denotes unhappiness with assigned sex. Causes of gender dissatisfaction are poorly understood, even among individuals without DSD. Gender dissatisfaction occurs more frequently in individuals with DSD than in the general population, but is difficult to predict from karyotype, prenatal androgen exposure, degree of genital virilisation, or assigned gender.[5-7] Prenatal androgen exposure is clearly associated with other aspects of psychosexual development.[8 9] There are dose related effects on childhood play behaviour in girls with congenital adrenal hyperplasia (CAH), whereby those with the more severe mutations and marked genital virilisation play more with boys' toys.[10] Prenatal androgen exposure is also associated with other psychological characteristics such as maternal interest and sexual orientation. It is important to emphasise the separability of sex-typical behaviour, sexual orientation, and gender identity. Thus homosexual orientation (relative to sex of rearing) or strong cross-sex interest in an individual with DSD is *not* an indication of incorrect gender assignment. Understanding variations in psychosexual development in individuals with DSD requires reference to studies in non-human species that show marked but complex effects of androgens on sex differentiation of the brain and on behaviour. Outcomes can be influenced by timing, dose, and type of androgen exposure, receptor availability, and modification by the social environment.[11-14]

Data from rodent studies suggest that sex chromosome genes may also influence brain structure and behaviour directly.[15 16] However, studies in individuals with complete androgen insensitivity syndrome (CAIS) do not indicate a behavioural role for Y chromosome genes, although data are limited.[17] Sex differences in brain structures have been identified across species, some of which coincide with pubertal onset, perhaps suggesting hormonal responsivity.[18-20] The limbic system and hypothalamus, both playing a role in reproduction, show sex differences in specific nuclei but it is not clear when these differences emerge. Interpretation of sex differences is complicated by the effect of cell death and synaptic pruning on normal maturation and by effects of experience on the brain. Structure of the brain is not currently useful for gender assignment.

INVESTIGATION AND MANAGEMENT OF DSD

General concepts of care

Optimal clinical management of individuals with DSD[21] should comprise the following:

- gender assignment must be avoided before expert evaluation in newborns;

Abbreviations: CAH, congenital adrenal hyperplasia; CAIS, complete androgen insensitivity syndrome; DSD, disorders of sex development; ESPE, European Society for Paediatric Endocrinology; LWPES, Lawson Wilkins Pediatric Endocrine Society; MGD, mixed gonadal dysgenesis; PAIS, partial androgen insensitivity syndrome

- evaluation and long term management must be carried out at a centre with an experienced multidisciplinary team;
- all individuals should receive a gender assignment;
- open communication with patients and families is essential and participation in decision making is encouraged;
- patient and family concerns should be respected and addressed in strict confidence.

The initial contact with the parents of a child with a DSD is important, as first impressions from these encounters often persist. A key point to emphasise is that the DSD child has the potential to become a well adjusted, functional member of society. While privacy needs to be respected, DSD is not shameful. It should be explained to the parents that the best course of action may not initially be clear, but the health care team will work with the family to reach the best possible set of decisions in the circumstances. The health care team should discuss with the parents what information to share in the early stages with family members and friends. Parents need to be informed about sexual development, and web based information may be helpful, provided the content and focus of the information is balanced and sound (http://www.sickkids.ca/childphysiology/cpwp/genital/genitalintro.html).

Ample time and opportunity should be made for continued discussion with review of information previously provided.[1]

Table 1 Proposed revised nomenclature

Previous	Proposed
Intersex	**Disorders of sex development** (DSD)
Male pseudohermaphrodite Undervirilisation of an XY male Undermasculinisation of an XY male	46,XY DSD
Female pseudohermaphrodite Overvirilisation of an XX female Masculinisation of an XX female	46,XX DSD
True hermaphrodite	Ovotesticular DSD
XX male or XX sex reversal	46,XX testicular DSD
XY sex reversal	46,XY complete gonadal dysgenesis

The multidisciplinary team

Optimal care for children with DSD requires an experienced multidisciplinary team which is generally found in tertiary care centres. Ideally, the team includes paediatric subspecialists in endocrinology, surgery or urology or both, psychology/psychiatry, gynaecology, genetics, neonatology, and, if available, social work, nursing, and medical ethics.[22] Core composition will vary according to DSD type, local resources, developmental context, and location. Ongoing communication with the family primary care physician is essential.[23]

The team has a responsibility to educate other health care staff in the appropriate initial management of affected newborn infants and their families. For new DSD patients, the team should develop a plan for clinical management with respect to diagnosis, gender assignment, and treatment options before making any recommendations. Ideally, discussions with the family are conducted by one professional with appropriate communication skills.[24] Transitional care should be organised with the multidisciplinary team operating in an environment comprising specialists with experience in both paediatric and adult practice. Support groups have an important role in the delivery of care to DSD patients and their families[25] (see appendix 1).

Clinical evaluation

A family and prenatal history, a general physical examination with attention to any associated dysmorphic features, and an assessment of the genital anatomy in comparison with published norms needs to be recorded (table 3). Criteria that suggest DSD include:

- overt genital ambiguity (for example, cloacal exstrophy);

Table 2 An example of a DSD classification

Sex chromosome DSD	46,XY DSD	46,XX DSD
(A) 45,X (Turner syndrome and variants)	**(A) Disorders of gonadal (testicular) development** 1. Complete gonadal dysgenesis (Swyer syndrome)	**(A) Disorders of gonadal (ovarian) development** 1. Ovotesticular DSD 2. Testicular DSD (eg, SRY+, dup SOX9)
(B) 47,XXY (Klinefelter syndrome and variants)	2. Partial gonadal dysgenesis 3. Gonadal regression 4. Ovotesticular DSD	3. Gonadal dysgenesis
(C) 45,X/46,XY (mixed gonadal dysgenesis, ovotesticular DSD)	**(B) Disorders in androgen synthesis or action** 1. Androgen biosynthesis defect (eg, 17-hydroxysteroid dehydrogenase deficiency, 5α reductase deficiency, StAR mutations	**(B) Androgen excess** 1. Fetal (eg, 21-hydroxylase deficiency, 11-hydroxylase deficiency) 2. Fetoplacental (aromatase deficiency, POR)
(D) 46,XX/46,XY (chimeric, ovotesticular DSD)	2. Defect in androgen action (eg, CAIS, PAIS) 3. LH receptor defects (eg, Leydig cell hypoplasia, aplasia) 4. Disorders of AMH and AMH receptor (persistent mullerian duct syndrome)	3. Maternal (luteoma, exogenous, etc)
	(C) Other (eg, severe hypospadias, cloacal extrophy)	**(C) Other** (eg, cloacal extrophy, vaginal atresia, MURCS, other syndromes)

While consideration of karyotype is useful for classification, unnecessary reference to karyotype should be avoided; ideally, a system based on descriptive terms (for example, androgen insensitivity syndrome) should be used wherever possible.
AMH, anti-mullerian hormone; CAIS, complete androgen insensitivity syndrome; DSD, disorders of sex development; MURCS, mullerian, renal, cervicothoracic somite abnormalities; PAIS, partial androgen insensitivity syndrome; POR, cytochrome P450 oxidoreductase.

Table 3 Anthropometric measurements of the external genitalia

Sex	Population	Age	Stretched penile length (PL) (cm)	Penile width (cm)	Mean testicular volume (ml)	Reference
M	USA	30 wks GA	2.5			26
M	USA	Full term	3.5 (0.4)	1.1 (0.1)	0.52 (median)	26, 27
M	Japan	Term to 14 years	2.9 (0.4) to 8.3 (0.8)			28
M	Australia	24–36 weeks GA	PL = 2.27 + (0.16 GA)			29
M	China	Term	3.1 (0.3)	1.07 (0.09)		30
M	India	Term	3.6 (0.4)	1.14 (0.07)		30
M	N America	Term	3.4 (0.3)	1.13 (0.08)		30
M	Europe	10 years	6.4 (0.4)		0.95 to 1.20	27, 31
M	Europe	Adult	13.3 (1.6)		16.5 to 18.2	27, 31

Sex	Population	Age	Clitoral length (mm)	Clitoral width (mm)	Perineal length* (mm)	Reference
F	USA	Full term	4.0 (1.24)	3.32 (0.78)		32
F	USA	Adult nulliparous	15.4 (4.3)			33
F	UK	Adult	19.1 (8.7)	5.5 (1.7)	31.3 (8.5)	34

Values are mean (SD) unless specified.
*Distance from posterior fourchette to anterior anal margin.
GA, gestational age; PL, penile length.

- apparent female genitalia with an enlarged clitoris, posterior labial fusion, or an inguinal/labial mass;
- apparent male genitalia with bilateral undescended testes, micropenis, isolated perineal hypospadias, or mild hypospadias with undescended testis;
- a family history of DSD such as CAIS;
- a discordance between genital appearance and a prenatal karyotype.

Most causes of DSD are recognised in the neonatal period; later presentations in older children and young adults include: previously unrecognised genital ambiguity; inguinal hernia in a girl; delayed or incomplete puberty; virilisation in a girl; primary amenorrhoea; breast development in a boy; and gross and occasionally cyclical haematuria in a boy.

Diagnostic evaluation

Considerable progress has been made over understanding the genetic basis of human sexual development,[35] yet a specific molecular diagnosis is identified in only about 20% of cases of DSD. The majority of virilised 46,XX infants will have CAH. In contrast, only 50% of 46,XY children with DSD will receive a definitive diagnosis.[36 37] Diagnostic algorithms do exist, but with the spectrum of findings and diagnoses, no single evaluation protocol can be recommended in all circumstances. Some tests, such as imaging by ultrasound, are operator dependent. Hormone measurements need to be interpreted in relation to the specific assay characteristics and to normal values for gestational and chronological age. In some cases serial measurements may be needed.

First line testing in newborns includes: karyotyping with X and Y specific probe detection (even when prenatal karyotype is available), imaging (abdomino-pelvic ultrasound), measurement of 17-hydroxyprogesterone, testosterone, gonadotropins, antimullerian hormone, serum electrolytes, and urinanalysis. The results of these investigations are generally available within 48 hours and will be sufficient for making a working diagnosis. Decision making algorithms are available to guide further investigation.[38] These include hCG and ACTH stimulation tests to assess testicular and adrenal steroid biosynthesis, urinary steroid analysis by GC mass spectroscopy, imaging studies, and biopsies of gonadal material. Some gene analyses are carried out in clinical service laboratories. However, current molecular diagnosis is limited by cost, accessibility, and quality control.[39] Research laboratories provide genetic testing, including functional analysis, but may face restrictions on communicating results.[40]

Gender assignment in newborn infants

Initial gender uncertainty is unsettling and stressful for families. Expediting a thorough assessment and decision is required. Factors that influence gender assignment include the diagnosis, genital appearance, surgical options, need for life long replacement therapy, the potential for fertility, views of the family, and sometimes the circumstances relating to cultural practices. More than 90% of 46,XX CAH patients[41] and all 46,XY CAIS assigned females in infancy[42] identify as females. Evidence supports the current recommendation to raise markedly virilised 46,XX infants with CAH as female.[43] Approximately 60% of 5α-reductase (5αRD2) deficient patients assigned female in infancy and virilising at puberty (and all assigned male) live as males.[5] In 5αRD2 and possibly 17β-hydroxysteroid dehydrogenase (17βHSD3) deficiencies, where the diagnosis is made in infancy, the combination of a male gender identity in the majority and the potential for fertility (documented in 5αRD2, but unknown in 17βHSD3) should be discussed when providing evidence for gender assignment.[5 44 45] Among patients with PAIS, androgen biosynthetic defects, and incomplete gonadal dysgenesis, there is dissatisfaction with the sex of rearing in about 25% of individuals, whether raised male or female.[46] Available data support male rearing in all patients with micropenis, taking into account equal satisfaction with assigned gender in those raised male or female, but no need for surgery, and the potential for fertility in patients reared male.[42] The decision on sex of rearing in ovotesticular DSD should consider the potential for fertility based on gonadal differentiation and genital development, and assuming the genitalia are, or can be made, consistent with the chosen sex. In the case of mixed gonadal dysgenesis (MGD), factors to consider include prenatal androgen exposure, testicular function at and after puberty, phallic development, and gonadal location. Individuals with cloacal exstrophy reared female show variability in gender identity outcome, but more than 65% appear to live as female.[6]

Surgical management

The surgeon has a responsibility to outline the surgical sequence and subsequent consequences from infancy to adulthood. Only surgeons with expertise in the care of children and specific training in the surgery of DSD should undertake these procedures. Parents now appear to be less inclined to choose

surgery for less severe clitoromegaly.[47] Surgery should only be considered in cases of severe virilisation (Prader III, IV, and V) and should be carried out in conjunction, when appropriate, with repair of the common urogenital sinus. As orgasmic function and erectile sensation may be disturbed by clitoral surgery, the surgical procedure should be anatomically based to preserve erectile function and the innervation of the clitoris. Emphasis is on functional outcome rather than a strictly cosmetic appearance. It is generally felt that surgery that is carried out for cosmetic reasons in the first year of life relieves parental distress and improves attachment between the child and the parents.[48–51] The systematic evidence for this belief is lacking.

There is inadequate evidence currently in relation to establishment of functional anatomy, to abandon the practice of early separation of the vagina and urethra.[52] The rationale for early reconstruction is based on guidelines on the timing of genital surgery from the American Academy of Pediatrics (AAP),[53] the beneficial effects of oestrogen on tissue in early infancy, and the avoidance of potential complications from the connection between the urinary tract and peritoneum through the Fallopian tubes. It is anticipated that surgical reconstruction in infancy will need to be refined at the time of puberty.[54–56] Vaginal dilatation should not be undertaken before puberty. The surgeon must be familiar with several operative techniques in order to reconstruct the spectrum of urogenital sinus disorders. An absent or inadequate vagina (with rare exceptions) requires a vaginoplasty performed in adolescence when the patient is psychologically motivated and a full partner in the procedure. No one technique has been universally successful; self dilatation, skin substitution, and bowel vaginoplasty each have specific advantages and disadvantages.

In the case of a DSD associated with hypospadias,[57] standard techniques for surgical repair such as chordee correction, urethral reconstruction, and the judicious use of testosterone supplementation apply. The magnitude and complexity of phalloplasty in adulthood should be taken into account during the initial counselling period if successful gender assignment is dependent on this procedure.[58] At times this may affect the balance of gender assignment. Patients must not be given unrealistic expectations about penile reconstruction, including the use of tissue engineering. There is no evidence that prophylactic removal of asymptomatic discordant structures, such as a utriculus or mullerian remnants, is required although symptoms in future may indicate surgical removal. For the male who has a successful neophalloplasty in adulthood, an erectile prosthesis may be inserted but has a high morbidity.

The testes in patients with CAIS[35] and those with PAIS, raised female, should be removed to prevent malignancy in adulthood. The availability of oestrogen replacement therapy allows for the option of early removal at the time of diagnosis which also takes care of the associated hernia, psychological problems with the presence of testes, and the malignancy risk. Parental choice allows deferment until adolescence, recognising that the earliest reported malignancy in CAIS is at 14 years of age.[59] The streak gonad in a patient with MGD raised male should be removed laparoscopically (or by laparotomy) in early childhood.[35] Bilateral gonadectomy is performed in early childhood in females (bilateral streak gonads) with gonadal dysgenesis and Y chromosome material. In patients with androgen biosynthetic defects raised female, gonadectomy should be undertaken before puberty. A scrotal testis in patients with gonadal dysgenesis is at risk for malignancy. Current recommendations are testicular biopsy at puberty seeking signs of the premalignant lesion termed carcinoma in situ or undifferentiated intratubular germ cell neoplasia. If positive, the option is sperm banking before treatment with local low dose radiotherapy which is curative.[60]

Surgical management in DSD should also consider options that will facilitate the chances of fertility. In patients with a symptomatic utriculus, removal is best undertaken laparoscopically to increase the chance of preserving continuity of the vasa deferentia. Patients with bilateral ovotestes are potentially fertile from functional ovarian tissue.[35 61] Separation of ovarian and testicular tissue can be technically difficult and should be undertaken, if possible, in early life.

Sex steroid replacement

Hypogonadism is common in patients with dysgenetic gonads, defects in sex steroid biosynthesis, and resistance to androgens. The timing of initiation of puberty may vary but this is an occasion that provides an opportunity to discuss the condition and set a foundation for long term adherence to treatment. Hormonal induction of puberty should attempt to replicate normal pubertal maturation to induce secondary sexual characteristics, a pubertal growth spurt, and optimal bone mineral accumulation, together with psychosocial support for psychosexual maturation.[62] Intramuscular depot injections of testosterone esters are commonly used in males; other options include oral testosterone undecanoate, and transdermal preparations are also available.[63–65] Patients with PAIS may require supraphysiological doses of testosterone for optimal effect.[66] Females with hypogonadism require oestrogen supplementation to induce pubertal changes and menses. A progestin is usually added after breakthrough bleeding develops or within one to two years of continuous oestrogen. There is no evidence that the addition of cyclic progesterone is beneficial in women without a uterus.

Psychosocial management

Psychosocial care provided by mental health staff with expertise in DSD should be an integral part of management in order to promote positive adaptation. This expertise can facilitate team decisions about gender assignment/reassignment, timing of surgery, and sex hormone replacement. Psychosocial screening tools that identify families at risk for maladaptive coping with a child's medical condition are available.[67] Once the child is sufficiently developed for a psychological assessment of gender identity, such an evaluation must be included in discussions about gender reassignment. Gender identity development begins before the age of 3 years,[68] but the earliest age at which it can be reliably assessed remains unclear. The generalisation that the age of 18 months is the upper limit of imposed gender reassignment should be treated with caution and viewed conservatively. Atypical gender role behaviour is more common in children with DSD than in the general population but should not be taken as an indicator for gender reassignment. In affected children and adolescents who report significant gender dysphoria, a comprehensive psychological evaluation[69] and an opportunity to explore feelings about gender with a qualified clinician is required over a period of time. If the desire to change gender persists, the patient's wish should be supported and may require the input of a specialist skilled in the management of gender change.

The process of disclosure concerning facts about karyotype, gonadal status, and prospects for future fertility is a collaborative ongoing action which requires a flexible individual based approach. It should be planned with the parents from the time of diagnosis.[70] Studies in other chronic medical disorders and of adoptees indicate that disclosure is associated with enhanced psychosocial adaptation.[71] Medical education and counselling for children is a recurrent gradual process of increasing

sophistication which is commensurate with changing cognitive and psychological development.[72]

Quality of life encompasses falling in love, dating, attraction, ability to develop intimate relationships, sexual functioning, and the opportunity to marry and to raise children, regardless of biological indicators of sex. The most frequent problems encountered in DSD patients are sexual aversion and lack of arousability, which are often misinterpreted as low libido.[73] Health care staff should offer adolescent patients opportunities to talk confidentially without their parents and encourage the participation in condition specific support groups which enhance the ability of the patient to discuss their concerns comfortably. Some patients avoid intimate relationships and it is important to address fears of rejection and advise on the process of building a relationship with a partner. The focus should be on interpersonal relationships and not solely on sexual function and activity. Referral for sex therapy may be needed. Repeated examination of the genitalia, including medical photography, may be experienced as deeply shaming.[74] Medical photography has its place for record keeping and education, but should be undertaken whenever possible if the patient is under anaesthesia for a procedure and with appropriate consent. Medical interventions and negative sexual experiences may have fostered symptoms of post-traumatic stress disorder and referral to a qualified mental health professional may be indicated.[75]

OUTCOME IN DSD

As a general statement, information across a range of assessments is insufficient in DSD. The following is based on those disorders where some evidence base is available. They include CAH, CAIS and PAIS, disorders of androgen biosynthesis, gonadal dysgenesis syndromes (complete and partial), and micropenis. Long term outcome in DSD should include the following: external and internal genital phenotype, physical health including fertility, sexual function, social and psychosexual adjustment, mental health, quality of life, and social participation. There are additional health problems in individuals with DSD. These include the consequences of associated problems such as other malformations, developmental delay and intellectual impairment, delayed growth and development, and unwanted effects of hormones on libido and body image.[76]

Surgical outcome

Some studies suggest satisfactory outcomes from early surgery.[43 46 47 77] Nevertheless, outcomes from clitoroplasty identify problems related to decreased sexual sensitivity, loss of clitoral tissue, and cosmetic issues.[78] Techniques for vaginoplasty carry the potential for scarring at the introitus, necessitating repeated modification before sexual function can be reliable. Surgery to construct a neo-vagina carries a risk of neoplasia.[79] The risks from vaginoplasty are different for high and low confluence of the urethra and vagina. Analysis of long term outcomes is complicated by a mixture of surgical techniques and diagnostic categories.[80] Few women with CAIS need surgery to lengthen the vagina.[81]

The outcome in undermasculinised males with a phallus is dependent on the degree of hypospadias and the amount of erectile tissue. Feminising as opposed to masculinising genitoplasty requires less surgery to achieve an acceptable outcome and results in fewer urological difficulties.[46] Long term data on sexual function and quality of life among those assigned female as well as male show great variability. There are no controlled clinical trials of the efficacy of early (less than 12 months of age) versus late surgery (in adolescence and adulthood), or of the efficacy of different techniques.

Risk of gonadal tumours

Interpretation of published reports is hampered by unclear terminology and by effects of normal cell maturation delay.[82–84] The highest tumour risk is found in TSPY (testis-specific protein Y encoded) positive gonadal dysgenesis and PAIS with intra-abdominal gonads, while the lowest risk (<5%) is found in ovotestis[85] and CAIS.[83 86] Table 4 provides a summary of the risk of tumour development according to diagnosis and recommendations for management.

Cultural and social factors

DSD may carry a stigma. Social and cultural factors, as well as hormonal effects, appear to influence gender role in 5α-reductase deficiency. Gender role change occurs at different rates in different societies, suggesting that social factors may also be important modifiers of gender role change.

In some societies, female infertility precludes marriage, which also affects employment prospects and creates economic dependence. Religious and philosophical views may influence how parents respond to the birth of an infant with a medical condition. Fatalism and guilt feelings in relation to congenital malformations or genetic conditions have an influence, while poverty and

Table 4 Risk of germ cell malignancy according to diagnosis

Risk group	Disorder	Malignancy risk (%)	Recommended action	Studies (n)	Patients (n)
High	GD* (+Y)† intra-abdominal	15–35	Gonadectomy‡	12	>350
	PAIS non-scrotal	50	Gonadectomy‡	2	24
	Frasier	60	Gonadectomy‡	1	15
	Denys-Drash (+Y)	40	Gonadectomy‡	1	5
Intermediate	Turner (+Y)	12	Gonadectomy‡	11	43
	17β-HSD	28	Monitor	2	7
	GD (+Y)‡ scrotal	Unknown	Biopsy§ and irradiation?	0	0
	PAIS scrotal gonad	Unknown	Biopsy§ and irradiation?	0	0
Low	CAIS	2	Biopsy§ and ???	2	55
	Ovotestis DSD	3	Testis tissue removal?	3	426
	Turner (–Y)	1	None	11	557
No (?)	5α-reductase	0	Unresolved	1	3
	Leydig cell hypoplasia	0	Unresolved	2	

*Gonadal dysgenesis (including not further specified, 46XY, 46X/46XY, mixed, partial, complete).
†GBY region positive, including the *TSPY* gene.
‡At time of diagnosis.
§At puberty, allowing investigation of at least 30 seminiferous tubules, with diagnosis preferably based on OCT3/4 immunohistochemistry.
CAIS, complete androgen insensitivity syndrome; DSD, disorders of sex development; HSD, hydroxysteroid dehydrogenase deficiency; PAIS, partial androgen insensitivity syndrome.

Table 5 Genes known to be involved in disorders of sex development: 46,XY

Gene	Protein	OMIM	Locus	Inheritance	Gonad	Mullerian structures	External genitalia	Associated features/variant phenotypes
46,XY DSD								
Disorders of gonadal (testicular) development: single gene disorders								
WT1	TF	607102	11p13	AD	Dysgenetic testis	+/−	Female or ambiguous	Wilms tumour, renal abnormalities, gonadal tumours (WAGR, Denys-Drash, and Frasier syndromes)
SF1 (NR5A1)	Nuclear receptor TF	184757	9q33	AD/AR	Dysgenetic testis	+/−	Female or ambiguous	More severe phenotypes include primary adrenal failure; milder phenotypes have isolated partial gonadal dysgenesis
SRY	TF	480000	Yp11.3	Y	Dysgenetic testis or ovotestis	+/−	Female or ambiguous	
SOX9	TF	608160	17q24-25	AD	Dysgenetic testis or ovotestis	+/−	Female or ambiguous	Campomelic dysplasia (17q24 rearrangements milder phenotype than point mutations)
DHH	Signalling molecule	605423	12q13.1	AR	Dysgenetic testis	+	Female	The severe phenotype of one patient included minifascicular neuropathy, other patients have isolated gonadal dysgenesis
ATRX	Helicase (?chromatin remodelling)	300032	Xq13.3	X	Dysgenetic testis	−	Female, ambiguous or male	α-Thalassaemia, mental retardation
ARX	TF	300382	Xp22.13	X	Dysgenetic testis	−	Ambiguous	X-linked lissencephaly, epilepsy, temperature instability
Disorders of gonadal (testicular) development: chromosomal changes involving key candidate genes								
DMRT1	TF	602424	9p24.3	Monosomic deletion	Dysgenetic testis	+/−	Female or ambiguous	Mental retardation
DAX1 (NR0B1)	Nuclear receptor TF	300018	Xp21.3	dupXp21	Dysgenetic testis or ovary	+/−	Female or ambiguous	
WNT4	Signalling molecule	603490	1p35	dup1p35	Dysgenetic testis	+	Ambiguous	Mental retardation
Disorders of hormone synthesis or action								
LHGCR	G protein receptor	152790	2p21	AR	Testis	−	Female, ambiguous or micropenis	Leydig cell hypoplasia
DHCR7	Enzyme	602858	11q12-13	AR	Testis	−	Variable	Smith-Lemli-Opitz syndrome: coarse facies, second-third toe syndactyly, failure to thrive, developmental delay, cardiac and visceral abnormalities
STAR	Mitochondrial membrane protein	600617	8p11.2	AR	Testis	−	Female	Congenital lipoid adrenal hyperplasia (primary adrenal failure), pubertal failure
CYP11A1	Enzyme	118485	15q23-24	AR	Testis	−	Female or Ambiguous	Congenital adrenal hyperplasia (primary adrenal failure), pubertal failure
HSD3B2	Enzyme	201810	1p13.1	AR	Testis	−	Ambiguous	CAH, primary adrenal failure, partial androgenisation due to ↑ DHEA
CYP17	Enzyme	202110	10q24.3	AR	Testis	−	Female, ambiguous or micropenis	CAH, hypertension due to ↑ corticosterone & 11-deoxycorticosterone (except in isolated 17,20-lyase deficiency)
POR (P450 oxido-reductase)	CYP enzyme electron donor	124015	7q11.2	AR	Testis	−	Male or ambiguous	Mixed features of 21-hydroxylase deficiency, 17α-hydroxylase/17,20-lyase deficiency, and aromatase deficiency; sometimes associated with Antley Bixler craniosynostosis
HSD17B3	Enzyme	605573	9q22	AR	Testis	−	Female or ambiguous	Partial androgenisation at puberty, ↑ androstenedione:testosterone ratio
SRD5A2	Enzyme	607306	2p23	AR	Testis	−	Ambiguous or micropenis	Partial androgenisation at puberty, ↑ testosterone:DHT ratio,
AMH	Signalling molecule	600957	19p13.3-13.2	AR	Testis	+	Normal male	Persistent mullerian duct syndrome
AMH-Receptor	Serine-threonine kinase transmembrane receptor	600956	12q13	AR	Testis	+	Normal male	(PMDS). Male external genitalia, bilateral cryptorchidism
Androgen receptor	Nuclear receptor TF	313700	Xq11-12	X	Testis	−	Female, ambiguous, micropenis or normal male	Phenotypic spectrum from complete androgen insensitivity syndrome (female external genitalia) and partial androgen insensitivity (ambiguous) to normal male genitalia/infertility

AD, autosomal dominant; AR, autosomal recessive; CAH, congenital adrenal hyperplasia; TF, transcription factor; X, X-linked recessive; Y, Y-linked recessive.

Table 6 Genes known to be involved in disorders of sex development: 46,XX

Gene	Protein	OMIM	Locus	Inheritance	Gonad	Mullerian structures	External genitalia	Associated features/variant phenotypes
Disorders of gonadal (ovarian) development								
SRY	TF	480000	Yp11.3	Translocation	Testis or ovotestis	–	Male or ambiguous	
SOX9	TF	608160	17q24	dup17q24	ND	–	Male or ambiguous	
Androgen excess								
HSD3B2	Enzyme	201810	1p13	AR	Ovary	+	Clitoromegaly	CAH, primary adrenal failure, partial androgenisation due to ↑DHEA
CYP21A2	Enzyme	201910	6p21-23	AR	Ovary	+	Ambiguous	CAH, phenotypic spectrum from severe salt losing forms associated with adrenal failure to simple virilising forms with compensated adrenal function, ↑17-hydroxyprogesterone
CYP11B1	Enzyme	202010	8q21-22	AR	Ovary	+	Ambiguous	CAH, hypertension due to ↑11-deoxycortisol and 11-deoxycorticosterone
POR (P450 oxido-reductase)	CYP enzyme electron donor	124015	7q11.2	AR	Ovary	+	Ambiguous	Mixed features of 21-hydroxylase deficiency, 17α-hydroxylase/17,20-lyase deficiency and aromatase deficiency; associated with Antley Bixler craniosynostosis
CYP19	Enzyme	107910	15q21	AR	Ovary	+	Ambiguous	Maternal androgenisation during pregnancy, absent breast development at puberty, except in partial cases
Glucocorticoid receptor	Nuclear receptor TF	138040	5q31	AR	Ovary	+	Ambiguous	↑ACTH, 17-hydroxyprogesterone and cortisol; failure of dexamethasone suppression (NB patient heterozygous for a mutation in CYP21)

ACTH, adrenocorticotropin; AD, autosomal dominant; AR, autosomal recessive; CAH, congenital adrenal hyperplasia; ND, not determined; TF, transcription factor; X, X chrosomal; Y, Y chromosomal.
Chromosomal rearrangements likely to include key genes are included. Modified from Achermann *et al*[88], with permission from the Endocrine Society.

illiteracy negatively affect access to health care.[87]

FUTURE STUDIES

Establishing a precise diagnosis in DSD is just as important as in other chronic medical conditions with lifelong consequences. Considerable progress has been achieved with molecular studies, as illustrated in tables 5 and 6, which summarise the genes known to be involved in DSD. Use of tissue specific animal knock out models, comparative genomic hybridisation, and microarray screens of the mouse urogenital ridge will provide benefits in identifying new genes causing DSD.[89] It is essential that the momentum for an international collaborative approach to this task is maintained.

Much remains to be clarified about the determinants of gender identity in DSD. Future studies require representative sampling to carefully conceptualise and measure gender identity, recognising that there are multiple determinants to consider and gender identity may change into adulthood. In terms of psychological management, studies are needed to evaluate the effectiveness of information management with regard to timing and content. The pattern of surgical practice in DSD is changing with respect to the timing of surgery and the techniques employed. It is essential to evaluate the effects of early versus later surgery in an holistic manner, recognising the difficulties posed by an ever evolving clinical practice.

The consensus has clearly identified a major shortfall in information about long term outcome. Future studies should use appropriate instruments that assess outcomes in a standard manner[68 69] and take cognisance of guidelines relevant to all chronic conditions (http://www.who.int/classifications/icf/en/). These should preferably be prospective in nature and designed to avoid selection bias. Several countries already have registers of DSD cases but there could be added benefit from pooling such resources to enable prospective multicentre studies to be undertaken on a larger number of cases that are clearly defined. Allied to this should be an educational programme to ensure that professionals tasked with providing care for DSD families are suitably trained to discharge their responsibilities.

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REFERENCES

1 **Frader J**, Alderson P, Asch A, *et al*. Health care professionals and intersex conditions. *Arch Pediatr Adolesc Med* 2004;**158**:426–9.
2 **Conn J**, Gillam L, Conway G. Revealing the diagnosis of androgen insensitivity syndrome in adulthood. *BMJ* 2005;**331**:628–30.
3 **Dreger AD**, Chase C, Sousa A, *et al*. Changing the nomenclature/taxonomy for intersex: A scientific and clinical rationale. *J Pediatr Endocrinol Metab* 2005;**18**:729–33.
4 **Brown J**, Warne G. Practical management of the intersex infant. *J Pediatr Endocrinol Metab* 2005;**18**:3–23.
5 **Cohen-Kettenis PT**. Gender change in 46,XY persons with 5-alpha-reductase-2 deficiency and 17-beta-hydroxysteroid dehydrogenase-3 deficiency. *Arch Sex Behav* 2005;**34**:399–410.
6 **Meyer-Bahlburg HF**. Gender identity outcome in female-raised 46,XY persons with penile agenesis, cloacal exstrophy of the bladder, or penile ablation. *Arch Sex Behav* 2005;**34**:423–38.
7 **Zucker KJ**. Intersexuality and gender identity differentiation. *Annu Rev Sex Res* 1999;**10**:1–69.
8 **Cohen-Bendahan CCC**, van de Beek C, Berenbaum SA. Prenatal sex hormone effects on child and adult sex-typed behavior: methods and findings. *Neurosci Biobehav Rev* 2005;**29**:353–384.
9 **Meyer-Bahlburg HF**. Gender and sexuality in congenital adrenal hyperplasia. *Endocrinol Metab Clin North Am* 2001;**30**:155–71.
10 **Nordenström A**, Servin A, Bohlin G, *et al*. Sex-typed toy play behavior correlates with the degree of prenatal androgen exposure assessed by CYP21 genotype in girls with congenital adrenal hyperplasia. *J Clin Endo Metab* 2002;**87**:5119–24.
11 **Goy RW**, Bercovitch FB, McBrair MC. Behavioral masculinization is independent of genital masculinization in prenatally androgenized female rhesus macaques. *Horm Behav* 1988;**22**:552–71.
12 **Wallen K**. Hormonal influences on sexually differentiated behavior in nonhuman primates. *Front Neuroendocrinol* 2005;**26**:7–26.
13 **Moore CL**. The role of maternal stimulation in the development of sexual behavior and its neural basis. *Ann NY Acad Sci* 1992;**662**:160–77.
14 **Wallen K**. Nature needs nurture: the interaction of hormonal and social influences on the development of behavioral sex differences in rhesus monkeys. *Horm Behav* 1996;**30**:364–78.
15 **De Vries GJ**, Rissman EF, Simerly RB, *et al*. A model system for study of sex chromosome effects on sexually dimorphic neural and behavioral traits. *J Neurosci* 2002;**22**:9005–14.
16 **Skuse DH**, James RS, Bishop DVM, *et al*. Evidence from Turner's syndrome of an imprinted X-linked locus affecting cognitive function. *Nature* 1997;**387**:705–8.
17 **Hines M**, Ahmed F, Hughes IA. Psychological outcomes and gender-related development in complete androgen insensitivity syndrome. *Arch Sex Behav* 2003;**32**:93–101.
18 **Arnold AP**, Rissman EF, De Vries GJ. Two perspectives on the origin of sex differences in the brain. *Ann NY Acad Sci* 2003;**1007**:176–88.
19 **Luders E**, Narr K, Thompson PM, *et al*. Gender differences in cortical complexity. *Nature Neurosci* 2004;**7**:799–800.
20 **Paus T**. Mapping brain maturation and cognitive development during adolescence. *Trends Cogn Sci* 2005;**9**:60–8.
21 **Consortium on the Management of Disorders of Sex Differentiation**. Clinical guidelines: for the management of disorders of sex development in childhood. 2006 (www.dsdguidelines.org).
22 **Lee PA**. A perspective on the approach to the intersex child born with genital ambiguity. *J Pediatr Endocrinol Metab* 2004;**17**:133–40.
23 **American Academy of Pediatrics**. Council on Children with Disabilities. Care coordination in the medical home: integrating health and related systems of care for children with special health care needs, *Pediatrics* 2005;**116**:1238–44.
24 **Cashman S**, Reidy P, Cody K, *et al*. Developing and measuring progress toward collaborative, integrated, interdisciplinary health teams. *J Interprof Care* 2004;**18**:183–96.
25 **Warne G**. Support groups for CAH and AIS. *Endocrinologist* 2003;**13**:175–8.
26 **Feldman KW**, Smith DW. Fetal phallic growth and penile standards for newborn male infants. *J Pediatr* 1975;**86**:395–8.
27 **Schonfield WA**, Beebe GW. Normal growth and variation in the male genitalia from birth to maturity. *J Urol* 1942;**48**:759–77.
28 **Fujieda K**, Matsuura N. Growth and maturation in the male genitalia from birth to adolescence. II Change of penile length. *Acta Paediatr Japan* 1987;**29**:220–3.
29 **Tuladhar R**, Davis PG, Batch J, *et al*. Establishment of a normal range of penile length in preterm infants. *J Paediatr Child Health* 1998;**34**:471–3.
30 **Cheng PK**, Chanoine JP. Should the definition of micropenis vary according to ethnicity? *Horm Res* 2001;**55**:278–81.
31 **Zachmann M**, Prader A, Kind HP, *et al*. Testicular volume during adolescence: cross-sectional and longitudinal studies. *Helv Paediatr Acta* 1974;**29**:61–72.
32 **Oberfield SE**, Mondok A, Shahrivar F, *et al*. Clitoral size in full-term infants. *Am J Perinatol* 1989;**6**:453–54.
33 **Verkauf BS**, Von Thron J, O'Brien WF. Clitoral size in normal women. *Obstet Gynecol* 1992;**80**:41–4.
34 **Lloyd J**, Crouch NS, Minto CL, *et al*. Female genital appearance: "normality" unfolds. *BJOG* 2005;**112**:643–6.
35 **Grumbach MM**, Hughes IA, Conte FA. Disorders of sex differentiation. In:Larsen PR, Kronenberg HM, Melmed S, *et al*, editors. *Williams textbook of endocrinology*, 10th edition. Philadelphia: WB Saunders, 2003:842–1002.
36 **Ahmed SF**, Cheng A, Dovey L, *et al*. Phenotypic features, androgen receptor binding, and mutational analysis in 278 clinical cases reported as androgen insensitivity syndrome. *J Clin Endocrinol Metab* 2000;**85**:658–65.
37 **Morel Y**, Rey R, Teinturier C, *et al*. Aetiological diagnosis of male sex ambiguity: a collaborative study. *Eur J Pediatr* 2002;**161**:49–59.
38 **Ogilvy-Stuart AL**, Brain CE. Early assessment of ambiguous genitalia. *Arch Dis Child* 2004;**89**:401–7.
39 **Quillin JM**, Jackson-Cook C, Bodurtha J. The link between providers and patients: how laboratories can ensure quality results with genetic testing. *Clin Leadership Manag Rev* 2003;**17**:351–7.
40 **Pagon RA**, Tarczy-Hornoch P, Baskin PK, *et al*. GeneTests-Gene Clinics: genetic testing information for a growing audience. *Hum Mut* 2002;**19**:501–9.
41 **Dessens AB**, Slijper FM, Drop SL. Gender dysphoria and gender change in chromosomal females with congenital adrenal hyperplasia. *Arch Sex Behav* 2005;**32**:389–97.
42 **Mazur T**. Gender dysphoria and gender change in androgen insensitivity or micropenis. *Arch Sex Behav*, 2005;**34**:411–21.
43 **Clayton PE**, Miller WL, Oberfield SE, Ritzen EM, Speisser PW, ESPE/LWPES CAH Working Group. Consensus statement on 21-hydroxylase deficiency from the Lawson Wilkins Pediatric Endocrine Society and the European Society for Paediatric Endocrinology. *Horm Res* 2002;**58**:188–95.
44 **Nicolino M**, Bendelac N, Jay N, *et al*. Clinical and biological assessments of the undervirilized male. *BJU Int* 2004;**93**(suppl 3):20–5.
45 **Mendonca BB**, Inacio M, Costa EMF, *et al*. Male pseudohermaphroditism due to 5 alpha-reductase 2 deficiency: outcome of a Brazilian Cohort. *Endocrinologist* 2003;**13**:202–4.
46 **Migeon CJ**, Wisniewski AB, Gearhart JP, *et al*. Ambiguous genitalia with perineoscrotal hypospadias in 46,XY individuals: long-term medical, surgical, and psychosexual outcome. *Pediatrics* 2002;**110**:e31.
47 **Lee PA**, Witchel SF. Genital surgery among females with congenital adrenal hyperplasias: Changes over the past five decades. *J Pediatr Endocrinol Metab* 2002;**15**:1473–7.
48 **Rink RC**, Adams MC. Feminizing genitoplasty: state of the art. *World J Urol* 1998;**16**:212–18.
49 **Farkas A**, Chertin B, Hadas-Halpren I. 1-Stage feminizing genitoplasty: 8 years of experience with 49 cases. *J Urol* 2001;**165**:2341–6.
50 **Baskin LS**. Anatomical studies of the female genitalia: surgical reconstructive implications. *J Pediatr Endocrinol Metab* 2004;**17**:581–7.
51 **Crouch NS**, Minto CL, Laio LM, *et al*. Genital sensation after feminizing genitoplasty for congenital adrenal hyperplasia: a pilot study. *BJU Int* 2004;**93**:135–8.
52 **Meyer-Bahlburg HF**, Migeon CJ, Berkovitz GD, *et al*. Attitudes of adult 46,XY intersex persons to clinical management policies. *J Urol* 2004;**171**:1615–19.
53 **American Academy of Pediatrics**. Timing of elective surgery on the genitalia of male children with particular reference to the risks, benefits, and psychological effects of surgery and anaesthesia. *Pediatrics* 1996;**97**:590–4.
54 **Eroglu E**, Tekant G, Gundogdu G, *et al*. Feminizing surgical management of intersex patients. *Pediatr Surg Int* 2004;**20**:543–7.
55 **Alizai N**, Thomas DFM, Lilford RJ, *et al*. Feminizing genitoplasty for congenital adrenal hyperplasia: what happens at puberty? *J Urol* 1999;**161**:1588–91.
56 **Bailez MM**, Gearhart JP, Migeon CG, *et al*. Vaginal reconstruction after initial construction of the external genitalia in girls with salt wasting adrenal hyperplasia. *J Urol* 1992;**148**:680–4.
57 **Mouriquand PD**, Mure PY. Current concepts in hypospadiology. *BJU Int* 2004;**93**(suppl 3):26–34.
58 **Bettocchi C**, Ralph DJ, Pryor JP. Pedicled phalloplasty in females with gender dysphoria. *BJU Int* 2005;**95**:120–4.
59 **Hurt WG**, Bodurtha JN, McCall JB, *et al*. Seminoma in pubertal patient with androgen insensitivity syndrome. *Am J Obstet Gynecol* 1989;**161**:530–1.
60 **Rorth M**, Rajpert-De Meyts E, Andersson L, *et al*. Carcinoma in situ in the testis. *Scand J Urol Nephrol Suppl* 2000;**205**:166–86.
61 **Nihoul-Fékété C**. The Isabel Forshall Lecture. Surgical management of the intersex patient: an

overview in 2003, *J Pediatr Surg* 2004;**39**:144–5.
62 **Warne GL**, Grover S, Zajac JD. Hormonal therapies for individuals with intersex conditions: protocol for use. *Treat Endocrinol* 2005;**4**:19–29.
63 **Rogol AD**. New facets of androgen replacement therapy during childhood and adolescence. *Expert Opin Pharmacother* 2005;**6**:1319–36.
64 **Ahmed SF**, Tucker P, Mayo A, *et al*. Randomized, crossover comparison study of the short-term effect of oral testosterone undecanoate and intramuscular testosterone depot on linear growth and serum bone alkaline phosphatase. *J Pediatr Endocrinol Metab* 2004;**17**:941–50.
65 **Mayo A**, Macintyre H, Wallace AM, *et al*. Transdermal testosterone application: pharmacokinetics and effects on pubertal status, short-term growth, and bone turnover. *J Clin Endocrinol Metab* 2004;**89**:681–7.
66 **Weidemann W**, Peters B, Romalo G, *et al*. Response to androgen treatment in a patient with partial androgen insensitivity and a mutation in the deoxyribonucleic acid binding domain of the androgen receptor. *J Clin Endocrinol Metab* 2000;**83**:1173–81.
67 **Kazak AE**, Cant MC, Jensen MM, *et al*. Identifying psychosocial risk indicative of subsequent resource use in families of newly diagnosed pediatric oncology patients. *J Clin Oncol* 2003;**21**:3220–5.
68 **Martin CL**, Ruble DN, Szkrybalo J. Cognitive theories of early gender development. *Psychol Bull* 2002;**128**:903–33.
69 **Zucker KJ**. Measurement of psychosexual differentiation. *Arch Sex Behav* 2005;**34**:375–88.
70 **Carmichael P**, Ransley P. Telling children about a physical intersex condition. *Dialogues Pediatr Urol* 2002;**25**:7–8.
71 **Committee on Paediatric AIDS**, American Academy of Pediatrics. Disclosure of illness status to children and adolescents with HIV infection. *Pediatrics* 1999;**103**:164–6.
72 **Money J**. *Sex errors of the body and related syndromes: a guide to counselling children, adolescents, and their families*, 2nd edition. Baltimore: Paul H Brookes Publishing Co, 1994.
73 **Basson R**, Leiblum S, Brotto L, *et al*. Definitions of women's sexual dysfunction reconsidered: advocating expansion and revision. *J Psychosom Obstet Gynecol* 2003;**24**:221–9.
74 **Creighton S**, Alderson J, Brown S, Minto CL. Medical photography: ethics, consent and the intersex patient. *BJU Int* 2002;**89**:67–71.
75 **Ursano RJ**, Bell C, Eth S, *et al*. Work Group on ASD and PTSD; Steering Committee on Practice Guidelines. Practice guidelines for the treatment of patients with acute stress disorder and posttraumatic stress disorder. *Am J Psychiatry* 2004;**161**(11 suppl):3–31.
76 **Kuhnle U**, Bullinger M Outcome of congenital adrenal hyperplasia. *Pediatr Surg Int* 1997;**12**:511–15.
77 **Warne G**, Grover S, Hutson J, *et al*. Murdoch Childrens Research Institute Sex Study Group. A long-term outcome study of intersex conditions. *J Pediatr Endocrinol Metab* 2005;**18**:555–67.
78 **Creighton SM**. Long-term outcome of feminization surgery: the London experience. *BJU Int* 2004;**93**(suppl 3):44–6.
79 **Steiner E**, Woernie F. Carcinoma of the neovagina: case report and review of the literature. *Gynecol Oncol* 2002;**84**:171–5.
80 **Schober JM**. Long-term outcomes of feminizing genitoplasty for intersex. In: *Pediatric surgery and urology: long-term outcomes*. London: WB Saunders Co (in press)).
81 **Wisniewski AB**, Migeon CJ, Meyer-Bahlburg HF, *et al*. Complete androgen insensitivity syndrome: long-term medical, surgical, and psychosexual outcome. *J Clin Endocrinol Metab* 2000;**85**:2664–9.
82 **Honecker F**, Stoop H, de Krijger RR, *et al*. Pathobiological implications of the expression of markers of testicular carcinoma in situ by fetal germ cells. *J Pathol* 2004;**203**:849–57.
83 **Cools M**, Van Aerde K, Kersemaekers AM, *et al*. Morphological and immunohistochemical differences between gonadal maturation delay and early germ cell neoplasia in patients with undervirilization syndromes. *J Clin Endocrinol Metab* 2005;**90**:5295–303.
84 **Cools M**, Honecker F, Stoop H, *et al*. Maturation delay of germ cells in trisomy 21 fetuses results in increased risk for the development of testicular germ cell tumors. *Hum Pathol* 2006;**37**:101–11.
85 **Ramani P**, Yeung CK, Habeebu SS. Testicular intratubular germ cell neoplasia in children and adults with intersex. *Am J Surg Pathol* 1993;**17**:1124–33.
86 **Hannema SE**, Scott IS, Rajperts-De Meyts E, *et al*. Testicular development in the complete androgen insensitivity syndrome. *J Pathol* 2006;**208**:518–27.
87 **Warne GL**, Bhatia V. Intersex, East and West. In:Sytsma S, editor. *Ethics and intersex*. Berlin: Springer, 2006:183–205.
88 **Achermann JC**, Ozisik G, Meeks JJ, *et al*. Genetic causes of human reproductive disease. *J Clin Endocrinol Metab* 2002;**87**:2447–54.
89 **Small CL**, Shima JE, Uzumcu M, *et al*. Profiling gene expression during the differentiation and development of the murine embryonic gonad. *Biol Reprod* 2005;**72**:492–501.
90 **Martin PL**. Moving toward an international standard in informed consent: the impact of intersexuality and the internet on the standard of care. *Duke J Gend Law Policy* 2002;**9**:135–69.
91 **Department of Health**. *Reference guide to consent for examination or treatment*. London, DoH, 2001 (www.doh.gov.uk/consent).
92 **Sentencia SU-337/99**, May 12, 1999; T-551/99, Aug 2 1999.

APPENDIX 1

ROLE OF SUPPORT GROUPS

The value of peer and parent support for many chronic medical conditions is widely accepted, and DSDs, being lifelong conditions which affect developmental tasks at many stages of life, are no exception.

Those affected by DSDs and parent members value the following:

- Peer support ends isolation and stigma, providing a context in which conditions are put into perspective, and where intimate issues of concern can be discussed safely with someone who has "been there."
- Children who form relationships with peers and affected adults early in their lives benefit from a feeling of normalcy early on, with support in place well before adolescence. Adolescents often resist attempts to introduce them to peer support.
- Support groups can help families and consumers find the best quality care.

While clinical practice may focus on gender and genital appearance as key outcomes, stigma and experiences associated with having a DSD (both within and outside the medical environment) are more salient issues for many affected people.

Support groups complement the work of the health care team and, together, can help improve services. Initiatives by support groups have led to improvements in management of DSD and research directed towards clinically relevant issues. Dialogue between health care professionals and support groups, and collaboration as partners is to be encouraged.

APPENDIX 2

LEGAL ISSUES

Basic principles of medical law will remain, even as research and clinical experience evolve in aetiology, diagnosis, and treatment. This appendix draws on practice in three countries on standards of medical negligence and patient informed consent. In the USA, the medical profession sets standards of care based on prevailing medical custom.[90] However, a treatment may also be that used by a respected minority of practitioners.

USA

Informed consent in the USA was founded on the principle of battery, whereby it is an offence to violate another person's bodily integrity without consent. Nowadays, most states are concerned with negligent non-disclosure to the patient. The standard of adequate disclosure may be physician based, requiring conduct of a reasonable practitioner, or it may be patient based, asking what a reasonable patient would find material. Physician based disclosure must include information about risks, alternatives, outcomes, and prognosis, with or without treatment.

US courts assume that parents know what is best for their child when parental authority applies to consent for the child (substituted judgement). Parental decisions are deferred to except in situations where potentially life saving treatment is withheld. Consent to treatment by a child is dependent on an understanding of its nature and consequences.

United Kingdom

Medical negligence in the United Kingdom defines treatment that falls below the standard expected of a reasonably competent practitioner. The standard of proof in court is whether negligence is demonstrated on the balance of probabilities. It is incumbent on the practitioner to demonstrate that treatment was consistent with a rationally defensible body of medical opinion. A shift in parental prerogative to consent to treatment was reflected in the Children Act 1989, in which parental rights were replaced by parental responsibilities.[91] UK courts can intervene with orders made requiring or preventing a specific action related to the child. Age is not a barrier to

informed consent, providing that a minor demonstrates an understanding of the issues sufficient to have the capacity to consent.

Colombia

Colombian law is noted for a reasoned set of guidelines advanced by the highest court in cases of DSD.[92] A protocol was formulated for parental and physician intervention. The process of consent requires "qualified and persistent informed consent" over an extended period of time. Authorisation is given in stages to allow time for the parents to come to terms with their child's condition. The court aimed to strike a balance between parental autonomy for those who did and those who did not want early surgery for their child, until there was clear evidence of harm in deferring surgery until the child was competent to decide. Parents cannot consent for children over 5 years of age, as by then children are deemed to have identified with a gender and so are considered to be autonomous.

IMAGES IN PAEDIATRICS

doi: 10.1136/adc.2006.093682

Intraoral graphite tattoo

Graphite pencils, in addition to their usual role as teaching tools, may cause traumatic injury and foreign body reaction, especially during early childhood.

A 5 year old healthy female patient was referred from the paediatric clinic because of her father's concern about a blue lesion on the upper gum which has been increasing in size over four months. Intraoral examination showed an asymptomatic, firm, well defined, scalloped, blue–black macule measuring 15 mm×5 mm involving the attached gingiva and extending apically to the mucogingival junction in the area labial to the maxillary left primary central and lateral incisors (fig 1). There was no associated inflammation and the lesion failed to respond to the blanching test. A periapical radiograph of the anterior maxillary region did not show any pathological changes. Differential diagnoses of foreign body pigmentation, melanocytic nevi, and malignant melanoma were considered. A full mucoperiosteal flap was raised, revealing abundance of granulation tissue, destruction of labial cortical bone to the central incisor, and residues of solid black granules (fig 2). Histopathology showed mild chronic inflammatory cell infiltrate with multinucleated giant cells. There was no evidence of cellular atypia and solid granules were consistent with pencil graphite.

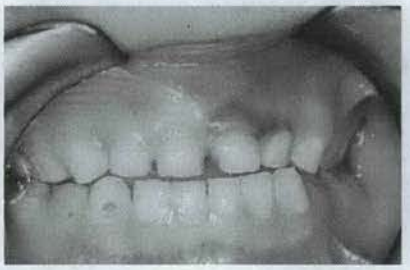

Figure 1 Intraoral view showing the macule labial to maxillary left primary central and lateral incisors.

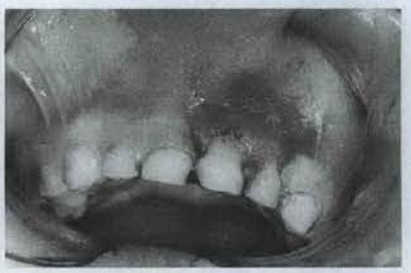

Figure 2 Destruction of alveolar labial bone and presence of black granules.

The most common causes of exogenous localised oral pigmentation are amalgam tattoo, followed by graphite.[1 2] Intraoral graphite implantation is common in the anterior palates of younger children; biopsy is mandatory to rule out malignancy.[2]

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References

1 **Witman PM**, Rogers RS 3rd. Pediatric oral medicine. *Dermatol Clin* 2003;**21**:157–70.
2 **Kauzman A**, Pavone M, Blanas N, *et al*. Pigmented lesions of the oral cavity: review, differential diagnosis, and case presentations. *J Can Dent Assoc* 2004;**70**:682–3.

WPATH WORLD PROFESSIONAL ASSOCIATION for TRANSGENDER HEALTH

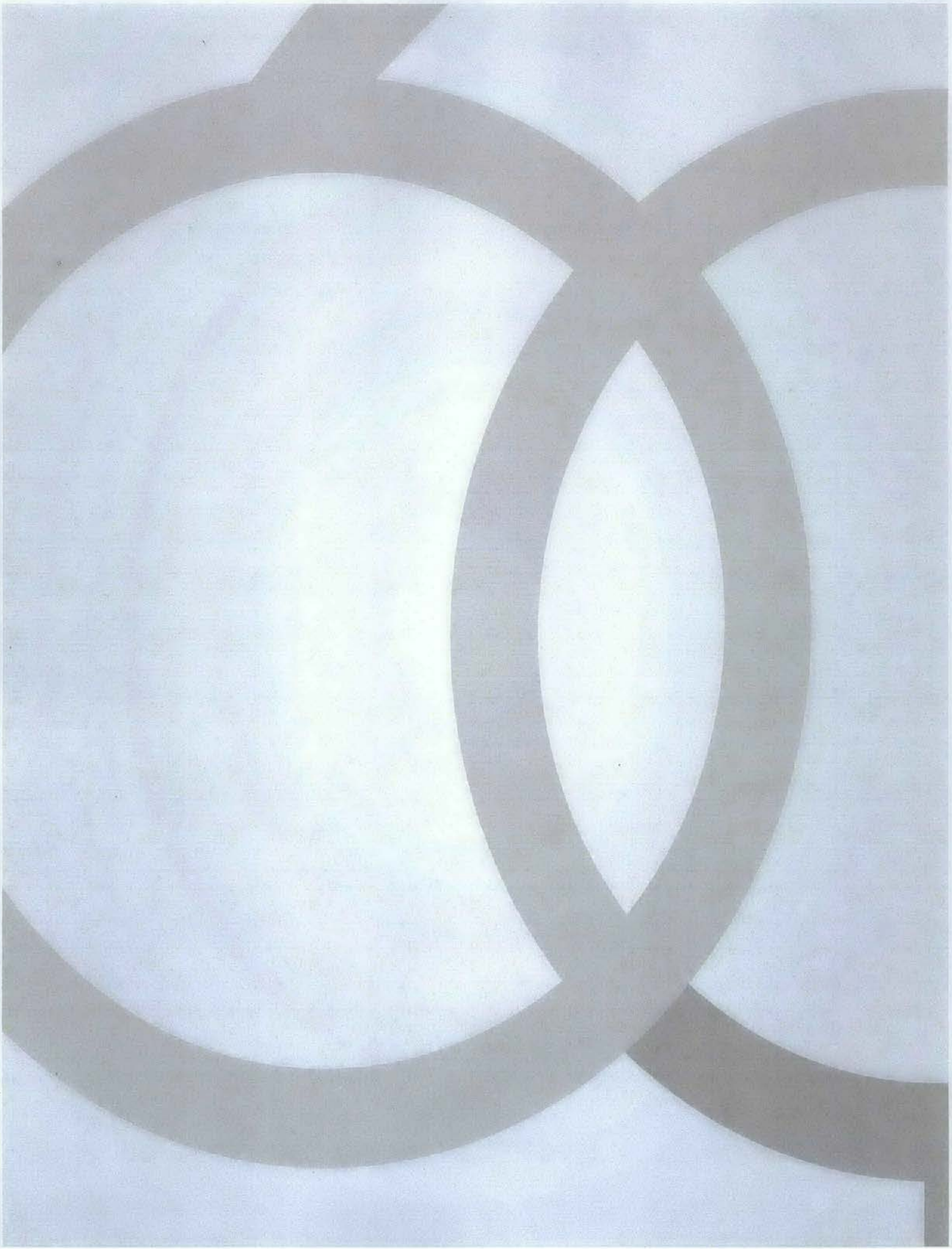
www.wpath.org

Standards of Care

for the Health of Transsexual, Transgender, and Gender Nonconforming People

The World Professional Association for Transgender Health

7th Version



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Standards of Care

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7th Version[1] | www.wpath.org

1 This is the seventh version of the Standards of Care. The original SOC were published in 1979. Previous revisions were in 1980, 1981, 1990, 1998, and 2001.

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Purpose and Use of the Standards of Care

The World Professional Association for Transgender Health (WPATH)[1] is an international, multidisciplinary, professional association whose mission is to promote evidence-based care, education, research, advocacy, public policy, and respect for transgender health. The vision of WPATH is to bring together diverse professionals dedicated to developing best practices and supportive policies worldwide that promote health, research, education, respect, dignity, and equality for transsexual, transgender, and gender nonconforming people in all cultural settings.

One of the main functions of WPATH is to promote the highest standards of health care for individuals through the articulation of *Standards of Care (SOC) for the Health of Transsexual, Transgender, and Gender Nonconforming People*. The *SOC* are based on the best available science and expert professional consensus.[2] Most of the research and experience in this field comes from a North American and Western European perspective; thus, adaptations of the *SOC* to other parts of the world are necessary. Suggestions for ways of thinking about cultural relativity and cultural competence are included in this version of the *SOC*.

The overall goal of the *SOC* is to provide clinical guidance for health professionals to assist transsexual, transgender, and gender nonconforming people with safe and effective pathways to achieving lasting personal comfort with their gendered selves, in order to maximize their overall health, psychological well-being, and self-fulfillment. This assistance may include primary care, gynecologic and urologic care, reproductive options, voice and communication therapy, mental health services (e.g., assessment, counseling, psychotherapy), and hormonal and surgical treatments. While this is primarily a document for health professionals, the *SOC* may also be used by individuals, their families, and social institutions to understand how they can assist with promoting optimal health for members of this diverse population.

WPATH recognizes that health is dependent upon not only good clinical care but also social and political climates that provide and ensure social tolerance, equality, and the full rights of citizenship. Health is promoted through public policies and legal reforms that promote tolerance and equity

1 Formerly the Harry Benjamin International Gender Dysphoria Association

2 *Standards of Care (SOC), Version 7* represents a significant departure from previous versions. Changes in this version are based upon significant cultural shifts, advances in clinical knowledge, and appreciation of the many health care issues that can arise for transsexual, transgender, and gender nonconforming people beyond hormone therapy and surgery (Coleman, 2009a, b, c, d).

for gender and sexual diversity and that eliminate prejudice, discrimination, and stigma. WPATH is committed to advocacy for these changes in public policies and legal reforms.

The Standards of Care Are Flexible Clinical Guidelines

The *SOC* are intended to be flexible in order to meet the diverse health care needs of transsexual, transgender, and gender nonconforming people. While flexible, they offer standards for promoting optimal health care and guiding the treatment of people experiencing gender dysphoria – broadly defined as discomfort or distress that is caused by a discrepancy between a person's gender identity and that person's sex assigned at birth (and the associated gender role and/or primary and secondary sex characteristics) (Fisk, 1974; Knudson, De Cuypere, & Bockting, 2010b).

As for all previous versions of the *SOC*, the criteria put forth in this document for hormone therapy and surgical treatments for gender dysphoria are clinical guidelines; individual health professionals and programs may modify them. Clinical departures from the *SOC* may come about because of a patient's unique anatomic, social, or psychological situation; an experienced health professional's evolving method of handling a common situation; a research protocol; lack of resources in various parts of the world; or the need for specific harm reduction strategies. These departures should be recognized as such, explained to the patient, and documented through informed consent for quality patient care and legal protection. This documentation is also valuable for the accumulation of new data, which can be retrospectively examined to allow for health care – and the *SOC* – to evolve.

The *SOC* articulate standards of care but also acknowledge the role of making informed choices and the value of harm reduction approaches. In addition, this version of the *SOC* recognizes and validates various expressions of gender that may not necessitate psychological, hormonal, or surgical treatments. Some patients who present for care will have made significant self-directed progress towards gender role changes, transition, or other resolutions regarding their gender identity or gender dysphoria. Other patients will require more intensive services. Health professionals can use the *SOC* to help patients consider the full range of health services open to them, in accordance with their clinical needs and goals for gender expression.

II

Global Applicability of the Standards of Care

While the *SOC* are intended for worldwide use, WPATH acknowledges that much of the recorded clinical experience and knowledge in this area of health care is derived from North American and Western European sources. From place to place, both across and within nations, there are differences in all of the following: social attitudes towards transsexual, transgender, and gender nonconforming people; constructions of gender roles and identities; language used to describe different gender identities; epidemiology of gender dysphoria; access to and cost of treatment; therapies offered; number and type of professionals who provide care; and legal and policy issues related to this area of health care (Winter, 2009).

It is impossible for the *SOC* to reflect all of these differences. In applying these standards to other cultural contexts, health professionals must be sensitive to these differences and adapt the *SOC* according to local realities. For example, in a number of cultures, gender nonconforming people are found in such numbers and living in such ways as to make them highly socially visible (Peletz, 2006). In settings such as these, it is common for people to initiate a change in their gender expression and physical characteristics while in their teens, or even earlier. Many grow up and live in a social, cultural, and even linguistic context quite unlike that of Western cultures. Yet almost all experience prejudice (Peletz, 2006; Winter, 2009). In many cultures, social stigma towards gender nonconformity is widespread and gender roles are highly prescriptive (Winter et al., 2009). Gender nonconforming people in these settings are forced to be hidden, and therefore may lack opportunities for adequate health care (Winter, 2009).

The *SOC* are not intended to limit efforts to provide the best available care to all individuals. Health professionals throughout the world – even in areas with limited resources and training opportunities – can apply the many core principles that undergird the *SOC*. These principles include the following: Exhibit respect for patients with nonconforming gender identities (do not pathologize differences in gender identity or expression); provide care (or refer to knowledgeable colleagues) that affirms patients' gender identities and reduces the distress of gender dysphoria, when present; become knowledgeable about the health care needs of transsexual, transgender, and gender nonconforming people, including the benefits and risks of treatment options for gender dysphoria; match the treatment approach to the specific needs of patients, particularly their goals for gender expression and need for relief from gender dysphoria; facilitate access to appropriate care; seek patients' informed consent before providing treatment; offer continuity of care; and be prepared to support and advocate for patients within their families and communities (schools, workplaces, and other settings).

Terminology is culturally and time-dependent and is rapidly evolving. It is important to use respectful language in different places and times, and among different people. As the *SOC* are translated into other languages, great care must be taken to ensure that the meanings of terms are accurately translated. Terminology in English may not be easily translated into other languages, and vice versa. Some languages do not have equivalent words to describe the various terms within this document; hence, translators should be cognizant of the underlying goals of treatment and articulate culturally applicable guidance for reaching those goals.

III

The Difference Between Gender Nonconformity and Gender Dysphoria

Being Transsexual, Transgender, or Gender Nonconforming Is a Matter of Diversity, Not Pathology

WPATH released a statement in May 2010 urging the de-psychopathologization of gender nonconformity worldwide (WPATH Board of Directors, 2010). This statement noted that "the expression of gender characteristics, including identities, that are not stereotypically associated with one's assigned sex at birth is a common and culturally-diverse human phenomenon [that] should not be judged as inherently pathological or negative."

Unfortunately, there is stigma attached to gender nonconformity in many societies around the world. Such stigma can lead to prejudice and discrimination, resulting in "minority stress" (I. H. Meyer, 2003). Minority stress is unique (additive to general stressors experienced by all people), socially based, and chronic, and may make transsexual, transgender, and gender nonconforming individuals more vulnerable to developing mental health concerns such as anxiety and depression (Institute of Medicine, 2011). In addition to prejudice and discrimination in society at large, stigma can contribute to abuse and neglect in one's relationships with peers and family members, which in turn can lead to psychological distress. However, these symptoms are socially induced and are not inherent to being transsexual, transgender, or gender nonconforming.

Gender Nonconformity Is Not the Same as Gender Dysphoria

Gender nonconformity refers to the extent to which a person's gender identity, role, or expression differs from the cultural norms prescribed for people of a particular sex (Institute of Medicine, 2011). *Gender dysphoria* refers to discomfort or distress that is caused by a discrepancy between a person's gender identity and that person's sex assigned at birth (and the associated gender role and/or primary and secondary sex characteristics) (Fisk, 1974; Knudson, De Cuypere, & Bockting, 2010b). Only *some* gender nonconforming people experience gender dysphoria at *some* point in their lives.

Treatment is available to assist people with such distress to explore their gender identity and find a gender role that is comfortable for them (Bockting & Goldberg, 2006). Treatment is individualized: What helps one person alleviate gender dysphoria might be very different from what helps another person. This process may or may not involve a change in gender expression or body modifications. Medical treatment options include, for example, feminization or masculinization of the body through hormone therapy and/or surgery, which are effective in alleviating gender dysphoria and are medically necessary for many people. Gender identities and expressions are diverse, and hormones and surgery are just two of many options available to assist people with achieving comfort with self and identity.

Gender dysphoria can in large part be alleviated through treatment (Murad et al., 2010). Hence, while transsexual, transgender, and gender nonconforming people may experience gender dysphoria at some point in their lives, many individuals who receive treatment will find a gender role and expression that is comfortable for them, even if these differ from those associated with their sex assigned at birth, or from prevailing gender norms and expectations.

Diagnoses Related to Gender Dysphoria

Some people experience gender dysphoria at such a level that the distress meets criteria for a formal diagnosis that might be classified as a mental disorder. Such a diagnosis is not a license for stigmatization or for the deprivation of civil and human rights. Existing classification systems such as the *Diagnostic Statistical Manual of Mental Disorders (DSM)* (American Psychiatric Association, 2000) and the *International Classification of Diseases* (*ICD*) (World Health Organization, 2007) define hundreds of mental disorders that vary in onset, duration, pathogenesis, functional disability, and treatability. All of these systems attempt to classify clusters of symptoms and conditions, not the individuals themselves. A disorder is a description of something with which a person might struggle, not a description of the person or the person's identity.

Thus, transsexual, transgender, and gender nonconforming individuals are not inherently disordered. Rather, the distress of gender dysphoria, when present, is the concern that might be diagnosable and for which various treatment options are available. The existence of a diagnosis for such dysphoria often facilitates access to health care and can guide further research into effective treatments.

Research is leading to new diagnostic nomenclatures, and terms are changing in both the *DSM* (Cohen-Kettenis & Pfäfflin, 2010; Knudson, De Cuypere, & Bockting, 2010b; Meyer-Bahlburg, 2010; Zucker, 2010) and the *ICD*. For this reason, familiar terms are employed in the *SOC* and definitions are provided for terms that may be emerging. Health professionals should refer to the most current diagnostic criteria and appropriate codes to apply in their practice areas.

IV
Epidemiologic Considerations

Formal epidemiologic studies on the incidence[3] and prevalence[4] of transsexualism specifically or transgender and gender nonconforming identities in general have not been conducted, and efforts to achieve realistic estimates are fraught with enormous difficulties (Institute of Medicine, 2011; Zucker & Lawrence, 2009). Even if epidemiologic studies established that a similar proportion of transsexual, transgender, or gender nonconforming people existed all over the world, it is likely that cultural differences from one country to another would alter both the behavioral expressions of different gender identities and the extent to which gender dysphoria – distinct from one's gender identity – is actually occurring in a population. While in most countries, crossing normative gender boundaries generates moral censure rather than compassion, there are examples in certain cultures of gender nonconforming behaviors (e.g., in spiritual leaders) that are less stigmatized and even revered (Besnier, 1994; Bolin, 1988; Chiñas, 1995; Coleman, Colgan, & Gooren, 1992; Costa & Matzner, 2007; Jackson & Sullivan, 1999; Nanda, 1998; Taywaditep, Coleman, & Dumronggittigule, 1997).

For various reasons, researchers who have studied incidence and prevalence have tended to focus on the most easily counted subgroup of gender nonconforming individuals: transsexual individuals who experience gender dysphoria and who present for gender-transition-related care at specialist gender clinics (Zucker & Lawrence, 2009). Most studies have been conducted in European

3 **incidence**—the number of new cases arising in a given period (e.g., a year)
4 **prevalence**—the number of individuals having a condition, divided by the number of people in the general population

countries such as Sweden (Wålinder, 1968, 1971), the United Kingdom (Hoenig & Kenna, 1974), the Netherlands (Bakker, Van Kesteren, Gooren, & Bezemer, 1993; Eklund, Gooren, & Bezemer, 1988; van Kesteren, Gooren, & Megens, 1996), Germany (Weitze & Osburg, 1996), and Belgium (De Cuypere et al., 2007). One was conducted in Singapore (Tsoi, 1988).

De Cuypere and colleagues (2007) reviewed such studies, as well as conducted their own. Together, those studies span 39 years. Leaving aside two outlier findings from Pauly in 1968 and Tsoi in 1988, ten studies involving eight countries remain. The prevalence figures reported in these ten studies range from 1:11,900 to 1:45,000 for male-to-female individuals (MtF) and 1:30,400 to 1:200,000 for female-to-male (FtM) individuals. Some scholars have suggested that the prevalence is much higher, depending on the methodology used in the research (for example, Olyslager & Conway, 2007).

Direct comparisons across studies are impossible, as each differed in their data collection methods and in their criteria for documenting a person as transsexual (e.g., whether or not a person had undergone genital reconstruction, versus had initiated hormone therapy, versus had come to the clinic seeking medically-supervised transition services). The trend appears to be towards higher prevalence rates in the more recent studies, possibly indicating increasing numbers of people seeking clinical care. Support for this interpretation comes from research by Reed and colleagues (2009), who reported a doubling of the numbers of people accessing care at gender clinics in the United Kingdom every five or six years. Similarly, Zucker and colleagues (2008) reported a four- to five-fold increase in child and adolescent referrals to their Toronto, Canada clinic over a 30-year period.

The numbers yielded by studies such as these can be considered minimum estimates at best. The published figures are mostly derived from clinics where patients met criteria for severe gender dysphoria and had access to health care at those clinics. These estimates do not take into account that treatments offered in a particular clinic setting might not be perceived as affordable, useful, or acceptable by all self-identified gender dysphoric individuals in a given area. By counting only those people who present at clinics for a specific type of treatment, an unspecified number of gender dysphoric individuals are overlooked.

Other clinical observations (not yet firmly supported by systematic study) support the likelihood of a higher prevalence of gender dysphoria: (i) Previously unrecognized gender dysphoria is occasionally diagnosed when patients are seen with anxiety, depression, conduct disorder, substance abuse, dissociative identity disorders, borderline personality disorder, sexual disorders, and disorders of sex development (Cole, O'Boyle, Emory, & Meyer III, 1997). (ii) Some crossdressers, drag queens/kings or female/male impersonators, and gay and lesbian individuals may be experiencing gender dysphoria (Bullough & Bullough, 1993). (iii) The intensity of some people's gender dysphoria fluctuates below and above a clinical threshold (Docter, 1988). (iv) Gender nonconformity among FtM individuals tends to be relatively invisible in many cultures, particularly to Western health

professionals and researchers who have conducted most of the studies on which the current estimates of prevalence and incidence are based (Winter, 2009).

Overall, the existing data should be considered a starting point, and health care would benefit from more rigorous epidemiologic study in different locations worldwide.

V

Overview of Therapeutic Approaches for Gender Dysphoria

Advancements in the Knowledge and Treatment of Gender Dysphoria

In the second half of the 20th century, awareness of the phenomenon of gender dysphoria increased when health professionals began to provide assistance to alleviate gender dysphoria by supporting changes in primary and secondary sex characteristics through hormone therapy and surgery, along with a change in gender role. Although Harry Benjamin already acknowledged a spectrum of gender nonconformity (Benjamin, 1966), the initial clinical approach largely focused on identifying who was an appropriate candidate for sex reassignment to facilitate a physical change from male to female or female to male as completely as possible (e.g., Green & Fleming, 1990; Hastings, 1974). This approach was extensively evaluated and proved to be highly effective. Satisfaction rates across studies ranged from 87% of MtF patients to 97% of FtM patients (Green & Fleming, 1990), and regrets were extremely rare (1-1.5% of MtF patients and <1% of FtM patients; Pfäfflin, 1993). Indeed, hormone therapy and surgery have been found to be medically necessary to alleviate gender dysphoria in many people (American Medical Association, 2008; Anton, 2009; The World Professional Association for Transgender Health, 2008).

As the field matured, health professionals recognized that while many individuals need both hormone therapy and surgery to alleviate their gender dysphoria, others need only one of these treatment options and some need neither (Bockting & Goldberg, 2006; Bockting, 2008; Lev, 2004). Often with the help of psychotherapy, some individuals integrate their trans- or cross-gender feelings into the gender role they were assigned at birth and do not feel the need to feminize or masculinize their body. For others, changes in gender role and expression are sufficient to alleviate

gender dysphoria. Some patients may need hormones, a possible change in gender role, but not surgery; others may need a change in gender role along with surgery, but not hormones. In other words, treatment for gender dysphoria has become more individualized.

As a generation of transsexual, transgender, and gender nonconforming individuals has come of age – many of whom have benefitted from different therapeutic approaches – they have become more visible as a community and demonstrated considerable diversity in their gender identities, roles, and expressions. Some individuals describe themselves not as gender nonconforming but as unambiguously cross-sexed (i.e., as a member of the other sex; Bockting, 2008). Other individuals affirm their unique gender identity and no longer consider themselves either male or female (Bornstein, 1994; Kimberly, 1997; Stone, 1991; Warren, 1993). Instead, they may describe their gender identity in specific terms such as transgender, bigender, or genderqueer, affirming their unique experience that may transcend a male/female binary understanding of gender (Bockting, 2008; Ekins & King, 2006; Nestle, Wilchins, & Howell, 2002). They may not experience their process of identity affirmation as a "transition," because they never fully embraced the gender role they were assigned at birth or because they actualize their gender identity, role, and expression in a way that does not involve a change from one gender role to another. For example, some youth identifying as genderqueer have always experienced their gender identity and role as such (genderqueer). Greater public visibility and awareness of gender diversity (Feinberg, 1996) has further expanded options for people with gender dysphoria to actualize an identity and find a gender role and expression that is comfortable for them.

Health professionals can assist gender dysphoric individuals with affirming their gender identity, exploring different options for expression of that identity, and making decisions about medical treatment options for alleviating gender dysphoria.

Options for Psychological and Medical Treatment of Gender Dysphoria

For individuals seeking care for gender dysphoria, a variety of therapeutic options can be considered. The number and type of interventions applied and the order in which these take place may differ from person to person (e.g., Bockting, Knudson, & Goldberg, 2006; Bolin, 1994; Rachlin, 1999; Rachlin, Green, & Lombardi, 2008; Rachlin, Hansbury, & Pardo, 2010). Treatments options include the following:

- Changes in gender expression and role (which may involve living part time or full time in another gender role, consistent with one's gender identity);
- Hormone therapy to feminize or masculinize the body;

- Surgery to change primary and/or secondary sex characteristics (e.g., breasts/chest, external and/or internal genitalia, facial features, body contouring);
- Psychotherapy (individual, couple, family, or group) for purposes such as exploring gender identity, role, and expression; addressing the negative impact of gender dysphoria and stigma on mental health; alleviating internalized transphobia; enhancing social and peer support; improving body image; or promoting resilience.

Options for Social Support and Changes in Gender Expression

In addition (or as an alternative) to the psychological and medical treatment options described above, other options can be considered to help alleviate gender dysphoria, for example:

- Offline and online peer support resources, groups, or community organizations that provide avenues for social support and advocacy;
- Offline and online support resources for families and friends;
- Voice and communication therapy to help individuals develop verbal and non-verbal communication skills that facilitate comfort with their gender identity;
- Hair removal through electrolysis, laser treatment, or waxing;
- Breast binding or padding, genital tucking or penile prostheses, padding of hips or buttocks;
- Changes in name and gender marker on identity documents.

VI

Assessment and Treatment of Children and Adolescents with Gender Dysphoria

There are a number of differences in the phenomenology, developmental course, and treatment approaches for gender dysphoria in children, adolescents, and adults. In children and adolescents, a rapid and dramatic developmental process (physical, psychological, and sexual) is involved and

there is greater fluidity and variability in outcomes, particular in prepubertal children. Accordingly, this section of the *SOC* offers specific clinical guidelines for the assessment and treatment of gender dysphoric children and adolescents.

Differences between Children and Adolescents with Gender Dysphoria

An important difference between gender dysphoric children and adolescents is in the proportion for whom dysphoria persists into adulthood. Gender dysphoria during childhood does not inevitably continue into adulthood.[5] Rather, in follow-up studies of prepubertal children (mainly boys) who were referred to clinics for assessment of gender dysphoria, the dysphoria persisted into adulthood for only 6-23% of children (Cohen-Kettenis, 2001; Zucker & Bradley, 1995). Boys in these studies were more likely to identify as gay in adulthood than as transgender (Green, 1987; Money & Russo, 1979; Zucker & Bradley, 1995; Zuger, 1984). Newer studies, also including girls, showed a 12-27% persistence rate of gender dysphoria into adulthood (Drummond, Bradley, Peterson-Badali, & Zucker, 2008; Wallien & Cohen-Kettenis, 2008).

In contrast, the persistence of gender dysphoria into adulthood appears to be much higher for adolescents. No formal prospective studies exist. However, in a follow-up study of 70 adolescents who were diagnosed with gender dysphoria and given puberty suppressing hormones, all continued with the actual sex reassignment, beginning with feminizing/masculinizing hormone therapy (de Vries, Steensma, Doreleijers, & Cohen-Kettenis, 2010).

Another difference between gender dysphoric children and adolescents is in the sex ratios for each age group. In clinically referred, gender dysphoric children under age 12, the male/female ratio ranges from 6:1 to 3:1 (Zucker, 2004). In clinically referred, gender dysphoric adolescents older than age 12, the male/female ratio is close to 1:1 (Cohen-Kettenis & Pfäfflin, 2003).

As discussed in section IV and by Zucker and Lawrence (2009), formal epidemiologic studies on gender dysphoria – in children, adolescents, and adults – are lacking. Additional research is needed to refine estimates of its prevalence and persistence in different populations worldwide.

5 Gender nonconforming behaviors in children may continue into adulthood, but such behaviors are not necessarily indicative of gender dysphoria and a need for treatment. As described in section III, gender dysphoria is not synonymous with diversity in gender expression.

Phenomenology in Children

Children as young as age two may show features that could indicate gender dysphoria. They may express a wish to be of the other sex and be unhappy about their physical sex characteristics and functions. In addition, they may prefer clothes, toys, and games that are commonly associated with the other sex and prefer playing with other-sex peers. There appears to be heterogeneity in these features: Some children demonstrate extremely gender nonconforming behavior and wishes, accompanied by persistent and severe discomfort with their primary sex characteristics. In other children, these characteristics are less intense or only partially present (Cohen-Kettenis et al., 2006; Knudson, De Cuypere, & Bockting, 2010a).

It is relatively common for gender dysphoric children to have co-existing internalizing disorders such as anxiety and depression (Cohen-Kettenis, Owen, Kaijser, Bradley, & Zucker, 2003; Wallien, Swaab, & Cohen-Kettenis, 2007; Zucker, Owen, Bradley, & Ameeriar, 2002). The prevalence of autistic spectrum disorders seems to be higher in clinically referred, gender dysphoric children than in the general population (de Vries, Noens, Cohen-Kettenis, van Berckelaer-Onnes, & Doreleijers, 2010).

Phenomenology in Adolescents

In most children, gender dysphoria will disappear before or early in puberty. However, in some children these feelings will intensify and body aversion will develop or increase as they become adolescents and their secondary sex characteristics develop (Cohen-Kettenis, 2001; Cohen-Kettenis & Pfäfflin, 2003; Drummond et al., 2008; Wallien & Cohen-Kettenis, 2008; Zucker & Bradley, 1995). Data from one study suggest that more extreme gender nonconformity in childhood is associated with persistence of gender dysphoria into late adolescence and early adulthood (Wallien & Cohen-Kettenis, 2008). Yet many adolescents and adults presenting with gender dysphoria do not report a history of childhood gender nonconforming behaviors (Docter, 1988; Landén, Wålinder, & Lundström, 1998). Therefore, it may come as a surprise to others (parents, other family members, friends, and community members) when a youth's gender dysphoria first becomes evident in adolescence.

Adolescents who experience their primary and/or secondary sex characteristics and their sex assigned at birth as inconsistent with their gender identity may be intensely distressed about it. Many, but not all, gender dysphoric adolescents have a strong wish for hormones and surgery. Increasing numbers of adolescents have already started living in their desired gender role upon entering high school (Cohen-Kettenis & Pfäfflin, 2003).

Among adolescents who are referred to gender identity clinics, the number considered eligible for early medical treatment – starting with GnRH analogues to suppress puberty in the first Tanner stages – differs among countries and centers. Not all clinics offer puberty suppression. If such treatment is offered, the pubertal stage at which adolescents are allowed to start varies from Tanner stage 2 to stage 4 (Delemarre-van de Waal & Cohen-Kettenis, 2006; Zucker et al., in press). The percentages of treated adolescents are likely influenced by the organization of health care, insurance aspects, cultural differences, opinions of health professionals, and diagnostic procedures offered in different settings.

Inexperienced clinicians may mistake indications of gender dysphoria for delusions. Phenomenologically, there is a qualitative difference between the presentation of gender dysphoria and the presentation of delusions or other psychotic symptoms. The vast majority of children and adolescents with gender dysphoria are not suffering from underlying severe psychiatric illness such as psychotic disorders (Steensma, Biemond, de Boer, & Cohen-Kettenis, published online ahead of print January 7, 2011).

It is more common for adolescents with gender dysphoria to have co-existing internalizing disorders such as anxiety and depression, and/or externalizing disorders such as oppositional defiant disorder (de Vries et al., 2010). As in children, there seems to be a higher prevalence of autistic spectrum disorders in clinically referred, gender dysphoric adolescents than in the general adolescent population (de Vries et al., 2010).

Competency of Mental Health Professionals Working with Children or Adolescents with Gender Dysphoria

The following are recommended minimum credentials for mental health professionals who assess, refer, and offer therapy to children and adolescents presenting with gender dysphoria:

1. Meet the competency requirements for mental health professionals working with adults, as outlined in section VII;

2. Trained in childhood and adolescent developmental psychopathology;

3. Competent in diagnosing and treating the ordinary problems of children and adolescents.

Roles of Mental Health Professionals Working with Children and Adolescents with Gender Dysphoria

The roles of mental health professionals working with gender dysphoric children and adolescents may include the following:

1. Directly assess gender dysphoria in children and adolescents (see general guidelines for assessment, below).

2. Provide family counseling and supportive psychotherapy to assist children and adolescents with exploring their gender identity, alleviating distress related to their gender dysphoria, and ameliorating any other psychosocial difficulties.

3. Assess and treat any co-existing mental health concerns of children or adolescents (or refer to another mental health professional for treatment). Such concerns should be addressed as part of the overall treatment plan.

4. Refer adolescents for additional physical interventions (such as puberty suppressing hormones) to alleviate gender dysphoria. The referral should include documentation of an assessment of gender dysphoria and mental health, the adolescent's eligibility for physical interventions (outlined below), the mental health professional's relevant expertise, and any other information pertinent to the youth's health and referral for specific treatments.

5. Educate and advocate on behalf of gender dysphoric children, adolescents, and their families in their community (e.g., day care centers, schools, camps, other organizations). This is particularly important in light of evidence that children and adolescents who do not conform to socially prescribed gender norms may experience harassment in school (Grossman, D'Augelli, & Salter, 2006; Grossman, D'Augelli, Howell, & Hubbard, 2006; Sausa, 2005), putting them at risk for social isolation, depression, and other negative sequelae (Nuttbrock et al., 2010).

6. Provide children, youth, and their families with information and referral for peer support, such as support groups for parents of gender nonconforming and transgender children (Gold & MacNish, 2011; Pleak, 1999; Rosenberg, 2002).

Assessment and psychosocial interventions for children and adolescents are often provided within a multi-disciplinary gender identity specialty service. If such a multidisciplinary service is not available, a mental health professional should provide consultation and liaison arrangements with a pediatric endocrinologist for the purpose of assessment, education, and involvement in any decisions about physical interventions.

Psychological Assessment of Children and Adolescents

When assessing children and adolescents who present with gender dysphoria, mental health professionals should broadly conform to the following guidelines:

1. Mental health professionals should not dismiss or express a negative attitude towards nonconforming gender identities or indications of gender dysphoria. Rather, they should acknowledge the presenting concerns of children, adolescents, and their families; offer a thorough assessment for gender dysphoria and any co-existing mental health concerns; and educate clients and their families about therapeutic options, if needed. Acceptance and removal of secrecy can bring considerable relief to gender dysphoric children/adolescents and their families.

2. Assessment of gender dysphoria and mental health should explore the nature and characteristics of a child's or adolescent's gender identity. A psychodiagnostic and psychiatric assessment – covering the areas of emotional functioning, peer and other social relationships, and intellectual functioning/school achievement – should be performed. Assessment should include an evaluation of the strengths and weaknesses of family functioning. Emotional and behavioral problems are relatively common, and unresolved issues in a child's or youth's environment may be present (de Vries, Doreleijers, Steensma, & Cohen-Kettenis, 2011; Di Ceglie & Thümmel, 2006; Wallien et al., 2007).

3. For adolescents, the assessment phase should also be used to inform youth and their families about the possibilities and limitations of different treatments. This is necessary for informed consent, but also important for assessment. The way that adolescents respond to information about the reality of sex reassignment can be diagnostically informative. Correct information may alter a youth's desire for certain treatment, if the desire was based on unrealistic expectations of its possibilities.

Psychological and Social Interventions for Children and Adolescents

When supporting and treating children and adolescents with gender dysphoria, health professionals should broadly conform to the following guidelines:

1. Mental health professionals should help families to have an accepting and nurturing response to the concerns of their gender dysphoric child or adolescent. Families play an important role in the psychological health and well-being of youth (Brill & Pepper, 2008; Lev, 2004). This also applies to peers and mentors from the community, who can be another source of social support.

2. Psychotherapy should focus on reducing a child's or adolescent's distress related to the gender dysphoria and on ameliorating any other psychosocial difficulties. For youth pursuing sex reassignment, psychotherapy may focus on supporting them before, during, and after reassignment. Formal evaluations of different psychotherapeutic approaches for this situation have not been published, but several counseling methods have been described (Cohen-Kettenis, 2006; de Vries, Cohen-Kettenis, & Delemarre-van de Waal, 2006; Di Ceglie & Thümmel, 2006; Hill, Menvielle, Sica, & Johnson, 2010; Malpas, in press; Menvielle & Tuerk, 2002; Rosenberg, 2002; Vanderburgh, 2009; Zucker, 2006).

Treatment aimed at trying to change a person's gender identity and expression to become more congruent with sex assigned at birth has been attempted in the past without success (Gelder & Marks, 1969; Greenson, 1964), particularly in the long term (Cohen-Kettenis & Kuiper, 1984; Pauly, 1965). Such treatment is no longer considered ethical.

1. Families should be supported in managing uncertainty and anxiety about their child's or adolescent's psychosexual outcomes and in helping youth to develop a positive self-concept.

2. Mental health professionals should not impose a binary view of gender. They should give ample room for clients to explore different options for gender expression. Hormonal or surgical interventions are appropriate for some adolescents, but not for others.

3. Clients and their families should be supported in making difficult decisions regarding the extent to which clients are allowed to express a gender role that is consistent with their gender identity, as well as the timing of changes in gender role and possible social transition. For example, a client might attend school while undergoing social transition only partly (e.g., by wearing clothing and having a hairstyle that reflects gender identity) or completely (e.g., by also using a name and pronouns congruent with gender identity). Difficult issues include whether and when to inform other people of the client's situation, and how others in their lives should respond.

4. Health professionals should support clients and their families as educators and advocates in their interactions with community members and authorities such as teachers, school boards, and courts.

5. Mental health professionals should strive to maintain a therapeutic relationship with gender nonconforming children/adolescents and their families throughout any subsequent social changes or physical interventions. This ensures that decisions about gender expression and the treatment of gender dysphoria are thoughtfully and recurrently considered. The same reasoning applies if a child or adolescent has already socially changed gender role prior to being seen by a mental health professional.

Social Transition in Early Childhood

Some children state that they want to make a social transition to a different gender role long before puberty. For some children, this may reflect an expression of their gender identity. For others, this could be motivated by other forces. Families vary in the extent to which they allow their young children to make a social transition to another gender role. Social transitions in early childhood do occur within some families with early success. This is a controversial issue, and divergent views are held by health professionals. The current evidence base is insufficient to predict the long-term outcomes of completing a gender role transition during early childhood. Outcomes research with children who completed early social transitions would greatly inform future clinical recommendations.

Mental health professionals can help families to make decisions regarding the timing and process of any gender role changes for their young children. They should provide information and help parents to weigh the potential benefits and challenges of particular choices. Relevant in this respect are the previously described relatively low persistence rates of childhood gender dysphoria (Drummond et al., 2008; Wallien & Cohen-Kettenis, 2008). A change back to the original gender role can be highly distressing and even result in postponement of this second social transition on the child's part (Steensma & Cohen-Kettenis, 2011). For reasons such as these, parents may want to present this role change as an exploration of living in another gender role, rather than an irreversible situation. Mental health professionals can assist parents in identifying potential in-between solutions or compromises (e.g., only when on vacation). It is also important that parents explicitly let the child know that there is a way back.

Regardless of a family's decisions regarding transition (timing, extent), professionals should counsel and support them as they work through the options and implications. If parents do not allow their young child to make a gender role transition, they may need counseling to assist them with meeting their child's needs in a sensitive and nurturing way, ensuring that the child has ample possibilities to explore gender feelings and behavior in a safe environment. If parents do allow their young child to make a gender role transition, they may need counseling to facilitate a positive experience for their child. For example, they may need support in using correct pronouns, maintaining a safe and supportive environment for their transitioning child (e.g., in school, peer group settings), and communicating with other people in their child's life. In either case, as a child nears puberty, further assessment may be needed as options for physical interventions become relevant.

Physical Interventions for Adolescents

Before any physical interventions are considered for adolescents, extensive exploration of psychological, family, and social issues should be undertaken, as outlined above. The duration of this exploration may vary considerably depending on the complexity of the situation.

Physical interventions should be addressed in the context of adolescent development. Some identity beliefs in adolescents may become firmly held and strongly expressed, giving a false impression of irreversibility. An adolescent's shift towards gender conformity can occur primarily to please the parents and may not persist or reflect a permanent change in gender dysphoria (Hembree et al., 2009; Steensma et al., published online ahead of print January 7, 2011).

Physical interventions for adolescents fall into three categories or stages (Hembree et al., 2009):

1. *Fully reversible interventions.* These involve the use of GnRH analogues to suppress estrogen or testosterone production and consequently delay the physical changes of puberty. Alternative treatment options include progestins (most commonly medroxyprogesterone) or other medications (such as spironolactone) that decrease the effects of androgens secreted by the testicles of adolescents who are not receiving GnRH analogues. Continuous oral contraceptives (or depot medroxyprogesterone) may be used to suppress menses.

2. *Partially reversible interventions.* These include hormone therapy to masculinize or feminize the body. Some hormone-induced changes may need reconstructive surgery to reverse the effect (e.g., gynaecomastia caused by estrogens), while other changes are not reversible (e.g., deepening of the voice caused by testosterone).

3. *Irreversible interventions.* These are surgical procedures.

A staged process is recommended to keep options open through the first two stages. Moving from one stage to another should not occur until there has been adequate time for adolescents and their parents to assimilate fully the effects of earlier interventions.

Fully Reversible Interventions

Adolescents may be eligible for puberty suppressing hormones as soon as pubertal changes have begun. In order for adolescents and their parents to make an informed decision about pubertal delay, it is recommended that adolescents experience the onset of puberty to at least Tanner Stage 2. Some children may arrive at this stage at very young ages (e.g., 9 years of age). Studies

evaluating this approach only included children who were at least 12 years of age (Cohen-Kettenis, Schagen, Steensma, de Vries, & Delemarre-van de Waal, 2011; de Vries, Steensma et al., 2010; Delemarre-van de Waal, van Weissenbruch, & Cohen Kettenis, 2004; Delemarre-van de Waal & Cohen-Kettenis, 2006).

Two goals justify intervention with puberty suppressing hormones: (i) their use gives adolescents more time to explore their gender nonconformity and other developmental issues; and (ii) their use may facilitate transition by preventing the development of sex characteristics that are difficult or impossible to reverse if adolescents continue on to pursue sex reassignment.

Puberty suppression may continue for a few years, at which time a decision is made to either discontinue all hormone therapy or transition to a feminizing/masculinizing hormone regimen. Pubertal suppression does not inevitably lead to social transition or to sex reassignment.

Criteria for puberty suppressing hormones

In order for adolescents to receive puberty suppressing hormones, the following minimum criteria must be met:

1. The adolescent has demonstrated a long-lasting and intense pattern of gender nonconformity or gender dysphoria (whether suppressed or expressed);

2. Gender dysphoria emerged or worsened with the onset of puberty;

3. Any co-existing psychological, medical, or social problems that could interfere with treatment (e.g., that may compromise treatment adherence) have been addressed, such that the adolescent's situation and functioning are stable enough to start treatment;

4. The adolescent has given informed consent and, particularly when the adolescent has not reached the age of medical consent, the parents or other caretakers or guardians have consented to the treatment and are involved in supporting the adolescent throughout the treatment process.

Regimens, monitoring, and risks for puberty suppression

For puberty suppression, adolescents with male genitalia should be treated with GnRH analogues, which stop luteinizing hormone secretion and therefore testosterone secretion. Alternatively, they may be treated with progestins (such as medroxyprogesterone) or with other medications that block testosterone secretion and/or neutralize testosterone action. Adolescents with female genitalia should be treated with GnRH analogues, which stop the production of estrogens and

progesterone. Alternatively, they may be treated with progestins (such as medroxyprogesterone). Continuous oral contraceptives (or depot medroxyprogesterone) may be used to suppress menses. In both groups of adolescents, use of GnRH analogues is the preferred treatment (Hembree et al., 2009), but their high cost is prohibitive for some patients

During pubertal suppression, an adolescent's physical development should be carefully monitored – preferably by a pediatric endocrinologist – so that any necessary interventions can occur (e.g., to establish an adequate gender appropriate height, to improve iatrogenic low bone marrow density) (Hembree et al., 2009).

Early use of puberty suppressing hormones may avert negative social and emotional consequences of gender dysphoria more effectively than their later use would. Intervention in early adolescence should be managed with pediatric endocrinological advice, when available. Adolescents with male genitalia who start GnRH analogues early in puberty should be informed that this could result in insufficient penile tissue for penile inversion vaginoplasty techniques (alternative techniques, such as the use of a skin graft or colon tissue, are available).

Neither puberty suppression nor allowing puberty to occur is a neutral act. On the one hand, functioning in later life can be compromised by the development of irreversible secondary sex characteristics during puberty and by years spent experiencing intense gender dysphoria. On the other hand, there are concerns about negative physical side effects of GnRH analog use (e.g., on bone development and height). Although the very first results of this approach (as assessed for adolescents followed over 10 years) are promising (Cohen-Kettenis et al., 2011; Delemarre-van de Waal & Cohen-Kettenis, 2006), the long-term effects can only be determined when the earliest treated patients reach the appropriate age.

Partially Reversible Interventions

Adolescents may be eligible to begin feminizing/masculinizing hormone therapy, preferably with parental consent. In many countries, 16-year-olds are legal adults for medical decision-making and do not require parental consent. Ideally, treatment decisions should be made among the adolescent, the family, and the treatment team.

Regimens for hormone therapy in gender dysphoric adolescents differ substantially from those used in adults (Hembree et al., 2009). The hormone regimens for youth are adapted to account for the somatic, emotional, and mental development that occurs throughout adolescence (Hembree et al., 2009).

Irreversible Interventions

Genital surgery should not be carried out until (i) patients reach the legal age of majority in a given country, and (ii) patients have lived continuously for at least 12 months in the gender role that is congruent with their gender identity. The age threshold should be seen as a minimum criterion and not an indication in and of itself for active intervention.

Chest surgery in FtM patients could be carried out earlier, preferably after ample time of living in the desired gender role and after one year of testosterone treatment. The intent of this suggested sequence is to give adolescents sufficient opportunity to experience and socially adjust in a more masculine gender role, before undergoing irreversible surgery. However, different approaches may be more suitable, depending on an adolescent's specific clinical situation and goals for gender identity expression.

Risks of Withholding Medical Treatment for Adolescents

Refusing timely medical interventions for adolescents might prolong gender dysphoria and contribute to an appearance that could provoke abuse and stigmatization. As the level of gender-related abuse is strongly associated with the degree of psychiatric distress during adolescence (Nuttbrock et al., 2010), withholding puberty suppression and subsequent feminizing or masculinizing hormone therapy is not a neutral option for adolescents.

VII
Mental Health

Transsexual, transgender, and gender nonconforming people might seek the assistance of a mental health professional for any number of reasons. Regardless of a person's reason for seeking care, mental health professionals should have familiarity with gender nonconformity, act with appropriate cultural competence, and exhibit sensitivity in providing care.

This section of the *SOC* focuses on the role of mental health professionals in the care of adults seeking help for gender dysphoria and related concerns. Professionals working with gender dysphoric children, adolescents, and their families should consult section VI.

Competency of Mental Health Professionals Working with Adults Who Present with Gender Dysphoria

The training of mental health professionals competent to work with gender dysphoric adults rests upon basic general clinical competence in the assessment, diagnosis, and treatment of mental health concerns. Clinical training may occur within any discipline that prepares mental health professionals for clinical practice, such as psychology, psychiatry, social work, mental health counseling, marriage and family therapy, nursing, or family medicine with specific training in behavioral health and counseling. The following are recommended minimum credentials for mental health professionals who work with adults presenting with gender dysphoria:

1. A master's degree or its equivalent in a clinical behavioral science field. This degree or a more advanced one should be granted by an institution accredited by the appropriate national or regional accrediting board. The mental health professional should have documented credentials from a relevant licensing board or equivalent for that country.

2. Competence in using the *Diagnostic Statistical Manual of Mental Disorders* and/or the *International Classification of Diseases* for diagnostic purposes.

3. Ability to recognize and diagnose co-existing mental health concerns and to distinguish these from gender dysphoria.

4. Documented supervised training and competence in psychotherapy or counseling.

5. Knowledgeable about gender nonconforming identities and expressions, and the assessment and treatment of gender dysphoria.

6. Continuing education in the assessment and treatment of gender dysphoria. This may include attending relevant professional meetings, workshops, or seminars; obtaining supervision from a mental health professional with relevant experience; or participating in research related to gender nonconformity and gender dysphoria.

In addition to the minimum credentials above, it is recommended that mental health professionals develop and maintain cultural competence to facilitate their work with transsexual, transgender, and gender nonconforming clients. This may involve, for example, becoming knowledgeable about current community, advocacy, and public policy issues relevant to these clients and their families. Additionally, knowledge about sexuality, sexual health concerns, and the assessment and treatment of sexual disorders is preferred.

Mental health professionals who are new to the field (irrespective of their level of training and other experience) should work under the supervision of a mental health professional with established competence in the assessment and treatment of gender dysphoria.

Tasks of Mental Health Professionals Working with Adults Who Present with Gender Dysphoria

Mental health professionals may serve transsexual, transgender, and gender nonconforming individuals and their families in many ways, depending on a client's needs. For example, mental health professionals may serve as a psychotherapist, counselor, or family therapist, or as a diagnostician/assessor, advocate, or educator.

Mental health professionals should determine a client's reasons for seeking professional assistance. For example, a client may be presenting for any combination of the following health care services: psychotherapeutic assistance to explore gender identity and expression or to facilitate a coming out process; assessment and referral for feminizing/masculinizing medical interventions; psychological support for family members (partners, children, extended family); or psychotherapy unrelated to gender concerns or other professional services.

Below are general guidelines for common tasks that mental health professionals may fulfill in working with adults who present with gender dysphoria.

Tasks Related to Assessment and Referral

1. Assess gender dysphoria

Mental health professionals assess clients' gender dysphoria in the context of an evaluation of their psychosocial adjustment (Bockting et al., 2006; Lev, 2004, 2009). The evaluation includes, at a minimum, assessment of gender identity and gender dysphoria, history and development of gender dysphoric feelings, the impact of stigma attached to gender nonconformity on mental health, and the availability of support from family, friends, and peers (for example, in person or online contact with other transsexual, transgender, or gender nonconforming individuals or groups). The evaluation may result in no diagnosis, in a formal diagnosis related to gender dysphoria, and/or in other diagnoses that describe aspects of the client's health and psychosocial adjustment. The role

of mental health professionals includes making reasonably sure that the gender dysphoria is not secondary to or better accounted for by other diagnoses.

Mental health professionals with the competencies described above (hereafter called "a qualified mental health professional") are best prepared to conduct this assessment of gender dysphoria. However, this task may instead be conducted by another type of health professional who has appropriate training in behavioral health and is competent in the assessment of gender dysphoria, particularly when functioning as part of a multidisciplinary specialty team that provides access to feminizing/masculinizing hormone therapy. This professional may be the prescribing hormone therapy provider or a member of that provider's health care team.

2. Provide information regarding options for gender identity and expression and possible medical interventions

An important task of mental health professionals is to educate clients regarding the diversity of gender identities and expressions and the various options available to alleviate gender dysphoria. Mental health professionals then may facilitate a process (or refer elsewhere) in which clients explore these various options, with the goals of finding a comfortable gender role and expression and becoming prepared to make a fully informed decision about available medical interventions, if needed. This process may include referral for individual, family, and group therapy and/or to community resources and avenues for peer support. The professional and the client discuss the implications, both short- and long-term, of any changes in gender role and use of medical interventions. These implications can be psychological, social, physical, sexual, occupational, financial, and legal (Bockting et al., 2006; Lev, 2004).

This task is also best conducted by a qualified mental health professional, but may be conducted by another health professional with appropriate training in behavioral health and with sufficient knowledge about gender nonconforming identities and expressions and about possible medical interventions for gender dysphoria, particularly when functioning as part of a multidisciplinary specialty team that provides access to feminizing/masculinizing hormone therapy.

3. Assess, diagnose, and discuss treatment options for co-existing mental health concerns

Clients presenting with gender dysphoria may struggle with a range of mental health concerns (Gómez-Gil, Trilla, Salamero, Godás, & Valdés, 2009; Murad et al., 2010) whether related or unrelated to what is often a long history of gender dysphoria and/or chronic minority stress. Possible concerns include anxiety, depression, self-harm, a history of abuse and neglect, compulsivity, substance abuse, sexual concerns, personality disorders, eating disorders, psychotic disorders, and autistic spectrum disorders (Bockting et al., 2006; Nuttbrock et al., 2010; Robinow, 2009). Mental health professionals should screen for these and other mental health concerns and incorporate

the identified concerns into the overall treatment plan. These concerns can be significant sources of distress and, if left untreated, can complicate the process of gender identity exploration and resolution of gender dysphoria (Bockting et al., 2006; Fraser, 2009a; Lev, 2009). Addressing these concerns can greatly facilitate the resolution of gender dysphoria, possible changes in gender role, the making of informed decisions about medical interventions, and improvements in quality of life.

Some clients may benefit from psychotropic medications to alleviate symptoms or treat co-existing mental health concerns. Mental health professionals are expected to recognize this and either provide pharmacotherapy or refer to a colleague who is qualified to do so. The presence of co-existing mental health concerns does not necessarily preclude possible changes in gender role or access to feminizing/masculinizing hormones or surgery; rather, these concerns need to be optimally managed prior to or concurrent with treatment of gender dysphoria. In addition, clients should be assessed for their ability to provide educated and informed consent for medical treatments.

Qualified mental health professionals are specifically trained to assess, diagnose, and treat (or refer to treatment for) these co-existing mental health concerns. Other health professionals with appropriate training in behavioral health, particularly when functioning as part of a multidisciplinary specialty team providing access to feminizing/masculinizing hormone therapy, may also screen for mental health concerns and, if indicated, provide referral for comprehensive assessment and treatment by a qualified mental health professional.

4. If applicable, assess eligibility, prepare, and refer for hormone therapy

The *SOC* provide criteria to guide decisions regarding feminizing/masculinizing hormone therapy (outlined in section VIII and Appendix C). Mental health professionals can help clients who are considering hormone therapy to be both psychologically prepared (for example, has made a fully informed decision with clear and realistic expectations; is ready to receive the service in line with the overall treatment plan; has included family and community as appropriate) and practically prepared (for example, has been evaluated by a physician to rule out or address medical contraindications to hormone use; has considered the psychosocial implications). If clients are of childbearing age, reproductive options (section IX) should be explored before initiating hormone therapy.

It is important for mental health professionals to recognize that decisions about hormones are first and foremost the client's decisions – as are all decisions regarding healthcare. However, mental health professionals have a responsibility to encourage, guide, and assist clients with making fully informed decisions and becoming adequately prepared. To best support their clients' decisions, mental health professionals need to have functioning working relationships with their clients and sufficient information about them. Clients should receive prompt and attentive evaluation, with the goal of alleviating their gender dysphoria and providing them with appropriate medical services.

Referral for feminizing/masculinizing hormone therapy

People may approach a specialized provider in any discipline to pursue feminizing/masculinizing hormone therapy. However, transgender health care is an interdisciplinary field, and coordination of care and referral among a client's overall care team is recommended.

Hormone therapy can be initiated with a referral from a qualified mental health professional. Alternatively, a health professional who is appropriately trained in behavioral health and competent in the assessment of gender dysphoria may assess eligibility, prepare, and refer the patient for hormone therapy, particularly in the absence of significant co-existing mental health concerns and when working in the context of a multidisciplinary specialty team. The referring health professional provides documentation – in the chart and/or referral letter – of the patient's personal and treatment history, progress, and eligibility. Health professionals who recommend hormone therapy share the ethical and legal responsibility for that decision with the physician who provides the service.

The recommended content of the referral letter for feminizing/masculinizing hormone therapy is as follows:

1. The client's general identifying characteristics;
2. Results of the client's psychosocial assessment, including any diagnoses;
3. The duration of the referring health professional's relationship with the client, including the type of evaluation and therapy or counseling to date;
4. An explanation that the criteria for hormone therapy have been met, and a brief description of the clinical rationale for supporting the client's request for hormone therapy;
5. A statement about the fact that informed consent has been obtained from the patient;
6. A statement that the referring health professional is available for coordination of care and welcomes a phone call to establish this.

For providers working within a multidisciplinary specialty team, a letter may not be necessary, rather, the assessment and recommendation can be documented in the patient's chart.

5. If applicable, assess eligibility, prepare, and refer for surgery

The *SOC* also provide criteria to guide decisions regarding breast/chest surgery and genital surgery (outlined in section XI and Appendix C). Mental health professionals can help clients who are considering surgery to be both psychologically prepared (for example, has made a fully informed

decision with clear and realistic expectations; is ready to receive the service in line with the overall treatment plan; has included family and community as appropriate) and practically prepared (for example, has made an informed choice about a surgeon to perform the procedure; has arranged aftercare). If clients are of childbearing age, reproductive options (section IX) should be explored before undergoing genital surgery.

The *SOC* do not state criteria for other surgical procedures, such as feminizing or masculinizing facial surgery; however, mental health professionals can play an important role in helping their clients to make fully informed decisions about the timing and implications of such procedures in the context of the overall coming out or transition process.

It is important for mental health professionals to recognize that decisions about surgery are first and foremost a client's decisions – as are all decisions regarding healthcare. However, mental health professionals have a responsibility to encourage, guide, and assist clients with making fully informed decisions and becoming adequately prepared. To best support their clients' decisions, mental health professionals need to have functioning working relationships with their clients and sufficient information about them. Clients should receive prompt and attentive evaluation, with the goal of alleviating their gender dysphoria and providing them with appropriate medical services.

Referral for surgery

Surgical treatments for gender dysphoria can be initiated with a referral (one or two, depending on the type of surgery) from a qualified mental health professional. The mental health professional provides documentation – in the chart and/or referral letter – of the patient's personal and treatment history, progress, and eligibility. Mental health professionals who recommend surgery share the ethical and legal responsibility for that decision with the surgeon.

- One referral from a qualified mental health professional is needed for breast/chest surgery (e.g., mastectomy, chest reconstruction, or augmentation mammoplasty).

- Two referrals – from qualified mental health professionals who have independently assessed the patient – are needed for genital surgery (i.e., hysterectomy/salpingo-oophorectomy, orchiectomy, genital reconstructive surgeries). If the first referral is from the patient's psychotherapist, the second referral should be from a person who has only had an evaluative role with the patient. Two separate letters, or one letter signed by both (e.g., if practicing within the same clinic) may be sent. Each referral letter, however, is expected to cover the same topics in the areas outlined below.

The recommended content of the referral letters for surgery is as follows:

1. The client's general identifying characteristics;

2. Results of the client's psychosocial assessment, including any diagnoses;

3. The duration of the mental health professional's relationship with the client, including the type of evaluation and therapy or counseling to date;

4. An explanation that the criteria for surgery have been met, and a brief description of the clinical rationale for supporting the patient's request for surgery;

5. A statement about the fact that informed consent has been obtained from the patient;

6. A statement that the mental health professional is available for coordination of care and welcomes a phone call to establish this.

For providers working within a multidisciplinary specialty team, a letter may not be necessary, rather, the assessment and recommendation can be documented in the patient's chart.

Relationship of Mental Health Professionals with Hormone-Prescribing Physicians, Surgeons, and other Health Professionals

It is ideal for mental health professionals to perform their work and periodically discuss progress and obtain peer consultation from other professionals (both in mental health care and other health disciplines) who are competent in the assessment and treatment of gender dysphoria. The relationship among professionals involved in a client's health care should remain collaborative, with coordination and clinical dialogue taking place as needed. Open and consistent communication may be necessary for consultation, referral, and management of postoperative concerns.

Tasks Related to Psychotherapy

1. Psychotherapy is not an absolute requirement for hormone therapy and surgery

A mental health screening and/or assessment as outlined above is needed for referral to hormonal and surgical treatments for gender dysphoria. In contrast, psychotherapy – although highly recommended – is not a requirement.

The *SOC* do not recommend a minimum number of psychotherapy sessions prior to hormone therapy or surgery. The reasons for this are multifaceted (Lev, 2009). First, a minimum number of sessions tends to be construed as a hurdle, which discourages the genuine opportunity for personal growth. Second, mental health professionals can offer important support to clients throughout all

phases of exploration of gender identity, gender expression, and possible transition – not just prior to any possible medical interventions. Third, clients differ in their abilities to attain similar goals in a specified time period.

2. Goals of psychotherapy for adults with gender concerns

The general goal of psychotherapy is to find ways to maximize a person's overall psychological well-being, quality of life, and self-fulfillment. Psychotherapy is not intended to alter a person's gender identity; rather, psychotherapy can help an individual to explore gender concerns and find ways to alleviate gender dysphoria, if present (Bockting et al., 2006; Bockting & Coleman, 2007; Fraser, 2009a; Lev, 2004). Typically, the overarching treatment goal is to help transsexual, transgender, and gender nonconforming individuals achieve long-term comfort in their gender identity expression, with realistic chances for success in their relationships, education, and work. For additional details, see Fraser (Fraser, 2009c).

Therapy may consist of individual, couple, family, or group psychotherapy, the latter being particularly important to foster peer support.

3. Psychotherapy for transsexual, transgender, and gender nonconforming clients, including counseling and support for changes in gender role

Finding a comfortable gender role is, first and foremost, a psychosocial process. Psychotherapy can be invaluable in assisting transsexual, transgender, and gender nonconforming individuals with all of the following: (i) clarifying and exploring gender identity and role, (ii) addressing the impact of stigma and minority stress on one's mental health and human development, and (iii) facilitating a coming out process (Bockting & Coleman, 2007; Devor, 2004; Lev, 2004), which for some individuals may include changes in gender role expression and the use of feminizing/masculinizing medical interventions.

Mental health professionals can provide support and promote interpersonal skills and resilience in individuals and their families as they navigate a world that often is ill prepared to accommodate and respect transgender, transsexual, and gender nonconforming people. Psychotherapy can also aid in alleviating any co-existing mental health concerns (e.g., anxiety, depression) identified during screening and assessment.

For transsexual, transgender, and gender nonconforming individuals who plan to change gender roles permanently and make a social gender role transition, mental health professionals can facilitate the development of an individualized plan with specific goals and timelines. While the experience of changing one's gender role differs from person to person, the social aspects of the experience are usually challenging – often more so than the physical aspects. Because changing

gender role can have profound personal and social consequences, the decision to do so should include an awareness of what the familial, interpersonal, educational, vocational, economic, and legal challenges are likely to be, so that people can function successfully in their gender role.

Many transsexual, transgender, and gender nonconforming people will present for care without ever having been related to or accepted in the gender role that is most congruent with their gender identity. Mental health professionals can help these clients to explore and anticipate the implications of changes in gender role, and to pace the process of implementing these changes. Psychotherapy can provide a space for clients to begin to express themselves in ways that are congruent with their gender identity and, for some clients, overcome fear about changes in gender expression. Calculated risks can be taken outside of therapy to gain experience and build confidence in the new role. Assistance with coming out to family and community (friends, school, workplace) can be provided.

Other transsexual, transgender, and gender nonconforming individuals will present for care already having acquired experience (minimal, moderate, or extensive) living in a gender role that differs from that associated with their birth-assigned sex. Mental health professionals can help these clients to identify and work through potential challenges and foster optimal adjustment as they continue to express changes in their gender role.

4. Family therapy or support for family members

Decisions about changes in gender role and medical interventions for gender dysphoria have implications for not only clients, but also their families (Emerson & Rosenfeld, 1996; Fraser, 2009a; Lev, 2004). Mental health professionals can assist clients with making thoughtful decisions about communicating with family members and others about their gender identity and treatment decisions. Family therapy may include work with spouses or partners, as well as with children and other members of a client's extended family.

Clients may also request assistance with their relationships and sexual health. For example, they may want to explore their sexuality and intimacy related concerns.

Family therapy might be offered as part of the client's individual therapy and, if clinically appropriate, by the same provider. Alternatively, referrals can be made to other therapists with relevant expertise to work with family members, or to sources of peer support (e.g., online or offline support networks of partners or families).

5. Follow-up care throughout life

Mental health professionals may work with clients and their families at many stages of their lives. Psychotherapy may be helpful at different times and for various issues throughout the life cycle.

6. Etherapy, online counseling, or distance counseling

Online or etherapy has been shown to be particularly useful for people who have difficulty accessing competent psychotherapeutic treatment and who may experience isolation and stigma (Derrig-Palumbo & Zeine, 2005; Fenichel et al., 2004; Fraser, 2009b). By extrapolation, etherapy may be a useful modality for psychotherapy with transsexual, transgender, and gender nonconforming people. Etherapy offers opportunities for potentially enhanced, expanded, creative, and tailored delivery of services; however, as a developing modality it may also carry unexpected risk. Telemedicine guidelines are clear in some disciplines in some parts of the United States (Fraser, 2009b; Maheu, Pulier, Wilhelm, McMenamin, & Brown-Connolly, 2005) but not all; the international situation is even less defined (Maheu et al., 2005). Until sufficient evidence-based data on this use of etherapy is available, caution in its use is advised.

Mental health professionals engaging in etherapy are advised to stay current with their particular licensing board, professional association, and country's regulations, as well as the most recent literature pertaining to this rapidly evolving medium. A more thorough description of the potential uses, processes, and ethical concerns related to etherapy has been published (Fraser, 2009b).

Other Tasks of the Mental Health Professional

1. Educate and advocate on behalf of clients within their community (schools, workplaces, other organizations) and assist clients with making changes in identity documents

Transsexual, transgender, and gender nonconforming people may face challenges in their professional, educational, and other types of settings as they actualize their gender identity and expression (Lev, 2004, 2009). Mental health professionals can play an important role by educating people in these settings regarding gender nonconformity and by advocating on behalf of their clients (Currah, Juang, & Minter, 2006) (Currah & Minter, 2000). This role may involve consultation with school counselors, teachers, and administrators, human resources staff, personnel managers and employers, and representatives from other organizations and institutions. In addition, health providers may be called upon to support changes in a client's name and/or gender marker on identity documents such as passports, driver's licenses, birth certificates, and diplomas.

2. Provide information and referral for peer support

For some transsexual, transgender, and gender nonconforming people, an experience in peer support groups may be more instructive regarding options for gender expression than anything individual psychotherapy could offer (Rachlin, 2002). Both experiences are potentially valuable, and all people exploring gender issues should be encouraged to participate in community activities, if possible. Resources for peer support and information should be made available.

Culture and its Ramifications for Assessment and Psychotherapy

Health professionals work in enormously different environments across the world. Forms of distress that cause people to seek professional assistance in any culture are understood and classified by people in terms that are products of their own cultures (Frank & Frank, 1993). Cultural settings also largely determine how such conditions are understood by mental health professionals. Cultural differences related to gender identity and expression can affect patients, mental health professionals, and accepted psychotherapy practice. WPATH recognizes that the *SOC* have grown out of a Western tradition and may need to be adapted depending on the cultural context.

Ethical Guidelines Related to Mental Health Care

Mental health professionals need to be certified or licensed to practice in a given country according to that country's professional regulations (Fraser, 2009b; Pope & Vasquez, 2011). Professionals must adhere to the ethical codes of their professional licensing or certifying organizations in all of their work with transsexual, transgender, and gender nonconforming clients.

Treatment aimed at trying to change a person's gender identity and lived gender expression to become more congruent with sex assigned at birth has been attempted in the past (Gelder & Marks, 1969; Greenson, 1964), yet without success, particularly in the long term (Cohen-Kettenis & Kuiper, 1984; Pauly, 1965). Such treatment is no longer considered ethical.

If mental health professionals are uncomfortable with or inexperienced in working with transsexual, transgender, and gender nonconforming individuals and their families, they should refer clients to a competent provider or, at minimum, consult with an expert peer. If no local practitioners are available, consultation may be done via telehealth methods, assuming local requirements for distance consultation are met.

Issues of Access to Care

Qualified mental health professionals are not universally available; thus, access to quality care might be limited. WPATH aims to improve access and provides regular continuing education opportunities to train professionals from various disciplines to provide quality, transgender-specific health care. Providing mental health care from a distance through the use of technology may be one way to improve access (Fraser, 2009b).

In many places around the world, access to health care for transsexual, transgender, and gender nonconforming people is also limited by a lack of health insurance or other means to pay for needed care. WPATH urges health insurance companies and other third-party payers to cover the medically necessary treatment to alleviate gender dysphoria (American Medical Association, 2008; Anton, 2009; The World Professional Association for Transgender Health, 2008).

When faced with a client who is unable to access services, referral to available peer support resources (offline and online) is recommended. Finally, harm reduction approaches might be indicated to assist clients with making healthy decisions to improve their lives.

VIII
Hormone Therapy

Medical Necessity of Hormone Therapy

Feminizing/masculinizing hormone therapy – the administration of exogenous endocrine agents to induce feminizing or masculinizing changes – is a medically necessary intervention for many transsexual, transgender, and gender nonconforming individuals with gender dysphoria (Newfield, Hart, Dibble, & Kohler, 2006; Pfäfflin & Junge, 1998). Some people seek maximum feminization/masculinization, while others experience relief with an androgynous presentation resulting from hormonal minimization of existing secondary sex characteristics (Factor & Rothblum, 2008). Evidence for the psychosocial outcomes of hormone therapy is summarized in Appendix D.

Hormone therapy must be individualized based on a patient's goals, the risk/benefit ratio of medications, the presence of other medical conditions, and consideration of social and economic issues. Hormone therapy can provide significant comfort to patients who do not wish to make a social gender role transition or undergo surgery, or who are unable to do so (Meyer III, 2009).

Hormone therapy is a recommended criterion for some, but not all, surgical treatments for gender dysphoria (see section XI and Appendix C).

Criteria for Hormone Therapy

Initiation of hormone therapy may be undertaken after a psychosocial assessment has been conducted and informed consent has been obtained by a qualified health professional, as outlined in section VII of the *SOC*. A referral is required from the mental health professional who performed the assessment, unless the assessment was done by a hormone provider who is also qualified in this area.

The criteria for hormone therapy are as follows:

1. Persistent, well-documented gender dysphoria;
2. Capacity to make a fully informed decision and to consent for treatment;
3. Age of majority in a given country (if younger, follow the *Standards of Care* outlined in section VI);
4. If significant medical or mental health concerns are present, they must be reasonably well-controlled.

As noted in section VII of the *SOC*, the presence of co-existing mental health concerns does not necessarily preclude access to feminizing/masculinizing hormones; rather, these concerns need to be managed prior to or concurrent with treatment of gender dysphoria.

In selected circumstances, it can be acceptable practice to provide hormones to patients who have not fulfilled these criteria. Examples include facilitating the provision of monitored therapy using hormones of known quality as an alternative to illicit or unsupervised hormone use or to patients who have already established themselves in their affirmed gender and who have a history of prior hormone use. It is unethical to deny availability or eligibility for hormone therapy solely on the basis of blood seropositivity for blood-borne infections such as HIV or hepatitis B or C.

In rare cases, hormone therapy may be contraindicated due to serious individual health conditions. Health professionals should assist these patients with accessing non-hormonal interventions for gender dysphoria. A qualified mental health professional familiar with the patient is an excellent resource in these circumstances.

Informed Consent

Feminizing/masculinizing hormone therapy may lead to irreversible physical changes. Thus, hormone therapy should be provided only to those who are legally able to provide informed consent. This includes people who have been declared by a court to be emancipated minors, incarcerated people, and cognitively impaired people who are considered competent to participate in their medical decisions (see also Bockting et al., 2006). Providers should document in the medical record that comprehensive information has been provided and understood about all relevant aspects of the hormone therapy, including both possible benefits and risks and the impact on reproductive capacity.

Relationship between the Standards of Care and Informed Consent Model Protocols

A number of community health centers in the United States have developed protocols for providing hormone therapy based on an approach that has become known as the Informed Consent Model (Callen Lorde Community Health Center, 2000, 2011; Fenway Community Health Transgender Health Program, 2007; Tom Waddell Health Center, 2006). These protocols are consistent with the guidelines presented in the WPATH *Standards of Care, Version 7*. The *SOC* are flexible clinical guidelines; they allow for tailoring of interventions to the needs of the individual receiving services and for tailoring of protocols to the approach and setting in which these services are provided (Ehrbar & Gorton, 2010).

Obtaining informed consent for hormone therapy is an important task of providers to ensure that patients understand the psychological and physical benefits and risks of hormone therapy, as well as its psychosocial implications. Providers prescribing the hormones or health professionals recommending the hormones should have the knowledge and experience to assess gender dysphoria. They should inform individuals of the particular benefits, limitations, and risks of hormones, given the patient's age, previous experience with hormones, and concurrent physical or mental health concerns.

Screening for and addressing acute or current mental health concerns is an important part of the informed consent process. This may be done by a mental health professional or by an appropriately trained prescribing provider (see section VII of the *SOC*). The same provider or another appropriately trained member of the health care team (e.g., a nurse) can address the psychosocial implications of taking hormones when necessary (e.g., the impact of masculinization/feminization on how one is perceived and its potential impact on relationships with family, friends, and coworkers). If indicated, these providers will make referrals for psychotherapy and for the assessment and treatment of co-existing mental health concerns such as anxiety or depression.

The difference between the Informed Consent Model and *SOC, Version 7* is that the *SOC* puts greater emphasis on the important role that mental health professionals can play in alleviating gender dysphoria and facilitating changes in gender role and psychosocial adjustment. This may include a comprehensive mental health assessment and psychotherapy, when indicated. In the Informed Consent Model, the focus is on obtaining informed consent as the threshold for the initiation of hormone therapy in a multidisciplinary, harm-reduction environment. Less emphasis is placed on the provision of mental health care until the patient requests it, unless significant mental health concerns are identified that would need to be addressed before hormone prescription.

Physical Effects of Hormone Therapy

Feminizing/masculinizing hormone therapy will induce physical changes that are more congruent with a patient's gender identity.

- In FtM patients, the following physical changes are expected to occur: deepened voice, clitoral enlargement (variable), growth in facial and body hair, cessation of menses, atrophy of breast tissue, increased libido, and decreased percentage of body fat compared to muscle mass.

- In MtF patients, the following physical changes are expected to occur: breast growth (variable), decreased libido and erections, decreased testicular size, and increased percentage of body fact compared to muscle mass.

Most physical changes, whether feminizing or masculinizing, occur over the course of two years. The amount of physical change and the exact timeline of effects can be highly variable. Tables 1a and 1b outline the approximate time course of these physical changes.

TABLE 1A: EFFECTS AND EXPECTED TIME COURSE OF MASCULINIZING HORMONES [A]

Effect	Expected Onset[B]	Expected Maximum Effect[B]
Skin oiliness/acne	1-6 months	1-2 years
Facial/body hair growth	3-6 months	3-5 years
Scalp hair loss	>12 months[C]	variable
Increased muscle mass/strength	6-12 months	2-5 years[D]
Body fat redistribution	3-6 months	2-5 years
Cessation of menses	2-6 months	n/a
Clitoral enlargement	3-6 months	1-2 years
Vaginal atrophy	3-6 months	1-2 years
Deepened voice	3-12 months	1-2 years

[A] Adapted with permission from Hembree et al.(2009). *Copyright 2009, The Endocrine Society.*
[B] Estimates represent published and unpublished clinical observations.
[C] Highly dependent on age and inheritance; may be minimal.
[D] Significantly dependent on amount of exercise.

TABLE 1B: EFFECTS AND EXPECTED TIME COURSE OF FEMINIZING HORMONES [A]

Effect	Expected Onset[B]	Expected Maximum Effect[B]
Body fat redistribution	3-6 months	2-5 years
Decreased muscle mass/ strength	3-6 months	1-2 years[C]
Softening of skin/decreased oiliness	3-6 months	unknown
Decreased libido	1-3 months	1-2 years
Decreased spontaneous erections	1-3 months	3-6 months
Male sexual dysfunction	variable	variable
Breast growth	3-6 months	2-3 years
Decreased testicular volume	3-6 months	2-3 years
Decreased sperm production	variable	variable
Thinning and slowed growth of body and facial hair	6-12 months	> 3 years[D]
Male pattern baldness	No regrowth, loss stops 1-3 months	1-2 years

[A] Adapted with permission from Hembree et al. (2009). *Copyright 2009, The Endocrine Society.*
[B] Estimates represent published and unpublished clinical observations.
[C] Significantly dependent on amount of exercise.
[D] Complete removal of male facial and body hair requires electrolysis, laser treatment, or both.

The degree and rate of physical effects depends in part on the dose, route of administration, and medications used, which are selected in accordance with a patient's specific medical goals (e.g., changes in gender role expression, plans for sex reassignment) and medical risk profile. There is no current evidence that response to hormone therapy – with the possible exception of voice deepening in FtM persons – can be reliably predicted based on age, body habitus, ethnicity, or family appearance. All other factors being equal, there is no evidence to suggest that any medically approved type or method of administering hormones is more effective than any other in producing the desired physical changes.

Risks of Hormone Therapy

All medical interventions carry risks. The likelihood of a serious adverse event is dependent on numerous factors: the medication itself, dose, route of administration, and a patient's clinical characteristics (age, co-morbidities, family history, health habits). It is thus impossible to predict whether a given adverse effect will happen in an individual patient.

The risks associated with feminizing/masculinizing hormone therapy for the transsexual, transgender, and gender nonconforming population as a whole are summarized in Table 2. Based on the level of evidence, risks are categorized as follows: (i) likely increased risk with hormone therapy, (ii) possibly increased risk with hormone therapy, or (iii) inconclusive or no increased risk. Items in the last category include those that may present risk, but for which the evidence is so minimal that no clear conclusion can be reached.

Additional detail about these risks can be found in Appendix B, which is based on two comprehensive, evidence-based literature reviews of masculinizing/feminizing hormone therapy (Feldman & Safer, 2009; Hembree et al., 2009), along with a large cohort study (Asscheman et al., 2011). These reviews can serve as detailed references for providers, along with other widely recognized, published clinical materials (Dahl, Feldman, Goldberg, & Jaberi, 2006; Ettner, Monstrey, & Eyler, 2007).

TABLE 2: RISKS ASSOCIATED WITH HORMONE THERAPY. BOLDED ITEMS ARE CLINICALLY SIGNIFICANT

Risk Level	Feminizing hormones	Masculinizing hormones
Likely increased risk	Venous thromboembolic disease[A] Gallstones Elevated liver enzymes Weight gain **Hypertriglyceridemia**	**Polycythemia** Weight gain Acne Androgenic alopecia (balding) Sleep apnea
Likely increased risk with presence of additional risk factors[B]	Cardiovascular disease	
Possible increased risk	**Hypertension** Hyperprolactinemia or prolactinom[A]	Elevated liver enzymes **Hyperlipidemia**
Possible increased risk with presence of additional risk factors[B]	**Type 2 diabetes**[A]	**Destabilization of certain psychiatric disorders**[C] **Cardiovascular disease** **Hypertension** **Type 2 diabetes**
No increased risk or inconclusive	**Breast cancer**	Loss of bone density **Breast cancer** **Cervical cancer** **Ovarian cancer** **Uterine cancer**

[A] Risk is greater with oral estrogen administration than with transdermal estrogen administration.
[B] Additional risk factors include age.
[C] Includes bipolar, schizoaffective, and other disorders that may include manic or psychotic symptoms. This adverse event appears to be associated with higher doses or supraphysiologic blood levels of testosterone.

Competency of Hormone-Prescribing Physicians, Relationship with Other Health Professionals

Feminizing/masculinizing hormone therapy is best undertaken in the context of a complete approach to health care that includes comprehensive primary care and a coordinated approach to psychosocial issues (Feldman & Safer, 2009). While psychotherapy or ongoing counseling is not required for the initiation of hormone therapy, if a therapist is involved, then regular communication among health professionals is advised (with the patient's consent) to ensure that the transition process is going well, both physically and psychosocially.

With appropriate training, feminizing/masculinizing hormone therapy can be managed by a variety of providers, including nurse practitioners and primary care physicians (Dahl et al., 2006). Medical visits relating to hormone maintenance provide an opportunity to deliver broader care to a population that is often medically underserved (Clements, Wilkinson, Kitano, & Marx, 1999; Feldman, 2007; Xavier, 2000). Many of the screening tasks and management of co-morbidities associated with long-term hormone use, such as cardiovascular risk factors and cancer screening, fall more uniformly within the scope of primary care rather than specialist care (American Academy of Family Physicians, 2005; Eyler, 2007; World Health Organization, 2008), particularly in locations where dedicated gender teams or specialized physicians are not available.

Given the multidisciplinary needs of transsexual, transgender, and gender nonconforming people seeking hormone therapy, as well as the difficulties associated with fragmentation of care in general (World Health Organization, 2008), WPATH strongly encourages the increased training and involvement of primary care providers in the area of feminizing/masculinizing hormone therapy. If hormones are prescribed by a specialist, there should be close communication with the patient's primary care provider. Conversely, an experienced hormone provider or endocrinologist should be involved if the primary care physician has no experience with this type of hormone therapy, or if the patient has a pre-existing metabolic or endocrine disorder that could be affected by endocrine therapy.

While formal training programs in transgender medicine do not yet exist, hormone providers have a responsibility to obtain appropriate knowledge and experience in this field. Clinicians can increase their experience and comfort in providing feminizing/masculinizing hormone therapy by co-managing care or consulting with a more experienced provider, or by providing more limited types of hormone therapy before progressing to initiation of hormone therapy. Because this field of medicine is evolving, clinicians should become familiar and keep current with the medical literature, and discuss emerging issues with colleagues. Such discussions might occur through networks established by WPATH and other national/local organizations.

Responsibilities of Hormone-Prescribing Physicians

In general, clinicians who prescribe hormone therapy should engage in the following tasks:

1. Perform an initial evaluation that includes discussion of a patient's physical transition goals, health history, physical examination, risk assessment, and relevant laboratory tests.

2. Discuss with patients the expected effects of feminizing/masculinizing medications and the possible adverse health effects. These effects can include a reduction in fertility (Feldman & Safer, 2009; Hembree et al., 2009). Therefore, reproductive options should be discussed with patients before starting hormone therapy (see section IX).

3. Confirm that patients have the capacity to understand the risks and benefits of treatment and are capable of making an informed decision about medical care.

4. Provide ongoing medical monitoring, including regular physical and laboratory examination to monitor hormone effectiveness and side effects.

5. Communicate as needed with a patient's primary care provider, mental health professional, and surgeon.

6. If needed, provide patients with a brief written statement indicating that they are under medical supervision and care that includes feminizing/masculinizing hormone therapy. Particularly during the early phases of hormone treatment, a patient may wish to carry this statement at all times to help prevent difficulties with the police and other authorities.

Depending on the clinical situation for providing hormones (see below), some of these responsibilities are less relevant. Thus, the degree of counseling, physical examinations, and laboratory evaluations should be individualized to a patient's needs.

Clinical Situations for Hormone Therapy

There are circumstances in which clinicians may be called upon to provide hormones without necessarily initiating or maintaining long-term feminizing/masculinizing hormone therapy. By acknowledging these different clinical situations (see below, from least to highest level of complexity), it may be possible to involve clinicians in feminizing/masculinizing hormone therapy who might not otherwise feel able to offer this treatment.

1. Bridging

Whether prescribed by another clinician or obtained through other means (e.g., purchased over the internet), patients may present for care already on hormone therapy. Clinicians can provide a limited (1-6 month) prescription for hormones while helping patients find a provider who can prescribe long-term hormone therapy. Providers should assess a patient's current regimen for safety and drug interactions and substitute safer medications or doses when indicated (Dahl et al., 2006; Feldman & Safer, 2009). If hormones were previously prescribed, medical records should be requested (with the patient's permission) to obtain the results of baseline examinations and laboratory tests and any adverse events. Hormone providers should also communicate with any mental health professional who is currently involved in a patient's care. If a patient has never had a psychosocial assessment as recommended by the *SOC* (see section VII), clinicians should refer the patient to a qualified mental health professional if appropriate and feasible (Feldman & Safer, 2009). Providers who prescribe bridging hormones need to work with patients to establish limits as to the duration of bridging therapy.

2. Hormone therapy following gonad removal

Hormone replacement with estrogen or testosterone is usually continued lifelong after an oophorectomy or orchiectomy, unless medical contraindications arise. Because hormone doses are often decreased after these surgeries (Basson, 2001; Levy, Crown, & Reid, 2003; Moore, Wisniewski, & Dobs, 2003) and only adjusted for age and co-morbid health concerns, hormone management in this situation is quite similar to hormone replacement in any hypogonadal patient.

3. Hormone maintenance prior to gonad removal

Once patients have achieved maximal feminizing/masculinizing benefits from hormones (typically two or more years), they remain on a maintenance dose. The maintenance dose is then adjusted for changes in health conditions, aging, or other considerations such as lifestyle changes (Dahl et al., 2006). When a patient on maintenance hormones presents for care, the provider should assess the patient's current regimen for safety and drug interactions and substitute safer medications or doses when indicated. The patient should continue to be monitored by physical examinations and laboratory testing on a regular basis, as outlined in the literature (Feldman & Safer, 2009; Hembree et al., 2009). The dose and form of hormones should be revisited regularly with any changes in the patient's health status and available evidence on the potential long-term risks of hormones (See *Hormone Regimens,* below).

4. Initiating hormonal feminization/masculinization

This clinical situation requires the greatest commitment in terms of provider time and expertise. Hormone therapy must be individualized based on a patient's goals, the risk/benefit ratio of medications, the presence of other medical conditions, and consideration of social and economic issues. Although a wide variety of hormone regimens have been published (Dahl et al., 2006; Hembree et al., 2009; Moore et al., 2003), there are no published reports of randomized clinical trials comparing safety and efficacy. Despite this variation, a reasonable framework for initial risk assessment and ongoing monitoring of hormone therapy can be constructed, based on the efficacy and safety evidence presented above.

Risk Assessment and Modification for Initiating Hormone Therapy

The initial evaluation for hormone therapy assesses a patient's clinical goals and risk factors for hormone-related adverse events. During the risk assessment, the patient and clinician should develop a plan for reducing risks wherever possible, either prior to initiating therapy or as part of ongoing harm reduction.

All assessments should include a thorough physical exam, including weight, height, and blood pressure. The need for breast, genital, and rectal exams, which are sensitive issues for most transsexual, transgender, and gender nonconforming patients, should be based on individual risks and preventive health care needs (Feldman & Goldberg, 2006; Feldman, 2007).

Preventive care

Hormone providers should address preventive health care with patients, particularly if a patient does not have a primary care provider. Depending on a patient's age and risk profile, there may be appropriate screening tests or exams for conditions affected by hormone therapy. Ideally, these screening tests should be carried out prior to the start of hormone therapy.

Risk assessment and modification for feminizing hormone therapy (MtF)

There are no absolute contraindications to feminizing therapy *per se*, but absolute contraindications exist for the different feminizing agents, particularly estrogen. These include previous venous thrombotic events related to an underlying hypercoagulable condition, history of estrogen-sensitive neoplasm, and end-stage chronic liver disease (Gharib et al., 2005).

Other medical conditions, as noted in Table 2 and Appendix B, can be exacerbated by estrogen or androgen blockade, and therefore should be evaluated and reasonably well controlled prior to starting hormone therapy (Feldman & Safer, 2009; Hembree et al., 2009). Clinicians should particularly attend to tobacco use, as it is associated with increased risk of venous thrombosis, which is further increased with estrogen use. Consultation with a cardiologist may be advisable for patients with known cardio- or cerebrovascular disease.

Baseline laboratory values are important to both assess initial risk and evaluate possible future adverse events. Initial labs should be based on the risks of feminizing hormone therapy outlined in Table 2, as well as individual patient risk factors, including family history. Suggested initial lab panels have been published (Feldman & Safer, 2009; Hembree et al., 2009). These can be modified for patients or health care systems with limited resources, and in otherwise healthy patients.

Risk assessment and modification for masculinizing hormone therapy (FtM)

Absolute contraindications to testosterone therapy include pregnancy, unstable coronary artery disease, and untreated polycythemia with a hematocrit of 55% or higher (Carnegie, 2004). Because the aromatization of testosterone to estrogen may increase risk in patients with a history of breast or other estrogen dependent cancers (Moore et al., 2003), consultation with an oncologist may be indicated prior to hormone use. Co-morbid conditions likely to be exacerbated by testosterone use should be evaluated and treated, ideally prior to starting hormone therapy (Feldman & Safer, 2009; Hembree et al., 2009). Consultation with a cardiologist may be advisable for patients with known cardio- or cerebrovascular disease.

An increased prevalence of polycystic ovarian syndrome (PCOS) has been noted among FtM patients even in the absence of testosterone use (Baba et al., 2007; Balen, Schachter, Montgomery, Reid, & Jacobs, 1993; Bosinski et al., 1997). While there is no evidence that PCOS is related to the development of a transsexual, transgender, or gender nonconforming identity, PCOS is associated with increased risk of diabetes, cardiac disease, high blood pressure, and ovarian and endometrial cancers (Cattrall & Healy, 2004). Signs and symptoms of PCOS should be evaluated prior to initiating testosterone therapy, as testosterone may affect many of these conditions. Testosterone can affect the developing fetus (Physicians' Desk Reference, 2011), and patients at risk of becoming pregnant require highly effective birth control.

Baseline laboratory values are important to both assess initial risk and evaluate possible future adverse events. Initial labs should be based on the risks of masculinizing hormone therapy outlined in Table 2, as well as individual patient risk factors, including family history. Suggested initial lab panels have been published (Feldman & Safer, 2009; Hembree et al., 2009). These can be modified for patients or health care systems with limited resources, and in otherwise healthy patients.

Clinical Monitoring during Hormone Therapy for Efficacy and Adverse Events

The purpose of clinical monitoring during hormone use is to assess the degree of feminization/masculinization and the possible presence of adverse effects of medication. However, as with the monitoring of any long-term medication, monitoring should take place in the context of comprehensive health care. Suggested clinical monitoring protocols have been published (Feldman & Safer, 2009; Hembree et al., 2009). Patients with co-morbid medical conditions may need to be monitored more frequently. Healthy patients in geographically remote or resource-poor areas may be able to use alternative strategies, such as telehealth, or cooperation with local providers such as nurses and physician assistants. In the absence of other indications, health professionals may prioritize monitoring for those risks that are either likely to be increased by hormone therapy or possibly increased by hormone therapy but clinically serious in nature.

Efficacy and risk monitoring during feminizing hormone therapy (MtF)

The best assessment of hormone efficacy is clinical response: Is a patient developing a feminized body while minimizing masculine characteristics, consistent with that patient's gender goals? In order to more rapidly predict the hormone dosages that will achieve clinical response, one can measure testosterone levels for suppression below the upper limit of the normal female range, and estradiol levels within a premenopausal female range but well below supraphysiologic levels (Feldman & Safer, 2009; Hembree et al., 2009).

Monitoring for adverse events should include both clinical and laboratory evaluation. Follow-up should include careful assessment for signs of cardiovascular impairment and venous thromboembolism (VTE) through measurement of blood pressure, weight, and pulse; heart and lung exams; and examination of the extremities for peripheral edema, localized swelling, or pain (Feldman & Safer, 2009). Laboratory monitoring should be based on the risks of hormone therapy described above, a patient's individual co-morbidities and risk factors, and the specific hormone regimen itself. Specific lab monitoring protocols have been published (Feldman & Safer, 2009; Hembree et al., 2009).

Efficacy and risk monitoring during masculinizing hormone therapy (FtM)

The best assessment of hormone efficacy is clinical response: Is a patient developing a masculinized body while minimizing feminine characteristics, consistent with that patient's gender goals? Clinicians can achieve a good clinical response with the least likelihood of adverse events by maintaining testosterone levels within the normal male range while avoiding supraphysiological

levels (Dahl et al., 2006; Hembree et al., 2009). For patients using intramuscular (IM) testosterone cypionate or enanthate, some clinicians check trough levels while others prefer midcycle levels (Dahl et al., 2006; Hembree et al., 2009; Tangpricha, Turner, Malabanan, & Holick, 2001; Tangpricha, Ducharme, Barber, & Chipkin, 2003).

Monitoring for adverse events should include both clinical and laboratory evaluation. Follow-up should include careful assessment for signs and symptoms of excessive weight gain, acne, uterine break-through bleeding, and cardiovascular impairment, as well as psychiatric symptoms in at-risk patients. Physical examinations should include measurement of pressure, weight, pulse, and skin; and heart and lung exams (Feldman & Safer, 2009). Laboratory monitoring should be based on the risks of hormone therapy described above, a patient's individual co-morbidities and risk factors, and the specific hormone regimen itself. Specific lab monitoring protocols have been published (Feldman & Safer, 2009; Hembree et al., 2009).

Hormone Regimens

To date, no controlled clinical trials of any feminizing/masculinizing hormone regimen have been conducted to evaluate safety or efficacy in producing physical transition. As a result, wide variation in doses and types of hormones have been published in the medical literature (Moore et al., 2003; Tangpricha et al., 2003; van Kesteren, Asscheman, Megens, & Gooren, 1997). In addition, access to particular medications may be limited by a patient's geographical location and/or social or econonomic situations. For these reasons, WPATH does not describe or endorse a particular feminizing/masculinizing hormone regimen. Rather, the medication classes and routes of administration used in most published regimens are broadly reviewed.

As outlined above, there are demonstrated safety differences in individual elements of various regimens. The Endocrine Society Guidelines (Hembree et al., 2009) and Feldman and Safer (2009) provide specific guidance regarding the types of hormones and suggested dosing to maintain levels within physiologic ranges for a patient's desired gender expression (based on goals of full feminization/masculinization). It is strongly recommend that hormone providers regularly review the literature for new information and use those medications that safely meet individual patient needs with available local resources.

Regimens for feminizing hormone therapy (MtF)

Estrogen

Use of oral estrogen, and specifically ethinyl estradiol, appears to increase the risk of VTE. Because of this safety concern, ethinyl estradiol is not recommended for feminizing hormone therapy. Transdermal estrogen is recommended for those patients with risks factors for VTE. The risk of adverse events increases with higher doses, particular those resulting in supraphysiologic levels (Hembree et al., 2009). Patients with co-morbid conditions that can be affected by estrogen should avoid oral estrogen if possible and be started at lower levels. Some patients may not be able to safely use the levels of estrogen needed to get the desired results. This possibility needs to be discussed with patients well in advance of starting hormone therapy.

Androgen reducing medications ("anti-androgens")

A combination of estrogen and "anti-androgens" is the most commonly studied regimen for feminization. Androgen reducing medications, from a variety of classes of drugs, have the effect of reducing either endogenous testosterone levels or testosterone activity, and thus diminishing masculine characteristics such as body hair. They minimize the dosage of estrogen needed to suppress testosterone, thereby reducing the risks associated with high-dose exogenous estrogen (Prior, Vigna, Watson, Diewold, & Robinow, 1986; Prior, Vigna, & Watson, 1989).

Common anti-androgens include the following:

- Spironolactone, an antihypertensive agent, directly inhibits testosterone secretion and androgen binding to the androgen receptor. Blood pressure and electrolytes need to be monitored because of the potential for hyperkalemia.
- Cyproterone acetate is a progestational compound with anti-androgenic properties. This medication is not approved in the United States because of concerns over potential hepatotoxicity, but it is widely used elsewhere (De Cuypere et al., 2005).
- GnRH agonists (e.g., goserelin, buserelin, triptorelin) are neurohormones that block the gonadtropin releasing hormone receptor, thus blocking the release of follicle stimulating hormone and luteinizing hormone. This leads to highly effective gonadal blockade. However, these medications are expensive and only available as injectables or implants.
- 5-alpha reductase inhibitors (finasteride and dutasteride) block the conversion of testosterone to the more active agent, 5-alpha-dihydrotestosterone. These medications have beneficial effects on scalp hair loss, body hair growth, sebaceous glands, and skin consistency.

Cyproterone and spironolactone are the most commonly used anti-androgens and are likely the most cost-effective.

Progestins

With the exception of cyproterone, the inclusion of progestins in feminizing hormone therapy is controversial (Oriel, 2000). Because progestins play a role in mammary development on a cellular level, some clinicians believe that these agents are necessary for full breast development (Basson & Prior, 1998; Oriel, 2000). However, a clinical comparison of feminization regimens with and without progestins found that the addition of progestins neither enhanced breast growth nor lowered serum levels of free testosterone (Meyer III et al., 1986). There are concerns regarding potential adverse effects of progestins, including depression, weight gain, and lipid changes (Meyer III et al., 1986; Tangpricha et al., 2003). Progestins (especially medroxyprogesterone) are also suspected to increase breast cancer risk and cardiovascular risk in women (Rossouw et al., 2002). Micronized progesterone may be better tolerated and have a more favorable impact on the lipid profile than medroxyprogesterone does (de Lignières, 1999; Fitzpatrick, Pace, & Wiita, 2000).

Regimens for masculinizing hormone therapy (FtM)

Testosterone

Testosterone generally can be given orally, transdermally, or parenterally (IM), although buccal and implantable preparations are also available. Oral testosterone undecenoate, available outside the United States, results in lower serum testosterone levels than non-oral preparations and has limited efficacy in suppressing menses (Feldman, 2005, April; Moore et al., 2003). Because intramuscular testosterone cypionate or enanthate are often administered every 2-4 weeks, some patients may notice cyclic variation in effects (e.g., fatigue and irritability at the end of the injection cycle, aggression or expansive mood at the beginning of the injection cycle), as well as more time outside the normal physiologic levels (Jockenhövel, 2004). This may be mitigated by using a lower but more frequent dosage schedule or by using a daily transdermal preparation (Dobs et al., 1999; Jockenhövel, 2004; Nieschlag et al., 2004). Intramuscular testosterone undecenoate (not currently available in the United States) maintains stable, physiologic testosterone levels over approximately 12 weeks and has been effective in both the setting of hypogonadism and in FtM individuals (Mueller, Kiesewetter, Binder, Beckmann, & Dittrich, 2007; Zitzmann, Saad, & Nieschlag, 2006). There is evidence that transdermal and intramuscular testosterone achieve similar masculinizing results, although the timeframe may be somewhat slower with transdermal preparations (Feldman, 2005, April). Especially as patients age, the goal is to use the lowest dose needed to maintain the desired clinical result, with appropriate precautions being made to maintain bone density.

Other agents

Progestins, most commonly medroxyprogesterone, can be used for a short period of time to assist with menstrual cessation early in hormone therapy. GnRH agonists can be used similarly, as well as for refractory uterine bleeding in patients without an underlying gynecological abnormality.

Bioidentical and compounded hormones

As discussion surrounding the use of bioidentical hormones in postmenopausal hormone replacement has heightened, interest has also increased in the use of similar compounds in feminizing/masculinizing hormone therapy. There is no evidence that custom compounded bioidentical hormones are safer or more effective than government agency-approved bioidentical hormones (Sood, Shuster, Smith, Vincent, & Jatoi, 2011). Therefore, it has been advised by the North American Menopause Society (2010) and others to assume that, whether the hormone is from a compounding pharmacy or not, if the active ingredients are similar, it should have a similar side-effect profile. WPATH concurs with this assessment.

IX
Reproductive Health

Many transgender, transsexual, and gender nonconforming people will want to have children. Because feminizing/masculinizing hormone therapy limits fertility (Darney, 2008; Zhang, Gu, Wang, Cui, & Bremner, 1999), it is desirable for patients to make decisions concerning fertility before starting hormone therapy or undergoing surgery to remove/alter their reproductive organs. Cases are known of people who received hormone therapy and genital surgery and later regretted their inability to parent genetically related children (De Sutter, Kira, Verschoor, & Hotimsky, 2002).

Health care professionals – including mental health professionals recommending hormone therapy or surgery, hormone-prescribing physicians, and surgeons – should discuss reproductive options with patients prior to initiation of these medical treatments for gender dysphoria. These discussions should occur even if patients are not interested in these issues at the time of treatment, which may be more common for younger patients (De Sutter, 2009). Early discussions are desirable, but not always possible. If an individual has not had complete sex reassignment surgery, it may be possible to stop hormones long enough for natal hormones to recover, allowing the production of mature

gametes (Payer, Meyer III, & Walker, 1979; Van den Broecke, Van der Elst, Liu, Hovatta, & Dhont, 2001).

Besides debate and opinion papers, very few research papers have been published on the reproductive health issues of individuals receiving different medical treatments for gender dysphoria. Another group who faces the need to preserve reproductive function in light of loss or damage to their gonads are people with malignances that require removal of reproductive organs or use of damaging radiation or chemotherapy. Lessons learned from that group can be applied to people treated for gender dysphoria.

MtF patients, especially those who have not already reproduced, should be informed about sperm preservation options and encouraged to consider banking their sperm prior to hormone therapy. In a study examining testes that were exposed to high-dose estrogen (Payer et al., 1979), findings suggest that stopping estrogen may allow the testes to recover. In an article reporting on the opinions of MtF individuals towards sperm freezing (De Sutter et al., 2002), the vast majority of 121 survey respondents felt that the availability of freezing sperm should be discussed and offered by the medical world. Sperm should be collected before hormone therapy or after stopping the therapy until the sperm count rises again. Cryopreservation should be discussed even if there is poor semen quality. In adults with azoospermia, a testicular biopsy with subsequent cryopreservation of biopsied material for sperm is possible, but may not be successful.

Reproductive options for FtM patients might include oocyte (egg) or embryo freezing. The frozen gametes and embryo could later be used with a surrogate woman to carry to pregnancy. Studies of women with polycystic ovarian disease suggest that the ovary can recover in part from the effects of high testosterone levels (Hunter & Sterrett, 2000). Stopping the testosterone briefly might allow for ovaries to recover enough to make eggs; success likely depends on the patient's age and duration of testosterone treatment. While not systematically studied, some FtM individuals are doing exactly that, and some have been able to become pregnant and deliver children (More, 1998).

Patients should be advised that these techniques are not available everywhere and can be very costly. Transsexual, transgender, and gender nonconforming people should not be refused reproductive options for any reason.

A special group of individuals are prepubertal or pubertal adolescents who will never develop reproductive function in their natal sex due to blockers or cross gender hormones. At this time there is no technique for preserving function from the gonads of these individuals.

X

Voice and Communication Therapy

Communication, both verbal and nonverbal, is an important aspect of human behavior and gender expression. Transsexual, transgender, and gender nonconforming people might seek the assistance of a voice and communication specialist to develop vocal characteristics (e.g., pitch, intonation, resonance, speech rate, phrasing patterns) and non-verbal communication patterns (e.g., gestures, posture/movement, facial expressions) that facilitate comfort with their gender identity. Voice and communication therapy may help to alleviate gender dysphoria and be a positive and motivating step towards achieving one's goals for gender role expression.

Competency of Voice and Communication Specialists Working with Transsexual, Transgender, and Gender Nonconforming Clients

Specialists may include speech-language pathologists, speech therapists, and speech-voice clinicians. In most countries the professional association for speech-language pathologists requires specific qualifications and credentials for membership. In some countries the government regulates practice through licensing, certification, or registration processes (American Speech-Language-Hearing Association, 2011; Canadian Association of Speech-Language Pathologists and Audiologists; Royal College of Speech Therapists, United Kingdom; Speech Pathology Australia; Vancouver Coastal Health, Vancouver, British Columbia, Canada).

The following are recommended minimum credentials for voice and communication specialists working with transsexual, transgender, and gender nonconforming clients:

1. Specialized training and competence in the assessment and development of communication skills in transsexual, transgender, and gender nonconforming clients.

2. A basic understanding of transgender health, including hormonal and surgical treatments for feminization/masculinization and trans-specific psychosocial issues as outlined in the *SOC*; and familiarity with basic sensitivity protocols such as the use of preferred gender pronoun and name (Canadian Association of Speech-Language Pathologists and Audiologists; Royal College of Speech Therapists, United Kingdom; Speech Pathology Australia).

3. Continuing education in the assessment and development of communication skills in transsexual, transgender, and gender nonconforming clients. This may include attendance at professional meetings, workshops, or seminars; participation in research related to gender identity issues; independent study; or mentoring from an experienced, certified clinician.

Other professionals such as vocal coaches, theatre professionals, singing teachers, and movement experts may play a valuable adjunct role. Such professionals will ideally have experience working with, or be actively collaborating with, speech-language pathologists.

Assessment and Treatment Considerations

The overall purpose of voice and communication therapy is to help clients adapt their voice and communication in a way that is both safe and authentic, resulting in communication patterns that clients feel are congruent with their gender identity and that reflect their sense of self (Adler, Hirsch, & Mordaunt, 2006). It is essential that voice and communication specialists be sensitive to individual communication preferences. Communication – style, voice, choice of language, etc. – is personal. Individuals should not be counseled to adopt behaviors with which they are not comfortable or which do not feel authentic. Specialists can best serve their clients by taking the time to understand a person's gender concerns and goals for gender role expression (American Speech-Language-Hearing Association, 2011; Canadian Association of Speech-Language Pathologists and Audiologists; Royal College of Speech Therapists, United Kingdom; Speech Pathology Australia).

Individuals may choose the communication behaviors that they wish to acquire in accordance with their gender identity. These decisions are also informed and supported by the knowledge of the voice and communication specialist and by the assessment data for a specific client (Hancock, Krissinger, & Owen, 2010). Assessment includes a client's self-evaluation and a specialist's evaluation of voice, resonance, articulation, spoken language, and non-verbal communication (Adler et al., 2006; Hancock et al., 2010).

Voice and communication treatment plans are developed by considering the available research evidence, the clinical knowledge and experience of the specialist, and the client's own goals and values (American Speech-Language-Hearing Association, 2011; Canadian Association of Speech-Language Pathologists and Audiologists; Royal College of Speech Therapists, United Kingdom; Speech Pathology Australia; Vancouver Coastal Health, Vancouver, British Columbia, Canada). Targets of treatment typically include pitch, intonation, loudness and stress patterns, voice quality, resonance, articulation, speech rate and phrasing, language, and non-verbal communication (Adler et al., 2006; Davies & Goldberg, 2006; de Bruin, Coerts, & Greven, 2000; Gelfer, 1999; McNeill, 2006; Oates & Dacakis, 1983). Treatment may involve individual and/or group sessions. The frequency and duration of treatment will vary according to a client's needs. Existing protocols for voice and

communication treatment can be considered in developing an individualized therapy plan (Carew, Dacakis, & Oates, 2007; Dacakis, 2000; Davies & Goldberg, 2006; Gelfer, 1999; McNeill, Wilson, Clark, & Deakin, 2008; Mount & Salmon, 1988).

Feminizing or masculinizing the voice involves non-habitual use of the voice production mechanism. Prevention measures are necessary to avoid the possibility of vocal misuse and long-term vocal damage. All voice and communication therapy services should therefore include a vocal health component (Adler et al., 2006).

Vocal Health Considerations after Voice Feminization Surgery

As noted in section XI, some transsexual, transgender, and gender nonconforming people will undergo voice feminization surgery. (Voice deepening can be achieved through masculinizing hormone therapy, but feminizing hormones do not have an impact on the adult MtF voice.) There are varying degrees of satisfaction, safety, and long-term improvement in patients who have had such surgery. It is recommended that individuals undergoing voice feminization surgery also consult a voice and communication specialist to maximize the surgical outcome, help protect vocal health, and learn non-pitch related aspects of communication. Voice surgery procedures should include follow-up sessions with a voice and communication specialist who is licensed and/or credentialed by the board responsible for speech therapists/speech-language pathologists in that country (Kanagalingam et al., 2005; Neumann & Welzel, 2004).

XI
Surgery_

Sex Reassignment Surgery Is Effective and Medically Necessary

Surgery – particularly genital surgery – is often the last and the most considered step in the treatment process for gender dysphoria. While many transsexual, transgender, and gender nonconforming individuals find comfort with their gender identity, role, and expression without surgery, for many others surgery is essential and medically necessary to alleviate their gender dysphoria (Hage

& Karim, 2000). For the latter group, relief from gender dysphoria cannot be achieved without modification of their primary and/or secondary sex characteristics to establish greater congruence with their gender identity. Moreover, surgery can help patients feel more at ease in the presence of sex partners or in venues such as physicians' offices, swimming pools, or health clubs. In some settings, surgery might reduce risk of harm in the event of arrest or search by police or other authorities.

Follow-up studies have shown an undeniable beneficial effect of sex reassignment surgery on postoperative outcomes such as subjective well being, cosmesis, and sexual function (De Cuypere et al., 2005; Gijs & Brewaeys, 2007; Klein & Gorzalka, 2009; Pfäfflin & Junge, 1998). Additional information on the outcomes of surgical treatments are summarized in Appendix D.

Ethical Questions Regarding Sex Reassignment Surgery

In ordinary surgical practice, pathological tissues are removed to restore disturbed functions, or alterations are made to body features to improve a patient's self image. Some people, including some health professionals, object on ethical grounds to surgery as a treatment for gender dysphoria, because these conditions are thought not to apply.

It is important that health professionals caring for patients with gender dysphoria feel comfortable about altering anatomically normal structures. In order to understand how surgery can alleviate the psychological discomfort and distress of individuals with gender dysphoria, professionals need to listen to these patients discuss their symptoms, dilemmas, and life histories. The resistance against performing surgery on the ethical basis of "above all do no harm" should be respected, discussed, and met with the opportunity to learn from patients themselves about the psychological distress of having gender dysphoria and the potential for harm caused by denying access to appropriate treatments.

Genital and breast/chest surgical treatments for gender dysphoria are not merely another set of elective procedures. Typical elective procedures involve only a private mutually consenting contract between a patient and a surgeon. Genital and breast/chest surgeries as medically necessary treatments for gender dysphoria are to be undertaken only after assessment of the patient by qualified mental health professionals, as outlined in section VII of the *SOC*. These surgeries may be performed once there is written documentation that this assessment has occurred and that the person has met the criteria for a specific surgical treatment. By following this procedure, mental health professionals, surgeons, and of course patients, share responsibility for the decision to make irreversible changes to the body.

It is unethical to deny availability or eligibility for sex reassignment surgeries solely on the basis of blood seropositivity for blood-borne infections such as HIV or hepatitis C or B.

Relationship of Surgeons with Mental Health Professionals, Hormone-Prescribing Physicians (if Applicable), and Patients (Informed Consent)

The role of a surgeon in the treatment of gender dysphoria is not that of a mere technician. Rather, conscientious surgeons will have insight into each patient's history and the rationale that led to the referral for surgery. To that end, surgeons must talk at length with their patients and have close working relationships with other health professionals who have been actively involved in their clinical care.

Consultation is readily accomplished when a surgeon practices as part of an interdisciplinary health care team. In the absence of this, a surgeon must be confident that the referring mental health professional(s), and if applicable the physician who prescribes hormones, are competent in the assessment and treatment of gender dysphoria, because the surgeon is relying heavily on their expertise.

Once a surgeon is satisfied that the criteria for specific surgeries have been met (as outlined below), surgical treatment should be considered and a preoperative surgical consultation should take place. During this consultation, the procedure and postoperative course should be extensively discussed with the patient. Surgeons are responsible for discussing all of the following with patients seeking surgical treatments for gender dysphoria:

- The different surgical techniques available (with referral to colleagues who provide alternative options);
- The advantages and disadvantages of each technique;
- The limitations of a procedure to achieve "ideal" results; surgeons should provide a full range of before-and-after photographs of their own patients, including both successful and unsuccessful outcomes;
- The inherent risks and possible complications of the various techniques; surgeons should inform patients of their own complication rates with each procedure.

These discussions are the core of the informed consent process, which is both an ethical and legal requirement for any surgical procedure. Ensuring that patients have a realistic expectation of outcomes is important in achieving a result that will alleviate their gender dysphoria.

All of this information should be provided to patients in writing, in a language in which they are fluent, and in graphic illustrations. Patients should receive the information in advance (possibly via the internet) and given ample time to review it carefully. The elements of informed consent should always be discussed face-to-face prior to the surgical intervention. Questions can then be answered and written informed consent can be provided by the patient. Because these surgeries are irreversibile, care should be taken to ensure that patients have sufficient time to absorb information fully before they are asked to provide informed consent. A minimum of 24 hours is suggested.

Surgeons should provide immediate aftercare and consultation with other physicians serving the patient in the future. Patients should work with their surgeon to develop an adequate aftercare plan for the surgery.

Overview of Surgical Procedures for the Treatment of Patients with Gender Dysphoria

For the male-to-female (MtF) patient, surgical procedures may include the following:

1. Breast/chest surgery: augmentation mammoplasty (implants/lipofilling);
2. Genital surgery: penectomy, orchiectomy, vaginoplasty, clitoroplasty, vulvoplasty;
3. Non-genital, non-breast surgical interventions: facial feminization surgery, liposuction, lipofilling, voice surgery, thyroid cartilage reduction, gluteal augmentation (implants/lipofilling), hair reconstruction, and various aesthetic procedures.

For the female-to-male (FtM) patient, surgical procedures may include the following:

1. Breast/chest surgery: subcutaneous mastectomy, creation of a male chest;
2. Genital surgery: hysterectomy/ovariectomy, reconstruction of the fixed part of the urethra, which can be combined with a metoidioplasty or with a phalloplasty (employing a pedicled or free vascularized flap), vaginectomy, scrotoplasty, and implantation of erection and/or testicular prostheses;

3. Non-genital, non-breast surgical interventions: voice surgery (rare), liposuction, lipofilling, pectoral implants, and various aesthetic procedures.

Reconstructive Versus Aesthetic Surgery

The question of whether sex reassignment surgery should be considered "aesthetic" surgery or "reconstructive" surgery is pertinent not only from a philosophical point of view, but also from a financial point of view. Aesthetic or cosmetic surgery is mostly regarded as not medically necessary and therefore is typically paid for entirely by the patient. In contrast, reconstructive procedures are considered medically necessary – with unquestionable therapeutic results – and thus paid for partially or entirely by national health systems or insurance companies.

Unfortunately, in the field of plastic and reconstructive surgery (both in general and specifically for gender-related surgeries), there is no clear distinction between what is purely reconstructive and what is purely cosmetic. Most plastic surgery procedures actually are a mixture of both reconstructive and cosmetic components.

While most professionals agree that genital surgery and mastectomy cannot be considered purely cosmetic, opinions diverge as to what degree other surgical procedures (e.g., breast augmentation, facial feminization surgery) can be considered purely reconstructive. Although it may be much easier to see a phalloplasty or a vaginoplasty as an intervention to end lifelong suffering, for certain patients an intervention like a reduction rhinoplasty can have a radical and permanent effect on their quality of life, and therefore is much more medically necessary than for somebody without gender dysphoria.

Criteria for Surgeries

As for all of the *SOC*, the criteria for initiation of surgical treatments for gender dysphoria were developed to promote optimal patient care. While the *SOC* allow for an individualized approach to best meet a patient's health care needs, a criterion for all breast/chest and genital surgeries is documentation of persistent gender dysphoria by a qualified mental health professional. For some surgeries, additional criteria include preparation and treatment consisting of feminizing/masculinizing hormone therapy and one year of continuous living in a gender role that is congruent with one's gender identity.

These criteria are outlined below. Based on the available evidence and expert clinical consensus, different recommendations are made for different surgeries.

The *SOC* do not specify an order in which different surgeries should occur. The number and sequence of surgical procedures may vary from patient to patient, according to their clinical needs.

Criteria for breast/chest surgery (one referral)

Criteria for mastectomy and creation of a male chest in FtM patients:

1. Persistent, well-documented gender dysphoria;
2. Capacity to make a fully informed decision and to consent for treatment;
3. Age of majority in a given country (if younger, follow the *SOC* for children and adolescents);
4. If significant medical or mental health concerns are present, they must be reasonably well controlled.

Hormone therapy is not a pre-requisite.

Criteria for breast augmentation (implants/lipofilling) in MtF patients:

1. Persistent, well-documented gender dysphoria;
2. Capacity to make a fully informed decision and to consent for treatment;
3. Age of majority in a given country (if younger, follow the *SOC* for children and adolescents);
4. If significant medical or mental health concerns are present, they must be reasonably well controlled.

Although not an explicit criterion, it is recommended that MtF patients undergo feminizing hormone therapy (minimum 12 months) prior to breast augmentation surgery. The purpose is to maximize breast growth in order to obtain better surgical (aesthetic) results.

Criteria for genital surgery (two referrals)

The criteria for genital surgery are specific to the type of surgery being requested.

Criteria for hysterectomy and ovariectomy in FtM patients and for orchiectomy in MtF patients:

1. Persistent, well documented gender dysphoria;
2. Capacity to make a fully informed decision and to consent for treatment;
3. Age of majority in a given country;
4. If significant medical or mental health concerns are present, they must be well controlled.
5. 12 continuous months of hormone therapy as appropriate to the patient's gender goals (unless the patient has a medical contraindication or is otherwise unable or unwilling to take hormones).

The aim of hormone therapy prior to gonadectomy is primarily to introduce a period of reversible estrogen or testosterone suppression, before the patient undergoes irreversible surgical intervention.

These criteria do not apply to patients who are having these procedures for medical indications other than gender dysphoria.

Criteria for metoidioplasty or phalloplasty in FtM patients and for vaginoplasty in MtF patients:

1. Persistent, well documented gender dysphoria;
2. Capacity to make a fully informed decision and to consent for treatment;
3. Age of majority in a given country;
4. If significant medical or mental health concerns are present, they must be well controlled;
5. 12 continuous months of hormone therapy as appropriate to the patient's gender goals (unless the patient has a medical contraindication or is otherwise unable or unwilling to take hormones).
6. 12 continuous months of living in a gender role that is congruent with their gender identity;

Although not an explicit criterion, it is recommended that these patients also have regular visits with a mental health or other medical professional.

Rationale for a preoperative, 12-month experience of living in an identity-congruent gender role:

The criterion noted above for some types of genital surgeries – i.e., that patients engage in 12 continuous months of living in a gender role that is congruent with their gender identity – is based on expert clinical consensus that this experience provides ample opportunity for patients to experience and socially adjust in their desired gender role, before undergoing irreversible surgery. As noted in section VII, the social aspects of changing one's gender role are usually challenging – often more so than the physical aspects. Changing gender role can have profound personal and social consequences, and the decision to do so should include an awareness of what the familial, interpersonal, educational, vocational, economic, and legal challenges are likely to be, so that people can function successfully in their gender role. Support from a qualified mental health professional and from peers can be invaluable in ensuring a successful gender role adaptation (Bockting, 2008).

The duration of 12 months allows for a range of different life experiences and events that may occur throughout the year (e.g., family events, holidays, vacations, season-specific work or school experiences). During this time, patients should present consistently, on a day-to-day basis and across all settings of life, in their desired gender role. This includes coming out to partners, family, friends, and community members (e.g., at school, work, other settings).

Health professionals should clearly document a patient's experience in the gender role in the medical chart, including the start date of living full time for those who are preparing for genital surgery. In some situations, if needed, health professionals may request verification that this criterion has been fulfilled: They may communicate with individuals who have related to the patient in an identity-congruent gender role, or request documentation of a legal name and/or gender marker change, if applicable.

Surgery for Persons with Psychotic Conditions and Other Serious Mental Illnesses

When patients with gender dysphoria are also diagnosed with severe psychiatric disorders and impaired reality testing (e.g., psychotic episodes, bipolar disorder, dissociative identity disorder, borderline personality disorder), an effort must be made to improve these conditions with psychotropic medications and/or psychotherapy before surgery is contemplated. Reevaluation by a mental health professional qualified to assess and manage psychotic conditions should be

conducted prior to surgery, describing the patient's mental status and readiness for surgery. It is preferable that this mental health professional be familiar with the patient. No surgery should be performed while a patient is actively psychotic (De Cuypere & Vercruysse, 2009).

Competency of Surgeons Performing Breast/Chest or Genital Surgery

Physicians who perform surgical treatments for gender dsyphoria should be urologists, gynecologists, plastic surgeons, or general surgeons, and board-certified as such by the relevant national and/or regional association. Surgeons should have specialized competence in genital reconstructive techniques as indicated by documented supervised training with a more experienced surgeon. Even experienced surgeons must be willing to have their surgical skills reviewed by their peers. An official audit of surgical outcomes and publication of these results would be greatly reassuring to both referring health professionals and patients. Surgeons should regularly attend professional meetings where new techniques are presented. The internet is often effectively used by patients to share information on their experience with surgeons and their teams.

Ideally, surgeons should be knowledgeable about more than one surgical technique for genital reconstruction so that they, in consultation with patients, can choose the ideal technique for each individual. Alternatively, if a surgeon is skilled in a single technique and this procedure is either not suitable for or desired by a patient, the surgeon should inform the patient about other procedures and offer referral to another appropriately skilled surgeon.

Breast/Chest Surgery Techniques and Complications

Although breast/chest appearance is an important secondary sex characteristic, breast presence or size is not involved in the legal definitions of sex and gender and is not necessary for reproduction. The performance of breast/chest operations for treatment of gender dysphoria should be considered with the same care as beginning hormone therapy, as both produce relatively irreversible changes to the body.

For the MtF patient, a breast augmentation (sometimes called "chest reconstruction") is not different from the procedure in a natal female patient. It is usually performed through implantation of breast prostheses and occasionally with the lipofilling technique. Infections and capsular fibrosis are rare complications of augmentation mammoplasty in MtF patients (Kanhai, Hage, Karim, & Mulder, 1999).

For the FtM patient, a mastectomy or "male chest contouring" procedure is available. For many FtM patients, this is the only surgery undertaken. When the amount of breast tissue removed requires skin removal, a scar will result and the patient should be so informed. Complications of subcutaneous mastectomy can include nipple necrosis, contour irregularities, and unsightly scarring (Monstrey et al., 2008).

Genital Surgery Techniques and Complications

Genital surgical procedures for the MtF patient may include orchiectomy, penectomy, vaginoplasty, clitoroplasty, and labiaplasty. Techniques include penile skin inversion, pedicled colosigmoid transplant, and free skin grafts to line the neovagina. Sexual sensation is an important objective in vaginoplasty, along with creation of a functional vagina and acceptable cosmesis.

Surgical complications of MtF genital surgery may include complete or partial necrosis of the vagina and labia, fistulas from the bladder or bowel into the vagina, stenosis of the urethra, and vaginas that are either too short or too small for coitus. While the surgical techniques for creating a neovagina are functionally and aesthetically excellent, anorgasmia following the procedure has been reported, and a second stage labiaplasty may be needed for cosmesis (Klein & Gorzalka, 2009; Lawrence, 2006).

Genital surgical procedures for FtM patients may include hysterectomy, ovariectomy (salpingo-oophorectomy), vaginectomy, metoidioplasty, scrotoplasty, urethroplasty, placement of testicular prostheses, and phalloplasty. For patients without former abdominal surgery, the laparoscopic technique for hysterectomy and salpingo-oophorectomy is recommended to avoid a lower-abdominal scar. Vaginal access may be difficult as most patients are nulliparous and have often not experienced penetrative intercourse. Current operative techniques for phalloplasty are varied. The choice of techniques may be restricted by anatomical or surgical considerations and by a client's financial considerations. If the objectives of phalloplasty are a neophallus of good appearance, standing micturition, sexual sensation, and/or coital ability, patients should be clearly informed that there are several separate stages of surgery and frequent technical difficulties, which may require additional operations. Even metoidioplasty, which in theory is a one-stage procedure for construction of a microphallus, often requires more than one operation. The objective of standing micturition with this technique can not always be ensured (Monstrey et al., 2009).

Complications of phalloplasty in FtMs may include frequent urinary tract stenoses and fistulas, and occasionally necrosis of the neophallus. Metoidioplasty results in a micropenis, without the capacity for standing urination. Phalloplasty, using a pedicled or a free vascularized flap, is a lengthy, multi-stage procedure with significant morbidity that includes frequent urinary complications and

unavoidable donor site scarring. For this reason, many FtM patients never undergo genital surgery other than hysterectomy and salpingo-oophorectomy (Hage & De Graaf, 1993).

Even patients who develop severe surgical complications seldom regret having undergone surgery. The importance of surgery can be appreciated by the repeated finding that quality of surgical results is one of the best predictors of the overall outcome of sex reassignment (Lawrence, 2006).

Other Surgeries

Other surgeries for assisting in body feminization include reduction thyroid chondroplasty (reduction of the Adam's apple), voice modification surgery, suction-assisted lipoplasty (contour modeling) of the waist, rhinoplasty (nose correction), facial bone reduction, face-lift, and blepharoplasty (rejuvenation of the eyelid). Other surgeries for assisting in body masculinization include liposuction, lipofilling, and pectoral implants. Voice surgery to obtain a deeper voice is rare but may be recommended in some cases, such as when hormone therapy has been ineffective.

Although these surgeries do not require referral by mental health professionals, such professionals can play an important role in assisting clients in making a fully informed decision about the timing and implications of such procedures in the context of the social transition.

Although most of these procedures are generally labeled "purely aesthetic," these same operations in an individual with severe gender dysphoria can be considered medically necessary, depending on the unique clinical situation of a given patient's condition and life situation. This ambiguity reflects reality in clinical situations, and allows for individual decisions as to the need and desirability of these procedures.

XII
Postoperative Care and Follow-up

Long-term postoperative care and follow-up after surgical treatments for gender dysphoria are associated with good surgical and psychosocial outcomes (Monstrey et al., 2009). Follow-up is important to a patient's subsequent physical and mental health and to a surgeon's knowledge about the benefits and limitations of surgery. Surgeons who operate on patients coming from long

distances should include personal follow-up in their care plan and attempt to ensure affordable local long-term aftercare in their patients' geographic region.

Postoperative patients may sometimes exclude themselves from follow-up by specialty providers, including the hormone-prescribing physician (for patients receiving hormones), not recognizing that these providers are often best able to prevent, diagnose, and treat medical conditions that are unique to hormonally and surgically treated patients. The need for follow-up equally extends to mental health professionals, who may have spent a longer period of time with the patient than any other professional and therefore are in an excellent position to assist in any postoperative adjustment difficulties. Health professionals should stress the importance of postoperative follow-up care with their patients and offer continuity of care.

Postoperative patients should undergo regular medical screening according to recommended guidelines for their age. This is discussed more in the next section.

XIII
Lifelong Preventive and Primary Care

Transsexual, transgender, and gender nonconforming people need health care throughout their lives. For example, to avoid the negative secondary effects of having a gonadectomy at a relatively young age and/or receiving long-term, high-dose hormone therapy, patients need thorough medical care by providers experienced in primary care and transgender health. If one provider is not able to provide all services, ongoing communication among providers is essential.

Primary care and health maintenance issues should be addressed before, during, and after any possible changes in gender role and medical interventions to alleviate gender dysphoria. While hormone providers and surgeons play important roles in preventive care, every transsexual, transgender, and gender nonconforming person should partner with a primary care provider for overall health care needs (Feldman, 2007).

General Preventive Health Care

Screening guidelines developed for the general population are appropriate for organ systems that are unlikely to be affected by feminizing/masculinizing hormone therapy. However, in areas such

as cardiovascular risk factors, osteoporosis, and some cancers (breast, cervical, ovarian, uterine, and prostate), such general guidelines may either over- or underestimate the cost-effectiveness of screening individuals who are receiving hormone therapy.

Several resources provide detailed protocols for the primary care of patients undergoing feminizing/masculinizing hormone therapy, including therapy that is provided after sex reassignment surgeries (Center of Excellence for Transgender Health, UCSF, 2011; Feldman & Goldberg, 2006; Feldman, 2007; Gorton, Buth, & Spade, 2005). Clinicians should consult their national evidence-based guidelines and discuss screening with their patients in light of the effects of hormone therapy on their baseline risk.

Cancer Screening

Cancer screening of organ systems that are associated with sex can present particular medical and psychosocial challenges for transsexual, transgender, and gender nonconforming patients and their health care providers. In the absence of large-scale prospective studies, providers are unlikely to have enough evidence to determine the appropriate type and frequency of cancer screenings for this population. Over-screening results in higher health care costs, high false positive rates, and often unnecessary exposure to radiation and/or diagnostic interventions such as biopsies. Under-screening results in diagnostic delay for potentially treatable cancers. Patients may find cancer screening gender affirming (such as mammograms for MtF patients) or both physically and emotionally painful (such as Pap smears offer continuity of care for FtM patients).

Urogenital Care

Gynecologic care may be necessary for transsexual, transgender, and gender nonconforming people of both sexes. For FtM patients, such care is needed predominantly for individuals who have not had genital surgery. For MtF patients, such care is needed after genital surgery. While many surgeons counsel patients regarding postoperative urogenital care, primary care clinicians and gynecologists should also be familiar with the special genital concerns of this population.

All MtF patients should receive counseling regarding genital hygiene, sexuality, and prevention of sexually transmitted infections; those who have had genital surgery should also be counseled on the need for regular vaginal dilation or penetrative intercourse in order to maintain vaginal depth and width (van Trotsenburg, 2009). Due to the anatomy of the male pelvis, the axis and the dimensions

of the neovagina differ substantially from those of a biologic vagina. This anatomic difference can affect intercourse if not understood by MtF patients and their partners (van Trotsenburg, 2009).

Lower urinary tract infections occur frequently in MtF patients who have had surgery because of the reconstructive requirements of the shortened urethra. In addition, these patients may suffer from functional disorders of the lower urinary tract; such disorders may be caused by damage of the autonomous nerve supply of the bladder floor during dissection between the rectum and the bladder, and by a change of the position of the bladder itself. A dysfunctional bladder (e.g., overactive bladder, stress or urge urinary incontinence) may occur after sex reassignment surgery (Hoebeke et al., 2005; Kuhn, Hiltebrand, & Birkhauser, 2007).

Most FtM patients do not undergo vaginectomy (colpectomy). For patients who take masculinizing hormones, despite considerable conversion of testosterone to estrogens, atrophic changes of the vaginal lining can be observed regularly and may lead to pruritus or burning. Examination can be both physically and emotionally painful, but lack of treatment can seriously aggravate the situation. Gynecologists treating the genital complaints of FtM patients should be aware of the sensitivity that patients with a male gender identity and masculine gender expression might have around having genitals typically associated with the female sex.

XIV

Applicability of the Standards of Care to People Living in Institutional Environments

The *SOC* in their entirety apply to all transsexual, transgender, and gender nonconforming people, irrespective of their housing situation. People should not be discriminated against in their access to appropriate health care based on where they live, including institutional environments such as prisons or long-/intermediate-term health care facilities (Brown, 2009). Health care for transsexual, transgender, and gender nonconforming people living in an institutional environment should mirror that which would be available to them if they were living in a non-institutional setting within the same community.

All elements of assessment and treatment as described in the *SOC* can be provided to people living in institutions (Brown, 2009). Access to these medically necessary treatments should not be denied on the basis of institutionalization or housing arrangements. If the in-house expertise of health professionals in the direct or indirect employ of the institution does not exist to assess

and/or treat people with gender dysphoria, it is appropriate to obtain outside consultation from professionals who are knowledgeable about this specialized area of health care.

People with gender dysphoria in institutions may also have co-existing mental health conditions (Cole et al., 1997). These conditions should be evaluated and treated appropriately.

People who enter an institution on an appropriate regimen of hormone therapy should be continued on the same, or similar, therapies and monitored according to the *SOC*. A "freeze frame" approach is not considered appropriate care in most situations (Kosilek v. Massachusetts Department of Corrections/Maloney, C.A. No. 92-12820-MLW, 2002). People with gender dysphoria who are deemed appropriate for hormone therapy (following the *SOC*) should be started on such therapy. The consequences of abrupt withdrawal of hormones or lack of initiation of hormone therapy when medically necessary include a high likelihood of negative outcomes such as surgical self-treatment by autocastration, depressed mood, dysphoria, and/or suicidality (Brown, 2010).

Reasonable accommodations to the institutional environment can be made in the delivery of care consistent with the *SOC*, if such accommodations do not jeopardize the delivery of medically necessary care to people with gender dysphoria. An example of a reasonable accommodation is the use of injectable hormones, if not medically contraindicated, in an environment where diversion of oral preparations is highly likely (Brown, 2009). Denial of needed changes in gender role or access to treatments, including sex reassignment surgery, on the basis of residence in an institution are not reasonable accommodations under the *SOC* (Brown, 2010).

Housing and shower/bathroom facilities for transsexual, transgender, and gender nonconforming people living in institutions should take into account their gender identity and role, physical status, dignity, and personal safety. Placement in a single-sex housing unit, ward, or pod on the sole basis of the appearance of the external genitalia may not be appropriate and may place the individual at risk for victimization (Brown, 2009).

Institutions where transsexual, transgender, and gender nonconforming people reside and receive health care should monitor for a tolerant and positive climate to ensure that residents are not under attack by staff or other residents.

XV

Applicability of the Standards of Care to People With Disorders of Sex Development

Terminology

The term *disorder of sex development* (DSD) refers to a somatic condition of atypical development of the reproductive tract (Hughes, Houk, Ahmed, Lee, & LWPES1/ESPE2 Consensus Group, 2006). DSDs include the condition that used to be called *intersexuality*. Although the terminology was changed to *DSD* during an international consensus conference in 2005 (Hughes et al., 2006), disagreement about language use remains. Some people object strongly to the "disorder" label, preferring instead to view these congenital conditions as a matter of diversity (Diamond, 2009) and to continue using the terms *intersex* or *intersexuality*. In the *SOC*, WPATH uses the term *DSD* in an objective and value-free manner, with the goal of ensuring that health professionals recognize this medical term and use it to access relevant literature as the field progresses. WPATH remains open to new terminology that will further illuminate the experience of members of this diverse population and lead to improvements in health care access and delivery.

Rationale for Addition to the SOC

Previously, individuals with a DSD who also met the *DSM-IV-TR's* behavioral criteria for Gender Identity Disorder (American Psychiatric Association, 2000) were excluded from that general diagnosis. Instead, they were categorized as having a "Gender Identity Disorder - Not Otherwise Specified." They were also excluded from the WPATH *Standards of Care*.

The current proposal for *DSM-5* (www.dsm5.org) is to replace the term *gender identity disorder* with *gender dysphoria*. Moreover, the proposed changes to the *DSM* consider gender dysphoric people with a DSD to have a subtype of gender dysphoria. This proposed categorization – which explicitly differentiates between gender dysphoric individuals with and without a DSD – is justified: In people with a DSD, gender dysphoria differs in its phenomenological presentation, epidemiology, life trajectories, and etiology (Meyer-Bahlburg, 2009).

Adults with a DSD and gender dysphoria have increasingly come to the attention of health professionals. Accordingly, a brief discussion of their care is included in this version of the *SOC*.

Health History Considerations

Health professionals assisting patients with both a DSD and gender dysphoria need to be aware that the medical context in which such patients have grown up is typically very different from that of people without a DSD.

Some people are recognized as having a DSD through the observation of gender-atypical genitals at birth. (Increasingly this observation is made during the prenatal period by way of imaging procedures such as ultrasound.) These infants then undergo extensive medical diagnostic procedures. After consultation among the family and health professionals – during which the specific diagnosis, physical and hormonal findings, and feedback from long-term outcome studies (Cohen-Kettenis, 2005; Dessens, Slijper, & Drop, 2005; Jurgensen, Hiort, Holterhus, & Thyen, 2007; Mazur, 2005; Meyer-Bahlburg, 2005; Stikkelbroeck et al., 2003; Wisniewski, Migeon, Malouf, & Gearhart, 2004) are considered – the newborn is assigned a sex, either male or female.

Other individuals with a DSD come to the attention of health professionals around the age of puberty through the observation of atypical development of secondary sex characteristics. This observation also leads to a specific medical evaluation.

The type of DSD and severity of the condition has significant implications for decisions about a patient's initial sex assignment, subsequent genital surgery, and other medical and psychosocial care (Meyer-Bahlburg, 2009). For instance, the degree of prenatal androgen exposure in individuals with a DSD has been correlated with the degree of masculinization of gender-related *behavior* (that is, *gender role and expression*); however, the correlation is only moderate, and considerable behavioral variability remains unaccounted for by prenatal androgen exposure (Jurgensen et al., 2007; Meyer-Bahlburg, Dolezal, Baker, Ehrhardt, & New, 2006). Notably, a similar correlation of prenatal hormone exposure with gender *identity* has not been demonstrated (e.g., Meyer-Bahlburg et al., 2004). This is underlined by the fact that people with the same (core) gender identity can vary widely in the degree of masculinization of their gender-related behavior.

Assessment and Treatment of Gender Dysphoria in People with Disorders of Sex Development

Very rarely are individuals with a DSD identified as having gender dysphoria *before* a DSD diagnosis has been made. Even so, a DSD diagnosis is typically apparent with an appropriate history and basic physical exam – both of which are part of a medical evaluation for the appropriateness of hormone therapy or surgical interventions for gender dysphoria. Mental health professionals should ask their clients presenting with gender dysphoria to have a physical exam, particularly if they are not currently seeing a primary care (or other health care) provider.

Most people with a DSD who are born with genital ambiguity do not develop gender dysphoria (e.g., Meyer-Bahlburg et al., 2004; Wisniewski et al., 2004). However, some people with a DSD will develop chronic gender dysphoria and even undergo a change in their birth-assigned sex and/or their gender role (Meyer-Bahlburg, 2005; Wilson, 1999; Zucker, 1999). If there are persistent and strong indications that gender dysphoria is present, a comprehensive evaluation by clinicians skilled in the assessment and treatment of gender dysphoria is essential, irrespective of the patient's age. Detailed recommendations have been published for conducting such an assessment and for making treatment decisions to address gender dysphoria in the context of a DSD (Meyer-Bahlburg, in press). Only after thorough assessment should steps be taken in the direction of changing a patient's birth-assigned sex or gender role.

Clinicians assisting these patients with treatment options to alleviate gender dysphoria may profit from the insights gained from providing care to patients without a DSD (Cohen-Kettenis, 2010). However, certain criteria for treatment (e.g., age, duration of experience with living in the desired gender role) are usually not routinely applied to people with a DSD; rather, the criteria are interpreted in light of a patient's specific situation (Meyer-Bahlburg, in press). In the context of a DSD, changes in birth-assigned sex and gender role have been made at any age between early elementary-school age and middle adulthood. Even genital surgery may be performed much earlier in these patients than in gender dysphoric individuals without a DSD if the surgery is well justified by the diagnosis, by the evidence-based gender-identity prognosis for the given syndrome and syndrome severity, and by the patient's wishes.

One reason for these treatment differences is that genital surgery in individuals with a DSD is quite common in infancy and adolescence. Infertility may already be present due to either early gonadal failure or to gonadectomy because of a malignancy risk. Even so, it is advisable for patients with a DSD to undergo a full social transition to another gender role only if there is a long-standing history of gender-atypical behavior, and if gender dysphoria and/or the desire to change one's gender role has been strong and persistent for a considerable period of time. Six months is the time period of full symptom expression required for the application of the gender dysphoria diagnosis proposed for *DSM-5* (Meyer-Bahlburg, in press).

Additional Resources

The gender-relevant medical histories of people with a DSD are often complex. Their histories may include a great variety of inborn genetic, endocrine, and somatic atypicalities, as well as various hormonal, surgical, and other medical treatments. For this reason, many additional issues need to be considered in the psychosocial and medical care of such patients, regardless of the presence of gender dysphoria. Consideration of these issues is beyond what can be covered in the *SOC*. The interested reader is referred to existing publications (e.g., Cohen-Kettenis & Pfäfflin, 2003; Meyer-Bahlburg, 2002, 2008). Some families and patients also find it useful to consult or work with community support groups.

There is a very substantial medical literature on the medical management of patients with a DSD. Much of this literature has been produced by high-level specialists in pediatric endocrinology and urology, with input from specialized mental health professionals, especially in the area of gender. Recent international consensus conferences have addressed evidence-based care guidelines (including issues of gender and of genital surgery) for DSD in general (Hughes et al., 2006) and specifically for Congenital Adrenal Hyperplasia (Joint LWPES/ESPE CAH Working Group et al., 2002; Speiser et al., 2010). Others have addressed the research needs for DSD in general (Meyer-Bahlburg & Blizzard, 2004) and for selected syndromes such as 46,XXY (Simpson et al., 2003).

References

Abramowitz, S. I. (1986). Psychosocial outcomes of sex reassignment surgery. *Journal of Consulting and Clinical Psychology, 54*(2), 183-189. doi:10.1037/0022-006X.54.2.183

ACOG Committee of Gynecologic Practice. (2005). Committee opinion #322: Compounded bioidentical hormones. *Obstetrics & Gynecology, 106*(5), 139-140.

Adler, R. K., Hirsch, S., & Mordaunt, M. (2006). *Voice and communication therapy for the transgender/transsexual client: A comprehensive clinical guide*. San Diego, CA: Plural Pub.

American Academy of Family Physicians. (2005). *Definition of family medicine*. Retrieved August 10, 2009, from http://www.aafp.org/online/en/home/policy/policies/f/fammeddef.html

American Medical Association. (2008). *Resolution 122 (A-08)*. Retrieved from http://www.ama-assn.org/ama1/pub/upload/mm/471/122.doc

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders DSM-IV-TR* (4th ed., text rev.). Washington, DC: Author.

American Speech-Language-Hearing Association. (2011). *Scope of practice*. Retrieved from www.asha.org

Anton, B. S. (2009). Proceedings of the American Psychological Association for the legislative year 2008: Minutes of the annual meeting of the council of representatives, February 22-24, 2008, Washington, DC, and August 13 and 17, 2008, Boston, MA, and minutes of the February, June, August, and December 2008 meetings of the board of directors. *American Psychologist, 64*, 372-453. doi:10.1037/a0015932

Asscheman, H., Giltay, E. J., Megens, J. A. J., de Ronde, W., van Trotsenburg, M. A. A., & Gooren, L. J. G. (2011). A long-term follow-up study of mortality in transsexuals receiving treatment with cross-sex hormones. *European Journal of Endocrinology, 164*(4), 635-642. doi:10.1530/EJE-10-1038

Baba, T., Endo, T., Honnma, H., Kitajima, Y., Hayashi, T., Ikeda, H., . . . Saito, T. (2007). Association between polycystic ovary syndrome and female-to-male transsexuality. *Human Reproduction, 22*(4), 1011-1016. doi:10.1093/humrep/del474

Bakker, A., Van Kesteren, P. J., Gooren, L. J., & Bezemer, P. D. (1993). The prevalence of transsexualism in the Netherlands. *Acta Psychiatrica Scandinavica, 87*(4), 237-238. doi:10.1111/j.1600-0447.1993.tb03364.x

Balen, A. H., Schachter, M. E., Montgomery, D., Reid, R. W., & Jacobs, H. S. (1993). Polycystic ovaries are a common finding in untreated female to male transsexuals. *Clinical Endocrinology, 38*(3), 325-329. doi:10.1111/j.1365-2265.1993.tb01013.x

Basson, R. (2001). Towards optimal hormonal treatment of male to female gender identity disorder. *Journal of Sexual and Reproductive Medicine, 1*(1), 45-51.

Basson, R., & Prior, J. C. (1998). Hormonal therapy of gender dysphoria: The male-to-female transsexual. In D. Denny (Ed.), *Current concepts in transgender identity* (pp. 277-296). New York: Garland Publishing, Inc.

Benjamin, H. (1966). *The transsexual phenomenon*. New York: Julian Press.

Besnier, N. (1994). Polynesian gender liminality through time and space. In G. Herdt (Ed.), *Third sex, third gender: Beyond sexual dimorphism in culture and history* (pp. 285-328). New York: Zone Books.

Bockting, W. O. (1999). From construction to context: Gender through the eyes of the transgendered. *Siecus Report, 28*(1), 3-7.

Bockting, W. O. (2008). Psychotherapy and the real-life experience: From gender dichotomy to gender diversity. *Sexologies, 17*(4), 211-224. doi:10.1016/j.sexol.2008.08.001

Bockting, W. O., & Coleman, E. (2007). Developmental stages of the transgender coming out process: Toward an integrated identity. In R. Ettner, S. Monstrey & A. Eyler (Eds.), *Principles of transgender medicine and surgery* (pp. 185-208). New York: The Haworth Press.

Bockting, W. O., & Goldberg, J. M. (2006). Guidelines for transgender care (special issue). *International Journal of Transgenderism, 9*(3/4).

Bockting, W. O., Knudson, G., & Goldberg, J. M. (2006). Counseling and mental health care for transgender adults and loved ones. *International Journal of Transgenderism, 9*(3/4), 35-82. doi:10.1300/J485v09n03_03

Bolin, A. (1988). *In search of Eve* (pp. 189-192). New York: Bergin & Garvey.

Bolin, A. (1994). Transcending and transgendering: Male-to-female transsexuals, dichotomy and diversity. In G. Herdt (Ed.), *Third sex, third gender: Beyond sexual dimorphism in culture and history* (pp. 447-486). New York: Zone Books.

Bornstein, K. (1994). *Gender outlaw: On men, women, and the rest of us*. New York: Routledge.

Bosinski, H. A. G., Peter, M., Bonatz, G., Arndt, R., Heidenreich, M., Sippell, W. G., & Wille, R. (1997). A higher rate of hyperandrogenic disorders in female-to-male transsexuals. *Psychoneuroendocrinology, 22*(5), 361-380. doi:10.1016/S0306-4530(97)00033-4

Brill, S. A., & Pepper, R. (2008). *The transgender child: A handbook for families and professionals*. Berkeley, CA: Cleis Press.

Brown, G. R. (2009). Recommended revisions to The World Professional Association for Transgender Health's Standards of Care section on medical care for incarcerated persons with gender identity disorder. *International Journal of Transgenderism, 11*(2), 133-139. doi:10.1080/15532730903008073

Brown, G. R. (2010). Autocastration and autopenectomy as surgical self-treatment in incarcerated persons with gender identity disorder. *International Journal of Transgenderism, 12*(1), 31-39. doi:10.1080/15532731003688970

Bullough, V. L., & Bullough, B. (1993). *Cross dressing, sex, and gender*. Philadelphia, PA: University of Pennsylvania Press.

Callen Lorde Community Health Center. (2000). *Transgender health program protocols*. Retrieved from http://www.callen-lorde.org/documents/TG_Protocol_Request_Form2.pdf

Callen Lorde Community Health Center. (2011). *Transgender health program protocols.* Retrieved from http://www.callen-lorde.org/documents/TG_Protocol_Request_Form2.pdf

Canadian Association of Speech-Language Pathologists and Audiologists. http://www.caslpa.ca/

Carew, L., Dacakis, G., & Oates, J. (2007). The effectiveness of oral resonance therapy on the perception of femininity of voice in male-to-female transsexuals. *Journal of Voice, 21*(5), 591-603. doi:10.1016/j.jvoice.2006.05.005

Carnegie, C. (2004). Diagnosis of hypogonadism: Clinical assessments and laboratory tests. *Reviews in Urology, 6*(Suppl 6), S3-8.

Cattrall, F. R., & Healy, D. L. (2004). Long-term metabolic, cardiovascular and neoplastic risks with polycystic ovary syndrome. *Best Practice & Research Clinical Obstetrics & Gynaecology, 18*(5), 803-812. doi:10.1016/j.bpobgyn.2004.05.005

Center of Excellence for Transgender Health, UCSF. (2011). *Primary care protocol for transgender health care.* Retrieved from http://transhealth.ucsf.edu/trans?page=protocol-00-00

Chiñas, B. (1995). Isthmus Zapotec attitudes toward sex and gender anomalies. In S. O. Murray (Ed.), *Latin American male homosexualities* (pp. 293-302). Albuquerque, NM: University of New Mexico Press.

Clements, K., Wilkinson, W., Kitano, K., & Marx, R. (1999). HIV prevention and health service needs of the transgender community in San Francisco. *International Journal of Transgenderism, 3*(1), 2-17.

Cohen-Kettenis, P. T. (2001). Gender identity disorder in DSM? *Journal of the American Academy of Child & Adolescent Psychiatry, 40*(4), 391-391. doi:10.1097/00004583-200104000-00006

Cohen-Kettenis, P. T. (2005). Gender change in 46,XY persons with 5□-reductase-2 deficiency and 17□-hydroxysteroid dehydrogenase-3 deficiency. *Archives of Sexual Behavior, 34*(4), 399-410. doi:10.1007/s10508-005-4339-4

Cohen-Kettenis, P. T. (2006). Gender identity disorders. In C. Gillberg, R. Harrington & H. C. Steinhausen (Eds.), *A clinician's handbook of child and adolescent psychiatry* (pp. 695-725). New York: Cambridge University Press.

Cohen-Kettenis, P. T. (2010). Psychosocial and psychosexual aspects of disorders of sex development. *Best Practice & Research Clinical Endocrinology & Metabolism, 24*(2), 325-334. doi:10.1016/j.beem.2009.11.005

Cohen-Kettenis, P. T., & Kuiper, A. J. (1984). Transseksualiteit en psychothérapie. *Tijdschrift Voor Psychotherapie, 10*, 153-166.

Cohen-Kettenis, P. T., Owen, A., Kaijser, V. G., Bradley, S. J., & Zucker, K. J. (2003). Demographic characteristics, social competence, and behavior problems in children with gender identity disorder: A cross-national, cross-clinic comparative analysis. *Journal of Abnormal Child Psychology, 31*(1), 41-53. doi:10.1023/A:1021769215342

Cohen-Kettenis, P. T., & Pfäfflin, F. (2003). *Transgenderism and intersexuality in childhood and adolescence: Making choices.* Thousand Oaks, CA: Sage Publications, Inc.

Cohen-Kettenis, P. T., & Pfäfflin, F. (2010). The DSM diagnostic criteria for gender identity disorder in adolescents and adults. *Archives of Sexual Behavior, 39*(2), 499-513. doi:10.1007/s10508-009-9562-y

Cohen-Kettenis, P. T., Schagen, S. E. E., Steensma, T. D., de Vries, A. L. C., & Delemarre-van de Waal, H. A. (2011). Puberty suppression in a gender-dysphoric adolescent: A 22-year follow-up. *Archives of Sexual Behavior, 40*(4), 843-847. doi:0.1007/s10508-011-9758-9

Cohen-Kettenis, P. T., Wallien, M., Johnson, L. L., Owen-Anderson, A. F. H., Bradley, S. J., & Zucker, K. J. (2006). A parent-report gender identity questionnaire for children: A cross-national, cross-clinic comparative analysis. *Clinical Child Psychology and Psychiatry, 11*(3), 397-405. doi:10.1177/1359104506059135

Cole, C. M., O'Boyle, M., Emory, L. E., & Meyer III, W. J. (1997). Comorbidity of gender dysphoria and other major psychiatric diagnoses. *Archives of Sexual Behavior, 26*(1), 13-26.

Coleman, E., Colgan, P., & Gooren, L. (1992). Male cross-gender behavior in Myanmar (Burma): A description of the acault. *Archives of Sexual Behavior, 21*(3), 313-321.

Costa, L. M., & Matzner, A. (2007). *Male bodies, women's souls: Personal narratives of Thailand's transgendered youth.* Binghamton, NY: Haworth Press.

Currah, P., Juang, R. M., & Minter, S. (2006). *Transgender rights.* Minneapolis, MN: University of Minnesota Press.

Currah, P., & Minter, S. (2000). Unprincipled exclusions: The struggle to achieve judicial and legislative equality for transgender people. *William and Mary Journal of Women and Law, 7*, 37-60.

Dacakis, G. (2000). Long-term maintenance of fundamental frequency increases in male-to-female transsexuals. *Journal of Voice, 14*(4), 549-556. doi:10.1016/S0892-1997(00)80010-7

Dahl, M., Feldman, J. L., Goldberg, J. M., & Jaberi, A. (2006). Physical aspects of transgender endocrine therapy. *International Journal of Transgenderism, 9*(3), 111-134. doi:10.1300/J485v09n03_06

Darney, P. D. (2008). Hormonal contraception. In H. M. Kronenberg, S. Melmer, K. S. Polonsky & P. R. Larsen (Eds.), *Williams textbook of endocrinology* (11th ed., pp. 615-644). Philadelphia: Saunders.

Davies, S., & Goldberg, J. M. (2006). Clinical aspects of transgender speech feminization and masculinization. *International Journal of Transgenderism, 9*(3-4), 167-196. doi:10.1300/J485v09n03_08

de Bruin, M. D., Coerts, M. J., & Greven, A. J. (2000). Speech therapy in the management of male-to-female transsexuals. *Folia Phoniatrica Et Logopaedica, 52*(5), 220-227.

De Cuypere, G., T'Sjoen, G., Beerten, R., Selvaggi, G., De Sutter, P., Hoebeke, P., . . . Rubens, R. (2005). Sexual and physical health after sex reassignment surgery. *Archives of Sexual Behavior, 34*(6), 679-690. doi:10.1007/s10508-005-7926-5

De Cuypere, G., Van Hemelrijck, M., Michel, A., Carael, B., Heylens, G., Rubens, R., . . . Monstrey, S. (2007). Prevalence and demography of transsexualism in Belgium. *European Psychiatry, 22*(3), 137-141. doi:10.1016/j.eurpsy.2006.10.002

De Cuypere, G., & Vercruysse, H. (2009). Eligibility and readiness criteria for sex reassignment surgery: Recommendations for revision of the WPATH standards of care. *International Journal of Transgenderism, 11*(3), 194-205. doi:10.1080/15532730903383781

de Lignières, B. (1999). Oral micronized progesterone. *Clinical Therapeutics, 21*(1), 41-60. doi:10.1016/S0149-2918(00)88267-3

De Sutter, P. (2009). Reproductive options for transpeople: Recommendations for revision of the WPATH's standards of care. *International Journal of Transgenderism, 11*(3), 183-185. doi:10.1080/15532730903383765

De Sutter, P., Kira, K., Verschoor, A., & Hotimsky, A. (2002). The desire to have children and the preservation of fertility in transsexual women: A survey. *International Journal of Transgenderism, 6*(3), retrieved from http://www.wpath.org/journal/www.iiav.nl/ezines/web/IJT/97-03/numbers/symposion/ijtvo06no03_02.htm

de Vries, A. L. C., Cohen-Kettenis, P. T., & Delemarre-van de Waal, H. A. (2006). Clinical management of gender dysphoria in adolescents. *International Journal of Transgenderism, 9*(3-4), 83-94. doi:10.1300/J485v09n03_04

de Vries, A. L. C., Doreleijers, T. A. H., Steensma, T. D., & Cohen-Kettenis, P. T. (2011). Psychiatric comorbidity in gender dysphoric adolescents. *Journal of Child Psychology and Psychiatry.* Advance online publication. doi:10.1111/j.1469-7610.2011.02426.x

de Vries, A. L. C., Noens, I. L. J., Cohen-Kettenis, P. T., van Berckelaer-Onnes, I. A., & Doreleijers, T. A. (2010). Autism spectrum disorders in gender dysphoric children and adolescents. *Journal of Autism and Developmental Disorders, 40*(8), 930-936. doi:10.1007/s10803-010-0935-9

de Vries, A. L. C., Steensma, T. D., Doreleijers, T. A. H., & Cohen-Kettenis, P. T. (2010). Puberty suppression in adolescents with gender identity disorder: A prospective follow-up study. *The Journal of Sexual Medicine*. Advance online publication. doi:10.1111/j.1743-6109.2010.01943.x

Delemarre-van de Waal, H. A., & Cohen-Kettenis, P. T. (2006). Clinical management of gender identity disorder in adolescents: A protocol on psychological and paediatric endocrinology aspects. *European Journal of Endocrinology, 155*(suppl 1), S131-S137. doi:10.1530/eje.1.02231

Delemarre-van de Waal, H. A., van Weissenbruch, M. M., & Cohen Kettenis, P. T. (2004). Management of puberty in transsexual boys and girls. *Hormone Research in Paediatrics, 62*(suppl 2), 75-75. doi:10.1159/000081145

Derrig-Palumbo, K., & Zeine, F. (2005). *Online therapy: A therapist's guide to expanding your practice*. New York: W.W. Norton & Co.

Dessens, A. B., Slijper, F. M. E., & Drop, S. L. S. (2005). Gender dysphoria and gender change in chromosomal females with congenital adrenal hyperplasia. *Archives of Sexual Behavior, 34*(4), 389-397. doi:10.1007/s10508-005-4338-5

Devor, A. H. (2004). Witnessing and mirroring: A fourteen stage model. *Journal of Gay and Lesbian Psychotherapy, 8*(1/2), 41-67.

Di Ceglie, D., & Thümmel, E. C. (2006). An experience of group work with parents of children and adolescents with gender identity disorder. *Clinical Child Psychology and Psychiatry, 11*(3), 387-396. doi:10.1177/1359104506064983

Diamond, M. (2009). Human intersexuality: Difference or disorder? *Archives of Sexual Behavior, 38*(2), 172-172. doi:10.1007/s10508-008-9438-6

Dobs, A. S., Meikle, A. W., Arver, S., Sanders, S. W., Caramelli, K. E., & Mazer, N. A. (1999). Pharmacokinetics, efficacy, and safety of a permeation-enhanced testosterone transdermal system in comparison with bi-weekly injections of testosterone enanthate for the treatment of hypogonadal men. *Journal of Clinical Endocrinology & Metabolism, 84*(10), 3469-3478. doi:10.1210/jc.84.10.3469

Docter, R. F. (1988). *Transvestites and transsexuals: Toward a theory of cross-gender behavior*. New York: Plenum Press.

Drummond, K. D., Bradley, S. J., Peterson-Badali, M., & Zucker, K. J. (2008). A follow-up study of girls with gender identity disorder. *Developmental Psychology, 44*(1), 34-45. doi:10.1037/0012-1649.44.1.34

Ehrbar, R. D., & Gorton, R. N. (2010). Exploring provider treatment models in interpreting the standards of care. *International Journal of Transgenderism, 12*(4), 198-2010. doi:10.1080/15532739.2010.544235

Ekins, R., & King, D. (2006). *The transgender phenomenon*. Thousand Oaks, CA: SAGE Publications Ltd.

Eklund, P. L., Gooren, L. J., & Bezemer, P. D. (1988). Prevalence of transsexualism in the Netherlands. *British Journal of Psychiatry, 152*(5), 638-640.

Eldh, J., Berg, A., & Gustafsson, M. (1997). Long-term follow up after sex reassignment surgery. *Scandinavian Journal of Plastic and Reconstructive Surgery and Hand Surgery, 31*(1), 39-45.

Emerson, S., & Rosenfeld, C. (1996). Stages of adjustment in family members of transgender individuals. *Journal of Family Psychotherapy, 7*(3), 1-12. doi:10.1300/J085V07N03_01

Emory, L. E., Cole, C. M., Avery, E., Meyer, O., & Meyer III, W. J. (2003). Client's view of gender identity: Life, treatment status and outcome. *18th Biennial Harry Benjamin Symposium*, Gent, Belgium.

Ettner, R., Monstrey, S., & Eyler, A. (Eds.) (2007). *Principles of transgender medicine and surgery*. Binghamton, NY: The Haworth Press.

Eyler, A. E. (2007). Primary medical care of the gender-variant patient. In R. Ettner, S. Monstrey & E. Eyler (Eds.), *Principles of transgender medicine and surgery* (pp. 15-32). Binghamton, NY: The Haworth Press.

Factor, R. J., & Rothblum, E. (2008). Exploring gender identity and community among three groups of transgender individuals in the United States: MTFs, FTMs, and genderqueers. *Health Sociology Review, 17*(3), 235-253.

Feinberg, L. (1996). *Transgender warriors: Making history from Joan of Arc to Dennis Rodman*. Boston, MA: Beacon Press.

Feldman, J. (2005, April). *Masculinizing hormone therapy with testosterone 1% topical gel*. Paper presented at the 19th Biennial Symposium of the Harry Benjamin International Gender Dysphoria Association, Bologna, Italy.

Feldman, J. (2007). Preventive care of the transgendered patient. In R. Ettner, S. Monstrey & E. Eyler (Eds.), *Principles of transgender surgery and medicine* (pp. 33-72). Binghamton, NY: The Haworth Press.

Feldman, J., & Goldberg, J. (2006). Transgender primary medical care. *International Journal of Transgenderism, 9*(3), 3-34. doi:10.1300/J485v09n03_02

Feldman, J., & Safer, J. (2009). Hormone therapy in adults: Suggested revisions to the sixth version of the standards of care. *International Journal of Transgenderism, 11*(3), 146-182. doi:10.1080/15532730903383757

Fenichel, M., Suler, J., Barak, A., Zelvin, E., Jones, G., Munro, K., . . . Walker-Schmucker, W. (2004). *Myths and realities of online clinical work, observations on the phenomena of online behavior, experience, and therapeutic relationships. A 3rd-year report from ISMHO's clinical case study group.* Retrieved May 24, 2011, from https://www.ismho.org/myths_n_realities.asp

Fenway Community Health Transgender Health Program. (2007). *Protocol for hormone therapy.* Retrieved from http://www.fenwayhealth.org/site/DocServer/Fenway_Protocols.pdf?docID=2181

Fisk, N. M. (1974). Editorial: Gender dysphoria syndrome--the conceptualization that liberalizes indications for total gender reorientation and implies a broadly based multi-dimensional rehabilitative regimen. *Western Journal of Medicine, 120*(5), 386-391.

Fitzpatrick, L. A., Pace, C., & Wiita, B. (2000). Comparison of regimens containing oral micronized progesterone or medroxyprogesterone acetate on quality of life in postmenopausal women: A cross-sectional survey. *Journal of Women's Health & Gender-Based Medicine, 9*(4), 381-387.

Frank, J. D., & Frank, J. B. (1993). *Persuasion and healing: A comparative study of psychotherapy* (Third ed.). Baltimore, MD: Johns Hopkins University Press.

Fraser, L. (2009a). Depth psychotherapy with transgender people. *Sexual and Relationship Therapy, 24*(2), 126-142. doi:10.1080/14681990903003878

Fraser, L. (2009b). Etherapy: Ethical and clinical considerations for version 7 of The World Professional Association for Transgender Health's standards of care. *International Journal of Transgenderism, 11*(4), 247-263. doi:10.1080/15532730903439492

Fraser, L. (2009c). Psychotherapy in The World Professional Association for Transgender Health's standards of care: Background and recommendations. *International Journal of Transgenderism, 11*(2), 110-126. doi:10.1080/15532730903008057

Garaffa, G., Christopher, N. A., & Ralph, D. J. (2010). Total phallic reconstruction in female-to-male transsexuals. *European Urology, 57*(4), 715-722. doi:10.1016/j.eururo.2009.05.018

Gelder, M. G., & Marks, I. M. (1969). Aversion treatment in transvestism and transsexualism. In R. Green, & J. Money (Eds.), *Transsexualism and sex reassignment* (pp. 383-413). Baltimore, MD: Johns Hopkins Press.

Gelfer, M. P. (1999). Voice treatment for the male-to-female transgendered client. *American Journal of Speech-Language Pathology, 8*(3), 201-208.

Gharib, S., Bigby, J., Chapin, M., Ginsburg, E., Johnson, P., Manson, J., & Solomon, C. (2005). *Menopause: A guide to management.* Boston, MA: Brigham and Women's Hospital.

Gijs, L., & Brewaeys, A. (2007). Surgical treatment of gender dysphoria in adults and adolescents: Recent developments, effectiveness, and challenges. *Annual Review of Sex Research, 18*, 178-224.

Gold, M., & MacNish, M. (2011). *Adjustment and resiliency following disclosure of transgender identity in families of adolescents and young adults: Themes and clinical implications*. Washington, DC: American Family Therapy Academy.

Gómez-Gil, E., Trilla, A., Salamero, M., Godás, T., & Valdés, M. (2009). Sociodemographic, clinical, and psychiatric characteristics of transsexuals from Spain. *Archives of Sexual Behavior, 38*(3), 378-392. doi:10.1007/s10508-007-9307-8

Gooren, L. (2005). Hormone treatment of the adult transsexual patient. *Hormone Research in Paediatrics, 64*(Suppl 2), 31-36. doi:10.1159/000087751

Gorton, R. N., Buth, J., & Spade, D. (2005). *Medical therapy and health maintenance for transgender men: A guide for health care providers*. San Francisco, CA: Lyon-Martin Women's Health Services.

Green, R. (1987). *The "sissy boy syndrome" and the development of homosexuality*. New Haven, CT: Yale University Press.

Green, R., & Fleming, D. (1990). Transsexual surgery follow-up: Status in the 1990s. *Annual Review of Sex Research, 1*(1), 163-174.

Greenson, R. R. (1964). On homosexuality and gender identity. *International Journal of Psycho-Analysis, 45*, 217-219.

Grossman, A. H., D'Augelli, A. R., Howell, T. J., & Hubbard, S. (2006). Parent's reactions to transgender youth's gender nonconforming expression and identity. *Journal of Gay & Lesbian Social Services, 18*(1), 3-16. doi:10.1300/J041v18n01_02

Grossman, A. H., D'Augelli, A. R., & Salter, N. P. (2006). Male-to-female transgender youth: Gender expression milestones, gender atypicality, victimization, and parents' responses. *Journal of GLBT Family Studies, 2*(1), 71-92.

Grumbach, M. M., Hughes, I. A., & Conte, F. A. (2003). Disorders of sex differentiation. In P. R. Larsen, H. M. Kronenberg, S. Melmed & K. S. Polonsky (Eds.), *Williams textbook of endocrinology* (10th ed., pp. 842-1002). Philadelphia, PA: Saunders.

Hage, J. J., & De Graaf, F. H. (1993). Addressing the ideal requirements by free flap phalloplasty: Some reflections on refinements of technique. *Microsurgery, 14*(9), 592-598. doi:10.1002/micr.1920140910

Hage, J. J., & Karim, R. B. (2000). Ought GIDNOS get nought? Treatment options for nontranssexual gender dysphoria. *Plastic and Reconstructive Surgery, 105*(3), 1222-1227.

Hancock, A. B., Krissinger, J., & Owen, K. (2010). Voice perceptions and quality of life of transgender people. *Journal of Voice*. Advance online publication. doi:10.1016/j.jvoice.2010.07.013

Hastings, D. W. (1974). Postsurgical adjustment of male transsexual patients. *Clinics in Plastic Surgery, 1*(2), 335-344.

Hembree, W. C., Cohen-Kettenis, P., Delemarre-van de Waal, H. A., Gooren, L. J., Meyer III, W. J., Spack, N. P., . . . Montori, V. M. (2009). Endocrine treatment of transsexual persons: An Endocrine Society clinical practice guideline. *Journal of Clinical Endocrinology & Metabolism, 94*(9), 3132-3154. doi:10.1210/jc.2009-0345

Hill, D. B., Menvielle, E., Sica, K. M., & Johnson, A. (2010). An affirmative intervention for families with gender-variant children: Parental ratings of child mental health and gender. *Journal of Sex and Marital Therapy, 36*(1), 6-23. doi:10.1080/00926230903375560

Hoebeke, P., Selvaggi, G., Ceulemans, P., De Cuypere, G. D., T'Sjoen, G., Weyers, S., . . . Monstrey, S. (2005). Impact of sex reassignment surgery on lower urinary tract function. *European Urology, 47*(3), 398-402. doi:10.1016/j.eururo.2004.10.008

Hoenig, J., & Kenna, J. C. (1974). The prevalence of transsexualism in England and Wales. *British Journal of Psychiatry, 124*(579), 181-190. doi:10.1192/bjp.124.2.181

Hughes, I. A., Houk, C. P., Ahmed, S. F., Lee, P. A., & LWPES1/ESPE2 Consensus Group. (2006). Consensus statement on management of intersex disorders. *Archives of Disease in Childhood, 91*(7), 554-563. doi:10.1136/adc.2006.098319

Hunter, M. H., & Sterrett, J. J. (2000). Polycystic ovary syndrome: It's not just infertility. *American Family Physician, 62*(5), 1079-1095.

Institute of Medicine. (2011). *The health of lesbian, gay, bisexual, and transgender people: Building a foundation for better understanding*. Washington, DC: The National Academies Press.

Jackson, P. A., & Sullivan, G. (Eds.). (1999). *Lady boys, tom boys, rent boys: Male and female homosexualities in contemporary Thailand*. Binghamton, NY: The Haworth Press.

Jockenhövel, F. (2004). Testosterone therapy-what, when and to whom? *The Aging Male, 7*(4), 319-324. doi:10.1080/13685530400016557

Johansson, A., Sundbom, E., Höjerback, T., & Bodlund, O. (2010). A five-year follow-up study of Swedish adults with gender identity disorder. *Archives of Sexual Behavior, 39*(6), 1429-1437. doi:10.1007/s10508-009-9551-1

Joint LWPES/ESPE CAH Working Group, Clayton, P. E., Miller, W. L., Oberfield, S. E., Ritzen, E. M., Sippell, W. G., & Speiser, P. W. (2002). Consensus statement on 21-hydroxylase deficiency from the Lawson Wilkins Pediatric Endocrine Society and the European Society for Pediatric Endocrinology. *Journal of Clinical Endocrinology & Metabolism, 87*(9), 4048-4053. doi:10.1210/jc.2002-020611

Jurgensen, M., Hiort, O., Holterhus, P. M., & Thyen, U. (2007). Gender role behavior in children with XY karyotype and disorders of sex development. *Hormones and Behavior, 51*(3), 443-453. doi:0.1016/j.yhbeh.2007.01.001

Kanagalingam, J., Georgalas, C., Wood, G. R., Ahluwalia, S., Sandhu, G., & Cheesman, A. D. (2005). Cricothyroid approximation and subluxation in 21 male-to-female transsexuals. *The Laryngoscope, 115*(4), 611-618. doi:10.1097/01.mlg.0000161357.12826.33

Kanhai, R. C. J., Hage, J. J., Karim, R. B., & Mulder, J. W. (1999). Exceptional presenting conditions and outcome of augmentation mammaplasty in male-to-female transsexuals. *Annals of Plastic Surgery, 43*(5), 476-483.

Kimberly, S. (1997). I am transsexual - hear me roar. *Minnesota Law & Politics, June*, 21-49.

Klein, C., & Gorzalka, B. B. (2009). Sexual functioning in transsexuals following hormone therapy and genital surgery: A review (CME). *The Journal of Sexual Medicine, 6*(11), 2922-2939. doi:10.1111/j.1743-6109.2009.01370.x

Knudson, G., De Cuypere, G., & Bockting, W. (2010a). Process toward consensus on recommendations for revision of the DSM diagnoses of gender identity disorders by The World Professional Association for Transgender Health. *International Journal of Transgenderism, 12*(2), 54-59. doi:10.1080/15532739.2010.509213

Knudson, G., De Cuypere, G., & Bockting, W. (2010b). Recommendations for revision of the DSM diagnoses of gender identity disorders: Consensus statement of The World Professional Association for Transgender Health. *International Journal of Transgenderism, 12*(2), 115-118. doi:10.1080/15532739.2010.509215

Kosilek v. Massachusetts Department of Corrections/Maloney, C.A. No. 92-12820-MLW (U.S. Federal District Court, Boston, MA, 2002).

Krege, S., Bex, A., Lümmen, G., & Rübben, H. (2001). Male-to-female transsexualism: A technique, results and long-term follow-up in 66 patients. *British Journal of Urology, 88*(4), 396-402. doi:10.1046/j.1464-410X.2001.02323.x

Kuhn, A., Bodmer, C., Stadlmayr, W., Kuhn, P., Mueller, M. D., & Birkhäuser, M. (2009). Quality of life 15 years after sex reassignment surgery for transsexualism. *Fertility and Sterility, 92*(5), 1685-1689. doi:10.1016/j.fertnstert.2008.08.126

Kuhn, A., Hiltebrand, R., & Birkhauser, M. (2007). Do transsexuals have micturition disorders? *European Journal of Obstetrics & Gynecology and Reproductive Biology, 131*(2), 226-230. doi:10.1016/j.ejogrb.2006.03.019

Landén, M., Wålinder, J., & Lundström, B. (1998). Clinical characteristics of a total cohort of female and male applicants for sex reassignment: A descriptive study. *Acta Psychiatrica Scandinavica, 97*(3), 189-194. doi:10.1111/j.1600-0447.1998.tb09986.x

Lawrence, A. A. (2003). Factors associated with satisfaction or regret following male-to-female sex reassignment surgery. *Archives of Sexual Behavior, 32*(4), 299-315. doi:10.1023/A:1024086814364

Lawrence, A. A. (2006). Patient-reported complications and functional outcomes of male-to-female sex reassignment surgery. *Archives of Sexual Behavior, 35*(6), 717-727. doi:10.1007/s10508-006-9104-9

Lev, A. I. (2004). *Transgender emergence: Therapeutic guidelines for working with gender-variant people and their families.* Binghamton, NY: Haworth Clinical Practice Press.

Lev, A. I. (2009). The ten tasks of the mental health provider: Recommendations for revision of The World Professional Association for Transgender Health's standards of care. *International Journal of Transgenderism, 11*(2), 74-99. doi:10.1080/15532730903008032

Levy, A., Crown, A., & Reid, R. (2003). Endocrine intervention for transsexuals. *Clinical Endocrinology, 59*(4), 409-418. doi:10.1046/j.1365-2265.2003.01821.x

MacLaughlin, D. T., & Donahoe, P. K. (2004). Sex determination and differentiation. *New England Journal of Medicine, 350*(4), 367-378.

Maheu, M. M., Pulier, M. L., Wilhelm, F. H., McMenamin, J. P., & Brown-Connolly, N. E. (2005). *The mental health professional and the new technologies: A handbook for practice today.* Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Malpas, J. (in press). Between pink and blue: A multi-dimensional family approach to gender nonconforming chldren and their families. *Family Process.*

Mazur, T. (2005). Gender dysphoria and gender change in androgen insensitivity or micropenis. *Archives of Sexual Behavior, 34*(4), 411-421. doi:10.1007/s10508-005-4341-x

McNeill, E. J. M. (2006). Management of the transgender voice. *The Journal of Laryngology & Otology, 120*(07), 521-523. doi:10.1017/S0022215106001174

McNeill, E. J. M., Wilson, J. A., Clark, S., & Deakin, J. (2008). Perception of voice in the transgender client. *Journal of Voice, 22*(6), 727-733. doi:10.1016/j.jvoice.2006.12.010

Menvielle, E. J., & Tuerk, C. (2002). A support group for parents of gender-nonconforming boys. *Journal of the American Academy of Child & Adolescent Psychiatry, 41*(8), 1010-1013. doi:10.1097/00004583-200208000-00021

Meyer, I. H. (2003). Prejudice as stress: Conceptual and measurement problems. *American Journal of Public Health, 93*(2), 262-265.

Meyer, J. K., & Reter, D. J. (1979). Sex reassignment: Follow-up. *Archives of General Psychiatry, 36*(9), 1010-1015.

Meyer III, W. J. (2009). World Professional Association for Transgender Health's standards of care requirements of hormone therapy for adults with gender identity disorder. *International Journal of Transgenderism, 11*(2), 127-132. doi:10.1080/15532730903008065

Meyer III, W. J., Webb, A., Stuart, C. A., Finkelstein, J. W., Lawrence, B., & Walker, P. A. (1986). Physical and hormonal evaluation of transsexual patients: A longitudinal study. *Archives of Sexual Behavior, 15*(2), 121-138. doi:10.1007/BF01542220

Meyer-Bahlburg, H. F. L. (2002). Gender assignment and reassignment in intersexuality: Controversies, data, and guidelines for research. *Advances in Experimental Medicine and Biology, 511*, 199-223. doi:10.1007/978-1-4615-0621-8_12

Meyer-Bahlburg, H. F. L. (2005). Gender identity outcome in female-raised 46,XY persons with penile agenesis, cloacal exstrophy of the bladder, or penile ablation. *Archives of Sexual Behavior, 34*(4), 423-438. doi:10.1007/s10508-005-4342-9

Meyer-Bahlburg, H. F. L. (2008). Treatment guidelines for children with disorders of sex development. *Neuropsychiatrie De l'Enfance Et De l'Adolescence, 56*(6), 345-349. doi:10.1016/j.neurenf.2008.06.002

Meyer-Bahlburg, H. F. L. (2009). Variants of gender differentiation in somatic disorders of sex development. *International Journal of Transgenderism, 11*(4), 226-237. doi:10.1080/15532730903439476

Meyer-Bahlburg, H. F. L. (2010). From mental disorder to iatrogenic hypogonadism: Dilemmas in conceptualizing gender identity variants as psychiatric conditions. *Archives of Sexual Behavior, 39*(2), 461-476. doi:10.1007/s10508-009-9532-4

Meyer-Bahlburg, H. F. L. (in press). Gender monitoring and gender reassignment of children and adolescents with a somatic disorder of sex development. *Child & Adolescent Psychiatric Clinics of North America.*

Meyer-Bahlburg, H. F. L., & Blizzard, R. M. (2004). Conference proceedings: Research on intersex: Summary of a planning workshop. *The Endocrinologist, 14*(2), 59-69. doi:10.1097/01.ten.0000123701.61007.4e

Meyer-Bahlburg, H. F. L., Dolezal, C., Baker, S. W., Carlson, A. D., Obeid, J. S., & New, M. I. (2004). Prenatal androgenization affects gender-related behavior but not gender identity in 5–12-year-old girls with congenital adrenal hyperplasia. *Archives of Sexual Behavior, 33*(2), 97-104. doi:10.1023/B:ASEB.0000014324.25718.51

Meyer-Bahlburg, H. F. L., Dolezal, C., Baker, S. W., Ehrhardt, A. A., & New, M. I. (2006). Gender development in women with congenital adrenal hyperplasia as a function of disorder severity. *Archives of Sexual Behavior, 35*(6), 667-684. doi:10.1007/s10508-006-9068-9

Meyer-Bahlburg, H. F. L., Migeon, C. J., Berkovitz, G. D., Gearhart, J. P., Dolezal, C., & Wisniewski, A. B. (2004). Attitudes of adult 46,XY intersex persons to clinical management policies. *The Journal of Urology, 171*(4), 1615-1619. doi:10.1097/01.ju.0000117761.94734.b7

Money, J., & Ehrhardt, A. A. (1972). *Man and woman, boy and girl.* Baltimore, MD: The Johns Hopkins University Press.

Money, J., & Russo, A. J. (1979). Homosexual outcome of discordant gender identity/role in childhood: Longitudinal follow-up. *Journal of Pediatric Psychology, 4*(1), 29-41. doi:10.1093/jpepsy/4.1.29

Monstrey, S., Hoebeke, P., Selvaggi, G., Ceulemans, P., Van Landuyt, K., Blondeel, P., . . . De Cuypere, G. (2009). Penile reconstruction: Is the radial forearm flap really the standard technique? *Plastic and Reconstructive Surgery, 124*(2), 510-518.

Monstrey, S., Selvaggi, G., Ceulemans, P., Van Landuyt, K., Bowman, C., Blondeel, P., . . . De Cuypere, G. (2008). Chest-wall contouring surgery in female-to-male transsexuals: A new algorithm. *Plastic and Reconstructive Surgery, 121*(3), 849-859. doi:10.1097/01.prs.0000299921.15447.b2

Moore, E., Wisniewski, A., & Dobs, A. (2003). Endocrine treatment of transsexual people: A review of treatment regimens, outcomes, and adverse effects. *Journal of Clinical Endocrinology & Metabolism, 88*(8), 3467-3473. doi:10.1210/jc.2002-021967

More, S. D. (1998). The pregnant man-an oxymoron? *Journal of Gender Studies, 7*(3), 319-328. doi:10.1080/09589236.1998.9960725

Mount, K. H., & Salmon, S. J. (1988). Changing the vocal characteristics of a postoperative transsexual patient: A longitudinal study. *Journal of Communication Disorders, 21*(3), 229-238. doi:10.1016/0021-9924(88)90031-7

Mueller, A., Kiesewetter, F., Binder, H., Beckmann, M. W., & Dittrich, R. (2007). Long-term administration of testosterone undecanoate every 3 months for testosterone supplementation in female-to-male transsexuals. *Journal of Clinical Endocrinology & Metabolism, 92*(9), 3470-3475. doi:10.1210/jc.2007-0746

Murad, M. H., Elamin, M. B., Garcia, M. Z., Mullan, R. J., Murad, A., Erwin, P. J., & Montori, V. M. (2010). Hormonal therapy and sex reassignment: A systematic review and meta-analysis of quality of life and psychosocial outcomes. *Clinical Endocrinology, 72*(2), 214-231. doi:10.1111/j.1365-2265.2009.03625.x

Nanda, S. (1998). *Neither man nor woman: The hijras of India*. Belmont, CA: Wadsworth Publishing.

Nestle, J., Wilchins, R. A., & Howell, C. (2002). *Genderqueer: Voices from beyond the sexual binary*. Los Angeles, CA: Alyson Publications.

Neumann, K., & Welzel, C. (2004). The importance of voice in male-to-female transsexualism. *Journal of Voice, 18*(1), 153-167.

Newfield, E., Hart, S., Dibble, S., & Kohler, L. (2006). Female-to-male transgender quality of life. *Quality of Life Research, 15*(9), 1447-1457. doi:10.1007/s11136-006-0002-3

Nieschlag, E., Behre, H. M., Bouchard, P., Corrales, J. J., Jones, T. H., Stalla, G. K., . . . Wu, F. C. W. (2004). Testosterone replacement therapy: Current trends and future directions. *Human Reproduction Update, 10*(5), 409-419. doi:10.1093/humupd/dmh035

North American Menopause Society. (2010). Estrogen and progestogen use in postmenopausal women: 2010 position statement. *Menopause, 17*(2), 242-255. doi:10.1097/gme.0b013e3181d0f6b9

Nuttbrock, L., Hwahng, S., Bockting, W., Rosenblum, A., Mason, M., Macri, M., & Becker, J. (2010). Psychiatric impact of gender-related abuse across the life course of male-to-female transgender persons. *Journal of Sex Research, 47*(1), 12-23. doi:10.1080/00224490903062258

Oates, J. M., & Dacakis, G. (1983). Speech pathology considerations in the management of transsexualism-a review. *International Journal of Language & Communication Disorders, 18*(3), 139-151. doi:10.3109/13682828309012237

Olyslager, F., & Conway, L. (2007). On the calculation of the prevalence of transsexualism. Paper presented at the *World Professional Association for Transgender Health 20th International Symposium*, Chicago, Illinois. Retrieved April 22, 2010 from http://www.changelingaspects.com/PDF/2007-09-06-Prevalence_of_Transsexualism.pdf

Oriel, K. A. (2000). Clinical update: Medical care of transsexual patients. *Journal of the Gay and Lesbian Medical Association, 4*(4), 185-194. doi:1090-7173/00/1200-0185$18.00/1

Pauly, I. B. (1965). Male psychosexual inversion: Transsexualism: A review of 100 cases. *Archives of General Psychiatry, 13*(2), 172-181.

Payer, A. F., Meyer III, W. J., & Walker, P. A. (1979). The ultrastructural response of human leydig cells to exogenous estrogens. *Andrologia, 11*(6), 423-436. doi:10.1111/j.1439-0272.1979.tb02232.x

Peletz, M. G. (2006). Transgenderism and gender pluralism in southeast asia since early modern times. *Current Anthropology, 47*(2), 309-340. doi:10.1086/498947

Pfäfflin, F. (1993). Regrets after sex reassignment surgery. *Journal of Psychology & Human Sexuality, 5*(4), 69-85.

Pfäfflin, F., & Junge, A. (1998). Sex reassignment. Thirty years of international follow-up studies after sex reassignment surgery: A comprehensive review, 1961-1991. *International Journal of Transgenderism.* Retrieved from http://web.archive.org/web/20070503090247/http://www.symposion.com/ijt/pfaefflin/1000.htm

Physicians' desk reference. (61st ed.). (2007). Montvale, NJ: PDR.

Physicians' desk reference. (65th ed.). (2010). Montvale, NJ: PDR.

Pleak, R. R. (1999). Ethical issues in diagnosing and treating gender-dysphoric children and adolescents. In M. Rottnek (Ed.), *Sissies and tomboys: Gender noncomformity and homosexual childhood* (pp. 34-51). New York: New York University Press.

Pope, K. S., & Vasquez, M. J. (2011). *Ethics in psychotherapy and counseling: A practical guide* (Fourth ed.). Hoboken, NJ: John Wiley & Sons, Inc.

Prior, J. C., Vigna, Y. M., & Watson, D. (1989). Spironolactone with physiological female steroids for presurgical therapy of male-to-female transsexualism. *Archives of Sexual Behavior, 18*(1), 49-57. doi:10.1007/BF01579291

Prior, J. C., Vigna, Y. M., Watson, D., Diewold, P., & Robinow, O. (1986). Spironolactone in the presurgical therapy of male to female transsexuals: Philosophy and experience of the Vancouver Gender Dysphoria Clinic. *Journal of Sex Information & Education Council of Canada, 1*, 1-7.

Rachlin, K. (1999). Factors which influence individual's decisions when considering female-to-male genital reconstructive surgery. *International Journal of Transgenderism, 3*(3). Retrieved from http://www.WPATH.org

Rachlin, K. (2002). Transgendered individuals' experiences of psychotherapy. *International Journal of Transgenderism, 6*(1). Retrieved from http://www.wpath.org/journal/www.iiav.nl /ezines/web/IJT/97-03/numbers/symposion/ijtvo06no01_03.htm.

Rachlin, K., Green, J., & Lombardi, E. (2008). Utilization of health care among female-to-male transgender individuals in the United States. *Journal of Homosexuality, 54*(3), 243-258. doi:10.1080/00918360801982124

Rachlin, K., Hansbury, G., & Pardo, S. T. (2010). Hysterectomy and oophorectomy experiences of female-to-male transgender individuals. *International Journal of Transgenderism, 12*(3), 155-166. doi:10.1080/15532739.2010.514220

Reed, B., Rhodes, S., Schofield, P. & Wylie, K. (2009). *Gender variance in the UK: Prevalence, incidence, growth and geographic distribution.* Retrieved June 8, 2011, from http://www.gires.org.uk/assets/Medpro-Assets/GenderVarianceUK-report.pdf

Rehman, J., Lazer, S., Benet, A. E., Schaefer, L. C., & Melman, A. (1999). The reported sex and surgery satisfactions of 28 postoperative male-to-female transsexual patients. *Archives of Sexual Behavior, 28*(1), 71-89. doi:10.1023/A:1018745706354

Robinow, O. (2009). Paraphilia and transgenderism: A connection with Asperger's disorder? *Sexual and Relationship Therapy, 24*(2), 143-151. doi:10.1080/14681990902951358

Rosenberg, M. (2002). Children with gender identity issues and their parents in individual and group treatment. *Journal of the American Academy of Child and Adolescent Psychiatry, 41*(5), 619-621. doi:10.1097/00004583-200205000-00020

Rossouw, J. E., Anderson, G. L., Prentice, R. L., LaCroix, A. Z., Kooperberg, C., Stefanick, M. L., . . . Johnson, K. C. (2002). Risks and benefits of estrogen plus progestin in healthy postmenopausal women: Principal results from the women's health initiative randomized controlled trial. *JAMA: The Journal of the American Medical Association, 288*(3), 321-333.

Royal College of Speech Therapists, United Kingdom. http://www.rcslt.org/

Ruble, D. N., Martin, C. L., & Berenbaum, S. A. (2006). Gender development. In N. Eisenberg, W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology* (6th ed., pp. 858-932). Hoboken, NJ: John Wiley & Sons, Inc.

Sausa, L. A. (2005). Translating research into practice: Trans youth recommendations for improving school systems. *Journal of Gay & Lesbian Issues in Education, 3*(1), 15-28. doi:10.1300/J367v03n01_04

Simpson, J. L., de la Cruz, F., Swerdloff, R. S., Samango-Sprouse, C., Skakkebaek, N. E., Graham, J. M. J., . . . Willard, H. F. (2003). Klinefelter syndrome: Expanding the phenotype and identifying new research directions. *Genetics in Medicine, 5*(6), 460-468. doi:10.1097/01.GIM.0000095626.54201.D0

Smith, Y. L. S., Van Goozen, S. H. M., Kuiper, A. J., & Cohen-Kettenis, P. T. (2005). Sex reassignment: Outcomes and predictors of treatment for adolescent and adult transsexuals. *Psychological Medicine, 35*(1), 89-99. doi:10.1017/S0033291704002776

Sood, R., Shuster, L., Smith, R., Vincent, A., & Jatoi, A. (2011). Counseling postmenopausal women about bioidentical hormones: Ten discussion points for practicing physicians. *Journal of the American Board of Family Practice, 24*(2), 202-210. doi:10.3122/jabfm.2011.02.100194

Speech Pathology Australia. http://www.speechpathologyaustralia.org.au/

Speiser, P. W., Azziz, R., Baskin, L. S., Ghizzoni, L., Hensle, T. W., Merke, D. P., . . . Oberfield, S. E. (2010). Congenital adrenal hyperplasia due to steroid 21-hydroxylase deficiency: An endocrine society clinical practice guideline. *Journal of Clinical Endocrinology & Metabolism, 95*(9), 4133-4160. doi:10.1210/jc.2009-2631

Steensma, T. D., Biemond, R., de Boer, F., & Cohen-Kettenis, P. T. (2011). Desisting and persisting gender dysphoria after childhood: A qualitative follow-up study. *Clinical Child Psychology and Psychiatry*. Advance online publication. doi:10.1177/1359104510378303

Steensma, T. D., & Cohen-Kettenis, P. T. (2011). Gender transitioning before puberty? *Archives of Sexual Behavior, 40*(4), 649-650. doi:10.1007/s10508-011-9752-2

Stikkelbroeck, N. M. M. L., Beerendonk, C., Willemsen, W. N. P., Schreuders-Bais, C. A., Feitz, W. F. J., Rieu, P. N. M. A., . . . Otten, B. J. (2003). The long term outcome of feminizing genital surgery for congenital adrenal hyperplasia: Anatomical, functional and cosmetic outcomes, psychosexual development, and satisfaction in adult female patients. *Journal of Pediatric and Adolescent Gynecology, 16*(5), 289-296. doi:10.1016/S1083-3188(03)00155-4

Stoller, R. J. (1964). A contribution to the study of gender identity. *International Journal of Psychoanalysis, 45*, 220-226.

Stone, S. (1991). The empire strikes back: A posttransexual manifesto. In J. Epstein, & K. Straub (Eds.), *Body guards: The cultural politics of gender ambiguity* (pp. 280-304). London: Routledge.

Tangpricha, V., Ducharme, S. H., Barber, T. W., & Chipkin, S. R. (2003). Endocrinologic treatment of gender identity disorders. *Endocrine Practice, 9*(1), 12-21.

Tangpricha, V., Turner, A., Malabanan, A., & Holick, M. (2001). Effects of testosterone therapy on bone mineral density in the FTM patient. *International Journal of Transgenderism, 5*(4).

Taywaditep, K. J., Coleman, E., & Dumronggittigule, P. (1997). Thailand (muang thai). In R. Francouer (Ed.), *International encyclopedia of sexuality*. New York: Continuum.

The World Professional Association for Transgender Health, Inc. (2008). *WPATH clarification on medical necessity of treatment, sex reassignment, and insurance coverage in the U.S.A.* Retrieved from http://www.wpath.org/documents/Med%20Nec%20on%202008%20Letterhead.pdf

Thole, Z., Manso, G., Salgueiro, E., Revuelta, P., & Hidalgo, A. (2004). Hepatotoxicity induced by antiandrogens: A review of the literature. *Urologia Internationalis, 73*(4), 289-295. doi:10.1159/000081585

Tom Waddell Health Center. (2006). *Protocols for hormonal reassignment of gender.* Retrieved from http://www.sfdph.org/dph/comupg/oservices/medSvs/hlthCtrs/TransGendprotocols122006.pdf

Tsoi, W. F. (1988). The prevalence of transsexualism in Singapore. *Acta Psychiatrica Scandinavica, 78*(4), 501-504. doi:10.1111/j.1600-0447.1988.tb06373.x

Van den Broecke, R., Van der Elst, J., Liu, J., Hovatta, O., & Dhont, M. (2001). The female-to-male transsexual patient: A source of human ovarian cortical tissue for experimental use. *Human Reproduction, 16*(1), 145-147. doi:10.1093/humrep/16.1.145

van Kesteren, P. J. M., Asscheman, H., Megens, J. A. J., & Gooren, L. J. G. (1997). Mortality and morbidity in transsexual subjects treated with cross-sex hormones. *Clinical Endocrinology, 47*(3), 337-343. doi:10.1046/j.1365-2265.1997.2601068.x

van Kesteren, P. J. M., Gooren, L. J., & Megens, J. A. (1996). An epidemiological and demographic study of transsexuals in the Netherlands. *Archives of Sexual Behavior, 25*(6), 589-600. doi:10.1007/BF02437841

van Trotsenburg, M. A. A. (2009). Gynecological aspects of transgender healthcare. *International Journal of Transgenderism, 11*(4), 238-246. doi:10.1080/15532730903439484

Vancouver Coastal Health, Vancouver, British Columbia, Canada. http://www.vch.ca/

Vanderburgh, R. (2009). Appropriate therapeutic care for families with pre-pubescent transgender/gender-dissonant children. *Child and Adolescent Social Work Journal, 26*(2), 135-154. doi:10.1007/s10560-008-0158-5

Vilain, E. (2000). Genetics of sexual development. *Annual Review of Sex Research, 11*, 1-25.

Wålinder, J. (1968). Transsexualism: Definition, prevalence and sex distribution. *Acta Psychiatrica Scandinavica, 43*(S203), 255-257.

Wålinder, J. (1971). Incidence and sex ratio of transsexualism in Sweden. *The British Journal of Psychiatry, 119*(549), 195-196.

Wallien, M. S. C., & Cohen-Kettenis, P. T. (2008). Psychosexual outcome of gender-dysphoric children. *Journal of the American Academy of Child & Adolescent Psychiatry, 47*(12), 1413-1423. doi:10.1097/CHI.0b013e31818956b9

Wallien, M. S. C., Swaab, H., & Cohen-Kettenis, P. T. (2007). Psychiatric comorbidity among children with gender identity disorder. *Journal of the American Academy of Child & Adolescent Psychiatry, 46*(10), 1307-1314. doi:10.1097/chi.0b013e3181373848

Warren, B. E. (1993). Transsexuality, identity and empowerment. A view from the frontlines. *SIECUS Report, February/March,* 14-16.

Weitze, C., & Osburg, S. (1996). Transsexualism in Germany: Empirical data on epidemiology and application of the German Transsexuals' Act during its first ten years. *Archives of Sexual Behavior, 25*(4), 409-425.

Wilson, J. D. (1999). The role of androgens in male gender role behavior. *Endocrine Reviews, 20*(5), 726-737. doi:10.1210/er.20.5.726

Winter, S. (2009). Cultural considerations for The World Professional Association for Transgender Health's standards of care: The Asian perspective. *International Journal of Transgenderism, 11*(1), 19-41. doi:10.1080/15532730902799938

Winter, S., Chalungsooth, P., Teh, Y. K., Rojanalert, N., Maneerat, K., Wong, Y. W., . . . Macapagal, R. A. (2009). Transpeople, transprejudice and pathologization: A seven-country factor analytic study. *International Journal of Sexual Health, 21*(2), 96-118. doi:10.1080/19317610902922537

Wisniewski, A. B., Migeon, C. J., Malouf, M. A., & Gearhart, J. P. (2004). Psychosexual outcome in women affected by congenital adrenal hyperplasia due to 21-hydroxylase deficiency. *The Journal of Urology, 171*(6, Part 1), 2497-2501. doi:10.1097/01.ju.0000125269.91938.f7

World Health Organization. (2007). *International classification of diseases and related health problems-10th revision.* Geneva, Switzerland: World Health Organization.

World Health Organization. (2008). *The world health report 2008: Primary health care - now more than ever.* Geneva, Switzerland: World Health Organization.

WPATH Board of Directors. (2010). *De-psychopathologisation statement released May 26, 2010.* Retrieved from http://wpath.org/announcements_detail.cfm?pk_announcement=17

Xavier, J. M. (2000). *The Washington, D.C. transgender needs assessment survey: Final report for phase two.* Washington, DC: Administration for HIV/AIDS of District of Columbia Government.

Zhang, G., Gu, Y., Wang, X., Cui, Y., & Bremner, W. J. (1999). A clinical trial of injectable testosterone undecanoate as a potential male contraceptive in normal Chinese men. *Journal of Clinical Endocrinology & Metabolism, 84*(10), 3642-3647. doi:10.1210/jc.84.10.3642

Zitzmann, M., Saad, F., & Nieschlag, E. (2006, April). *Long term experience of more than 8 years with a novel formulation of testosterone undecanoate (nebido) in substitution therapy of hypogonadal men.* Paper presented at European Congress of Endocrinology, Glasgow, UK, April 2006.

Zucker, K. J. (1999). Intersexuality and gender identity differentiation. *Annual Review of Sex Research, 10*(1), 1-69.

Zucker, K. J. (2004). Gender identity development and issues. *Child and Adolescent Psychiatric Clinics of North America, 13*(3), 551-568. doi:10.1016/j.chc.2004.02.006

Zucker, K. J. (2006). 'I'm half-boy, half-girl'': Play psychotherapy and parent counseling for gender identity disorder. In R. L. Spitzer, M. B. First, J. B. W. Williams & M. Gibbons (Eds.), *DSM-IV-TR casebook, volume 2* (pp. 321-334). Arlington, VA: American Psychiatric Publishing, Inc.

Zucker, K. J. (2010). The DSM diagnostic criteria for gender identity disorder in children. *Archives of Sexual Behavior, 39*(2), 477-498. doi:10.1007/s10508-009-9540-4

Zucker, K. J., & Bradley, S. J. (1995). *Gender identity disorder and psychosexual problems in children and adolescents.* New York: Guilford Press.

Zucker, K. J., Bradley, S. J., Owen-Anderson, A., Kibblewhite, S. J., & Cantor, J. M. (2008). Is gender identity disorder in adolescents coming out of the closet? *Journal of Sex & Marital Therapy, 34*(4), 287-290. doi:10.1080/00926230802096192

Zucker, K. J., Bradley, S. J., Owen-Anderson, A., Kibblewhite, S. J., Wood, H., Singh, D., & Choi, K. (in press). Demographics, behavior problems, and psychosexual characteristics of adolescents with gender identity disorder or transvestic fetishism. *Journal of Sex & Marital Therapy.*

Zucker, K. J., & Lawrence, A. A. (2009). Epidemiology of gender identity disorder: Recommendations for the standards of care of The World Professional Association for Transgender Health. *International Journal of Transgenderism, 11*(1), 8-18. doi:10.1080/15532730902799946

Zucker, K. J., Owen, A., Bradley, S. J., & Ameeriar, L. (2002). Gender-dysphoric children and adolescents: A comparative analysis of demographic characteristics and behavioral problems. *Clinical Child Psychology and Psychiatry, 7*(3), 398-411.

Zuger, B. (1984). Early effeminate behavior in boys: Outcome and significance for homosexuality. *Journal of Nervous and Mental Disease, 172*(2), 90-97.

APPENDIX A
GLOSSARY

Terminology in the area of health care for transsexual, transgender, and gender nonconforming people is rapidly evolving; new terms are being introduced, and the definitions of existing terms are changing. Thus, there is often misunderstanding, debate, or disagreement about language in this field. Terms that may be unfamiliar or that have specific meanings in the *SOC* are defined below for the purpose of this document only. Others may adopt these definitions, but WPATH acknowledges that these terms may be defined differently in different cultures, communities, and contexts.

WPATH also acknowledges that many terms used in relation to this population are not ideal. For example, the terms *transsexual* and *transvestite* – and, some would argue, the more recent term *transgender* – have been applied to people in an objectifying fashion. Yet such terms have been more or less adopted by many people who are making their best effort to make themselves understood. By continuing to use these terms, WPATH intends only to ensure that concepts and processes are comprehensible, in order to facilitate the delivery of quality health care to transsexual, transgender, and gender nonconforming people. WPATH remains open to new terminology that will further illuminate the experience of members of this diverse population and lead to improvements in health care access and delivery.

Bioidentical hormones: Hormones that are *structurally* identical to those found in the human body (ACOG Committee of Gynecologic Practice, 2005). The hormones used in bioidentical hormone therapy (BHT) are generally derived from plant sources and are structurally similar to endogenous human hormones, but they need to be commercially processed to become bioidentical.

Bioidentical compounded hormone therapy (BCHT): Use of hormones that are prepared, mixed, assembled, packaged, or labeled as a drug by a pharmacist and custom-made for a patient according to a physician's specifications. Government drug agency approval is not possible for each compounded product made for an individual consumer.

Crossdressing (transvestism): Wearing clothing and adopting a gender role presentation that, in a given culture, is more typical of the other sex.

Disorders of sex development (DSD): Congenital conditions in which the development of chromosomal, gonadal, or anatomic sex is atypical. Some people strongly object to the "disorder" label and instead view these conditions as a matter of diversity (Diamond, 2009), preferring the terms *intersex* and *intersexuality*.

Female-to-Male (FtM): Adjective to describe individuals assigned female at birth who are changing or who have changed their body and/or gender role from birth-assigned female to a more masculine body or role.

Gender dysphoria: Distress that is caused by a discrepancy between a person's gender identity and that person's sex assigned at birth (and the associated gender role and/or primary and secondary sex characteristics) (Fisk, 1974; Knudson, De Cuypere, & Bockting, 2010b).

Gender identity: A person's intrinsic sense of being male (a boy or a man), female (a girl or woman), or an alternative gender (e.g., boygirl, girlboy, transgender, genderqueer, eunuch) (Bockting, 1999; Stoller, 1964).

Gender identity disorder: Formal diagnosis set forth by the *Diagnostic Statistical Manual of Mental Disorders, 4th Edition, Text Rev (DSM IV-TR)* (American Psychiatric Association, 2000). Gender identity disorder is characterized by a strong and persistent cross-gender identification and a persistent discomfort with one's sex or sense of inappropriateness in the gender role of that sex, causing clinically significant distress or impairment in social, occupational, or other important areas of functioning.

Gender nonconforming: Adjective to describe individuals whose gender identity, role, or expression differs from what is normative for their assigned sex in a given culture and historical period.

Gender role or expression: Characteristics in personality, appearance, and behavior that in a given culture and historical period are designated as masculine or feminine (that is, more typical of the male or female social role) (Ruble, Martin, & Berenbaum, 2006). While most individuals present socially in clearly male or female gender roles, some people present in an alternative gender role such as genderqueer or specifically transgender. All people tend to incorporate both masculine and feminine characteristics in their gender expression in varying ways and to varying degrees (Bockting, 2008).

Genderqueer: Identity label that may be used by individuals whose gender identity and/or role does not conform to a binary understanding of gender as limited to the categories of man or woman, male or female (Bockting, 2008).

Male-to-Female (MtF): Adjective to describe individuals assigned male at birth who are changing or who have changed their body and/or gender role from birth-assigned male to a more feminine body or role.

Natural hormones: Hormones that are derived from natural *sources* such as plants or animals. Natural hormones may or may not be bioidentical.

Sex: Sex is assigned at birth as male or female, usually based on the appearance of the external genitalia. When the external genitalia are ambiguous, other components of sex (internal genitalia, chromosomal and hormonal sex) are considered in order to assign sex (Grumbach, Hughes, & Conte,

2003; MacLaughlin & Donahoe, 2004; Money & Ehrhardt, 1972; Vilain, 2000). For most people, gender identity and expression are consistent with their sex assigned at birth; for transsexual, transgender, and gender nonconforming individuals, gender identity or expression differ from their sex assigned at birth.

Sex reassignment surgery (gender affirmation surgery): Surgery to change primary and/or secondary sex characteristics to affirm a person's gender identity. Sex reassignment surgery can be an important part of medically necessary treatment to alleviate gender dysphoria.

Transgender: Adjective to describe a diverse group of individuals who cross or transcend culturally-defined categories of gender. The gender identity of transgender people differs to varying degrees from the sex they were assigned at birth (Bockting, 1999).

Transition: Period of time when individuals change from the gender role associated with their sex assigned at birth to a different gender role. For many people, this involves learning how to live socially in "the other" gender role; for others this means finding a gender role and expression that is most comfortable for them. Transition may or may not include feminization or masculinization of the body through hormones or other medical procedures. The nature and duration of transition is variable and individualized.

Transphobia, internalized: Discomfort with one's own transgender feelings or identity as a result of internalizing society's normative gender expectations.

Transsexual: Adjective (often applied by the medical profession) to describe individuals who seek to change or who have changed their primary and/or secondary sex characteristics through femininizing or masculinizing medical interventions (hormones and/or surgery), typically accompanied by a permanent change in gender role.

APPENDIX B
OVERVIEW OF MEDICAL RISKS OF HORMONE THERAPY

The risks outlined below are based on two comprehensive, evidence-based literature reviews of masculinizing/feminizing hormone therapy (Feldman & Safer, 2009; Hembree et al., 2009), along with a large cohort study (Asscheman et al., 2011). These reviews can serve as detailed references for providers, along with other widely recognized, published clinical materials (e.g., Dahl et al., 2006; Ettner et al., 2007).

Risks of Feminizing Hormone Therapy (MtF)

Likely increased risk:

Venous thromboembolic disease

- Estrogen use increases the risk of venous thromboembolic events (VTE), particularly in patients who are over age 40, smokers, highly sedentary, obese, and who have underlying thrombophilic disorders.
- This risk is increased with the additional use of third generation progestins.
- This risk is decreased with use of the transdermal route of estradiol administration, which is recommended for patients at higher risk of VTE.

Cardiovascular, cerebrovascular disease

- Estrogen use increases the risk of cardiovascular events in patients over age 50 with underlying cardiovascular risk factors. Additional progestin use may increase this risk.

Lipids

- Oral estrogen use may markedly increase triglycerides in patients, increasing the risk of pancreatitis and cardiovascular events.
- Different routes of administration will have different metabolic effects on levels of HDL cholesterol, LDL cholesterol and lipoprotein(a).
- In general, clinical evidence suggests that MtF patients with pre-existing lipid disorders may benefit from the use of transdermal rather than oral estrogen.

Liver/gallbladder

- Estrogen and cyproterone acetate use may be associated with transient liver enzyme elevations and, rarely, clinical hepatotoxicity.
- Estrogen use increases the risk of cholelithiasis (gall stones) and subsequent cholecystectomy.

Possible increased risk:

Type 2 diabetes mellitus

- Feminizing hormone therapy, particularly estrogen, may increase the risk of type 2 diabetes, particularly among patients with a family history of diabetes or other risk factors for this disease.

Hypertension

- Estrogen use may increase blood pressure, but the effect on incidence of overt hypertension is unknown.
- Spironolactone reduces blood pressure and is recommended for at-risk or hypertensive patients desiring feminization.

Prolactinoma

- Estrogen use increases the risk of hyperprolactinemia among MtF patients in the first year of treatment, but this risk unlikely thereafter.
- High-dose estrogen use may promote the clinical appearance of preexisting but clinically unapparent prolactinoma.

Inconclusive or no increased risk: Items in this category include those that may present risk, but for which the evidence is so minimal that no clear conclusion can be reached.

Breast cancer

- MtF persons who have taken feminizing hormones do experience breast cancer, but it is unknown how their degree of risk compares to that of persons born with female genitalia.
- Longer duration of feminizing hormone exposure (i.e., number of years taking estrogen preparations), family history of breast cancer, obesity (BMI >35), and the use of progestins likely influence the level of risk.

Other side effects of feminizing therapy:

The following effects may be considered minor or even desired, depending on the patient, but are clearly associated with feminizing hormone therapy.

Fertility and sexual function

- Feminizing hormone therapy may impair fertility.
- Feminizing hormone therapy may decrease libido.
- Feminizing hormone therapy reduces nocturnal erections, with variable impact on sexually stimulated erections.

Risks of anti-androgen medications:

Feminizing hormone regimens often include a variety of agents that affect testosterone production or action. These include GnRH agonists, progestins (including cyproterone acetate), spironolactone, and 5-alpha reductase inhibitors. An extensive discussion of the specific risks of these agents is beyond the scope of the *SOC*. However, both spironolactone and cyproterone acetate are widely used and deserve some comment.

Cyproterone acetate is a progestational compound with anti-androgenic properties (Gooren, 2005; Levy et al., 2003). Although widely used in Europe, it is not approved for use in the United States because of concerns about hepatotoxicity (Thole, Manso, Salgueiro, Revuelta, & Hidalgo, 2004). Spironolactone is commonly used as an anti-androgen in feminizing hormone therapy, particularly in regions where cyproterone is not approved for use (Dahl et al., 2006; Moore et al., 2003; Tangpricha et al., 2003). Spironolactone has a long history of use in treating hypertension and congestive heart failure. Its common side effects include hyperkalemia, dizziness, and gastrointestinal symptoms (*Physicians' Desk Reference*, 2007).

Risks of Masculinizing Hormone Therapy (FtM)

Likely increased risk:

Polycythemia

- Masculinizing hormone therapy involving testosterone or other androgenic steroids increases the risk of polycythemia (hematocrit > 50%), particularly in patients with other risk factors.
- Transdermal administration and adaptation of dosage may reduce this risk

Weight gain/visceral fat

- Masculinizing hormone therapy can result in modest weight gain, with an increase in visceral fat.

Possible increased risk:

Lipids

- Testosterone therapy decreases HDL, but variably affects LDL and triglycerides.
- Supraphysiologic (beyond normal male range) serum levels of testosterone, often found with extended intramuscular dosing, may worsen lipid profiles, whereas transdermal administration appears to be more lipid neutral.
- Patients with underlying polycystic ovarian syndrome or dyslipidemia may be at increased risk of worsening dyslipidemia with testosterone therapy.

Liver

- Transient elevations in liver enzymes may occur with testosterone therapy.
- Hepatic dysfunction and malignancies have been noted with oral methyltestosterone. However, methyltestosterone is no longer available in most countries and should no longer be used.

Psychiatric

Masculinizing therapy involving testosterone or other androgenic steroids may increase the risk of hypomanic, manic, or psychotic symptoms in patients with underlying psychiatric disorders that include such symptoms. This adverse event appears to be associated with higher doses or supraphysiologic blood levels of testosterone

Inconclusive or no increased risk: Items in this category include those that may present risk, but for which the evidence is so minimal that no clear conclusion can be reached.

Osteoporosis

- Testosterone therapy maintains or increases bone mineral density among FtM patients prior to oophorectomy, at least in the first three years of treatment.
- There is an increased risk of bone density loss after oophorectomy, particularly if testosterone therapy is interrupted or insufficient. This includes patients utilizing solely oral testosterone.

Cardiovascular

- Masculinizing hormone therapy at normal physiologic doses does not appear to increase the risk of cardiovascular events among healthy patients.
- Masculinizing hormone therapy may increase the risk of cardiovascular disease in patients with underlying risks factors.

Hypertension

- Masculinizing hormone therapy at normal physiologic doses may increase blood pressure but does not appear to increase the risk of hypertension.
- Patients with risk factors for hypertension, such as weight gain, family history, or polycystic ovarian syndrome, may be at increased risk.

Type 2 diabetes mellitus

- Testosterone therapy does not appear to increase the risk of type 2 diabetes among FtM patients overall.

- Testosterone therapy may further increase the risk of type 2 diabetes in patients with other risk factors, such as significant weight gain, family history, and polycystic ovarian syndrome. There are no data that suggest or show an increase in risk in those with risk factors for dyslipidemia.

Breast cancer

- Testosterone therapy in FtM patients does not increase the risk of breast cancer.

Cervical cancer

- Testosterone therapy in FtM patients does not increase the risk of cervical cancer, although it may increase the risk of minimally abnormal Pap smears due to atrophic changes.

Ovarian cancer

- Analogous to persons born with female genitalia with elevated androgen levels, testosterone therapy in FtM patients may increase the risk of ovarian cancer, although evidence is limited.

Endometrial (uterine) cancer

- Testosterone therapy in FtM patients may increase the risk of endometrial cancer, although evidence is limited.

Other side effects of masculinizing therapy:

The following effects may be considered minor or even desired, depending on the patient, but are clearly associated with masculinization.

Fertility and sexual function

- Testosterone therapy in FtM patients reduces fertility, although the degree and reversibility are unknown.
- Testosterone therapy can induce permanent anatomic changes in the developing embryo or fetus.
- Testosterone therapy induces clitoral enlargement and increases libido.

Acne, androgenic alopecia

Acne and varying degrees of male pattern hair loss (androgenic alopecia) are common side effects of masculinizing hormone therapy.

APPENDIX C
SUMMARY OF CRITERIA FOR HORMONE THERAPY AND SURGERIES

As for all previous versions of the *SOC*, the criteria put forth in the *SOC* for hormone therapy and surgical treatments for gender dysphoria are clinical guidelines; individual health professionals and programs may modify them. Clinical departures from the *SOC* may come about because of a patient's unique anatomic, social, or psychological situation; an experienced health professional's evolving method of handling a common situation; a research protocol; lack of resources in various parts of the world; or the need for specific harm reduction strategies. These departures should be recognized as such, explained to the patient, and documented through informed consent for quality patient care and legal protection. This documentation is also valuable to accumulate new data, which can be retrospectively examined to allow for health care – and the *SOC* – to evolve.

Criteria for Feminizing/Masculinizing Hormone Therapy (one referral or chart documentation of psychosocial assessment)

1. Persistent, well-documented gender dysphoria;
2. Capacity to make a fully informed decision and to consent for treatment;
3. Age of majority in a given country (if younger, follow the *SOC* for children and adolescents);
4. If significant medical or mental concerns are present, they must be reasonably well-controlled.

Criteria for Breast/Chest Surgery (one referral)

Mastectomy and creation of a male chest in FtM patients:

1. Persistent, well-documented gender dysphoria;
2. Capacity to make a fully informed decision and to consent for treatment;
3. Age of majority in a given country (if younger, follow the *SOC* for children and adolescents);
4. If significant medical or mental health concerns are present, they must be reasonably well controlled.

Hormone therapy is not a pre-requisite.

Breast augmentation (implants/lipofilling) in MtF patients:

1. Persistent, well-documented gender dysphoria;
2. Capacity to make a fully informed decision and to consent for treatment;
3. Age of majority in a given country (if younger, follow the *SOC* for children and adolescents);
4. If significant medical or mental health concerns are present, they must be reasonably well controlled.

Although not an explicit criterion, it is recommended that MtF patients undergo feminizing hormone therapy (minimum 12 months) prior to breast augmentation surgery. The purpose is to maximize breast growth in order to obtain better surgical (aesthetic) results.

Criteria for genital surgery (two referrals)

Hysterectomy and ovariectomy in FtM patients and orchiectomy in MtF patients:

1. Persistent, well documented gender dysphoria;

2. Capacity to make a fully informed decision and to consent for treatment;

3. Age of majority in a given country;

4. If significant medical or mental health concerns are present, they must be well controlled;

5. 12 continuous months of hormone therapy as appropriate to the patient's gender goals (unless the patient has a medical contraindication or is otherwise unable or unwilling to take hormones).

The aim of hormone therapy prior to gonadectomy is primarily to introduce a period of reversible estrogen or testosterone suppression, before a patient undergoes irreversible surgical intervention.

These criteria do not apply to patients who are having these surgical procedures for medical indications other than gender dysphoria.

Metoidioplasty or phalloplasty in FtM patients and vaginoplasty in MtF patients:

1. Persistent, well documented gender dysphoria;

2. Capacity to make a fully informed decision and to consent for treatment;

3. Age of majority in a given country;

4. If significant medical or mental health concerns are present, they must be well controlled;

5. 12 continuous months of hormone therapy as appropriate to the patient's gender goals (unless the patient has a medical contraindication or is otherwise unable or unwilling to take hormones);

6. 12 continuous months of living in a gender role that is congruent with their gender identity.

Although not an explicit criterion, it is recommended that these patients also have regular visits with a mental health or other medical professional.

The criterion noted above for some types of genital surgeries – i.e., that patients engage in 12 continuous months of living in a gender role that is congruent with their gender identity – is based on expert clinical consensus that this experience provides ample opportunity for patients to experience and socially adjust in their desired gender role, before undergoing irreversible surgery.

APPENDIX D
EVIDENCE FOR CLINICAL OUTCOMES OF THERAPEUTIC APPROACHES

One of the real supports for any new therapy is an outcome analysis. Because of the controversial nature of sex reassignment surgery, this type of analysis has been very important. Almost all of the outcome studies in this area have been retrospective.

One of the first studies to examine the post-treatment psychosocial outcomes of transsexual patients was done in 1979 at Johns Hopkins University School of Medicine and Hospital (USA) (J. K. Meyer & Reter, 1979). This study focused on patients' occupational, educational, marital, and domiciliary stability. The results revealed several significant changes with treatment. These changes were not seen as positive; rather, they showed that many individuals who had entered the treatment program were no better off or were worse off in many measures after participation in the program. These findings resulted in closure of the treatment program at that hospital/medical school (Abramowitz, 1986).

Subsequently, a significant number of health professionals called for a standard for eligibility for sex reassignment surgery. This led to the formulation of the original *Standards of Care* of the Harry Benjamin International Gender Dysphoria Association (now WPATH) in 1979.

In 1981, Pauly published results from a large retrospective study of people who underwent sex reassignment surgery. Participants in that study had much better outcomes: Among 83 FtM patients, 80.7% had a satisfactory outcome (i.e., patient self report of "improved social and emotional adjustment"), 6.0% unsatisfactory. Among 283 MtF patients, 71.4% had a satisfactory outcome, 8.1% unsatisfactory. This study included patients who were treated before the publication and use of the *Standards of Care*.

Since the *Standards of Care* have been in place, there has been a steady increase in patient satisfaction and decrease in dissatisfaction with the outcome of sex reassignment surgery. Studies conducted after 1996 focused on patients who were treated according to the *Standards of Care*. The findings of Rehman and colleagues (1999) and Krege and colleagues (2001) are typical of this body of work; none of the patients in these studies regretted having had surgery, and most reported being satisfied with the cosmetic and functional results of the surgery. Even patients who develop severe surgical complications seldom regret having undergone surgery. Quality of surgical results is one of the best predictors of the overall outcome of sex reassignment (Lawrence, 2003). The vast majority of follow-up studies have shown an undeniable beneficial effect of sex reassignment surgery on postoperative outcomes such as subjective well being, cosmesis, and sexual function (De Cuypere et al., 2005; Garaffa, Christopher, & Ralph, 2010; Klein & Gorzalka, 2009), although the specific magnitude of benefit is uncertain from

the currently available evidence. One study (Emory, Cole, Avery, Meyer, & Meyer III, 2003) even showed improvement in patient income.

One troubling report (Newfield et al., 2006) documented lower scores on quality of life (measured with the SF-36) for FtM patients than for the general population. A weakness of that study is that it recruited its 384 participants by a general email rather than a systematic approach, and the degree and type of treatment was not recorded. Study participants who were taking testosterone had typically being doing so for less than 5 years. Reported quality of life was higher for patients who had undergone breast/chest surgery than for those who had not ($p<.001$). (A similar analysis was not done for genital surgery). In other work, Kuhn and colleagues (2009) used the King's Health Questionnaire to assess the quality of life of 55 transsexual patients at 15 years after surgery. Scores were compared to those of 20 healthy female control patients who had undergone abdominal/pelvic surgery in the past. Quality of life scores for transsexual patients were the same or better than those of control patients for some subscales (emotions, sleep, incontinence, symptom severity, and role limitation), but worse in other domains (general health, physical limitation, and personal limitation).

It is difficult to determine the effectiveness of hormones alone in the relief of gender dysphoria. Most studies evaluating the effectiveness of masculinizing/feminizing hormone therapy on gender dysphoria have been conducted with patients who have also undergone sex reassignment surgery. Favorable effects of therapies that included both hormones and surgery were reported in a comprehensive review of over 2000 patients in 79 studies (mostly observational) conducted between 1961 and 1991 (Eldh, Berg, & Gustafsson, 1997; Gijs & Brewaeys, 2007; Murad et al., 2010; Pfäfflin & Junge, 1998). Patients operated on after 1986 did better than those before 1986; this reflects significant improvement in surgical complications (Eldh et al., 1997). Most patients have reported improved psychosocial outcomes, ranging between 87% for MtF patients and 97% for FtM patients (Green & Fleming, 1990). Similar improvements were found in a Swedish study in which "almost all patients were satisfied with sex reassignment at 5 years, and 86% were assessed by clinicians at follow-up as stable or improved in global functioning" (Johansson, Sundbom, Höjerback, & Bodlund, 2010). Weaknesses of these earlier studies are their retrospective design and use of different criteria to evaluate outcomes.

A prospective study conducted in the Netherlands evaluated 325 consecutive adult and adolescent subjects seeking sex reassignment (Smith, Van Goozen, Kuiper, & Cohen-Kettenis, 2005). Patients who underwent sex reassignment therapy (both hormonal and surgical intervention) showed improvements in their mean gender dysphoria scores, measured by the Utrecht Gender Dysphoria Scale. Scores for body dissatisfaction and psychological function also improved in most categories. Fewer than 2% of patients expressed regret after therapy. This is the largest prospective study to affirm the results from retrospective studies that a combination of hormone therapy and surgery improves gender dysphoria and other areas of psychosocial functioning. There is a need for further research on the effects of hormone therapy without surgery, and without the goal of maximum physical feminization or masculinization.

Overall, studies have been reporting a steady improvement in outcomes as the field becomes more advanced. Outcome research has mainly focused on the outcome of sex reassignment surgery. In current practice there is a range of identity, role, and physical adaptations that could use additional follow-up or outcome research (Institute of Medicine, 2011).

APPENDIX E
DEVELOPMENT PROCESS FOR THE STANDARDS OF CARE, VERSION 7

The process of developing *Standards of Care, Version 7* began when an initial *SOC* "work group" was established in 2006. Members were invited to examine specific sections of *SOC, Version 6.* For each section, they were asked to review the relevant literature, identify where research was lacking and needed, and recommend potential revisions to the *SOC* as warranted by new evidence. Invited papers were submitted by the following authors: Aaron Devor, Walter Bockting, George Brown, Michael Brownstein, Peggy Cohen-Kettenis, Griet DeCuypere, Petra DeSutter, Jamie Feldman, Lin Fraser, Arlene Istar Lev, Stephen Levine, Walter Meyer, Heino Meyer-Bahlburg, Stan Monstrey, Loren Schechter, Mick van Trotsenburg, Sam Winter, and Ken Zucker. Some of these authors chose to add co-authors to assist them in their task.

Initial drafts of these papers were due June 1, 2007. Most were completed by September 2007, with the rest completed by the end of 2007. These manuscripts were then submitted to the *International Journal of Transgenderism (IJT)*. Each underwent the regular *IJT* peer review process. The final papers were published in Volume 11 (1-4) in 2009, making them available for discussion and debate.

After these articles were published, a *Standards of Care* Revision Committee was established by the WPATH Board of Directors in 2010. The Revision Committee was first charged with debating and discussing the *IJT* background papers through a Google website. A subgroup of the Revision Committee was appointed by the Board of Directors to serve as the Writing Group. This group was charged with preparing the first draft of *SOC, Version 7* and continuing to work on revisions for consideration by the broader Revision Committee. The Board also appointed an International Advisory Group of transsexual, transgender, and gender nonconforming individuals to give input on the revision.

A technical writer was hired to (1) review all of the recommendations for revision – both the original recommendations as outlined in the *IJT* articles and additional recommendations that emanated from the online discussion – and (2) create a survey to solicit further input on these potential revisions. From the survey results, the Writing Group was able to discern where these experts stood in terms of areas of agreement and areas in need of more discussion and debate. The technical writer then (3) created a very rough first draft of *SOC, Version 7* for the Writing Group to consider and build on.

The Writing Group met on March 4 and 5, 2011 in a face-to-face expert consultation meeting. They reviewed all recommended changes and debated and came to consensus on various controversial areas. Decisions were made based on the best available science and expert consensus. These decisions were incorporated into the draft, and additional sections were written by the Writing Group with the assistance of the technical writer.

The draft that emerged from the consultation meeting was then circulated among the Writing Group and finalized with the help of the technical writer. Once this initial draft was finalized it was circulated among the broader *SOC* Revision Committee and the International Advisory Group. Discussion was opened up on the Google website and a conference call was held to resolve issues. Feedback from these groups was considered by the Writing Group, who then made further revision. Two additional drafts were created and posted on the Google website for consideration by the broader *SOC* Revision Committee and the International Advisory Group. Upon completion of these three iteratations of review and revision, the final document was presented to the WPATH Board of Directors for approval. The Board of Directors approved this version on September 14, 2011.

The plans are to disseminate this version of the *SOC* and invite feedback for further revisions. The WPATH Board of Directors decides the timing of any revision of the *SOC*.

Funding

The *Standards of Care* revision process was made possible through a generous grant from the Tawani Foundation and a gift from an anonymous donor. These funds supported the following:

1. Costs of a professional technical writer;
2. Process of soliciting international input on proposed changes from gender identity professionals and the transgender community;
3. Working meeting of the Writing Group;
4. Process of gathering additional feedback and arriving at final expert consensus from the professional and transgender communities, the *Standards of Care, Version 7* Revision Committee, and WPATH Board of Directors;
5. Costs of printing and distributing *Standards of Care, Version 7* and posting a free downloadable copy on the WPATH website;

6. Plenary session to launch the *Standards of Care, Version 7* at the 2011 WPATH Biennial Symposium in Atlanta, Georgia, USA.

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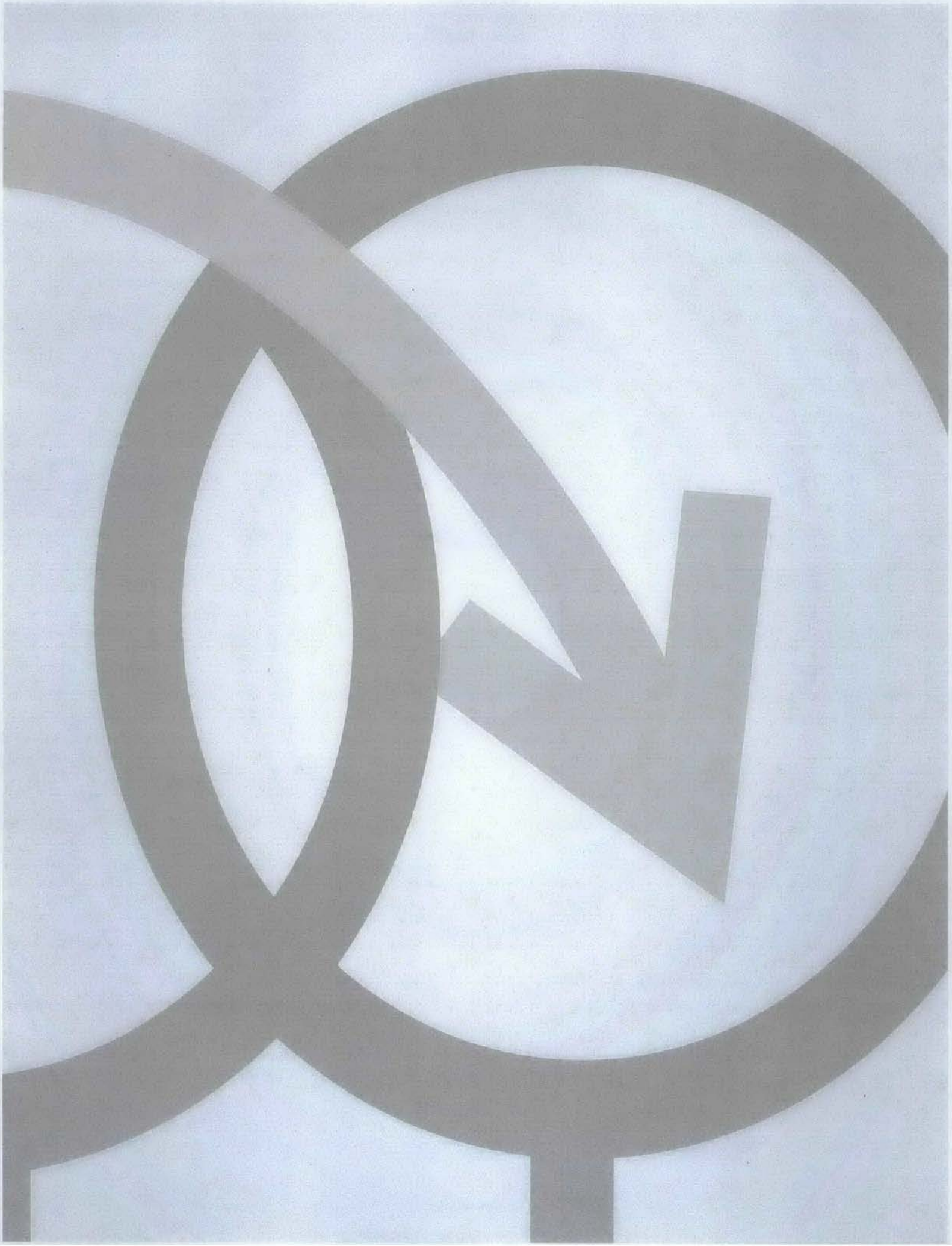

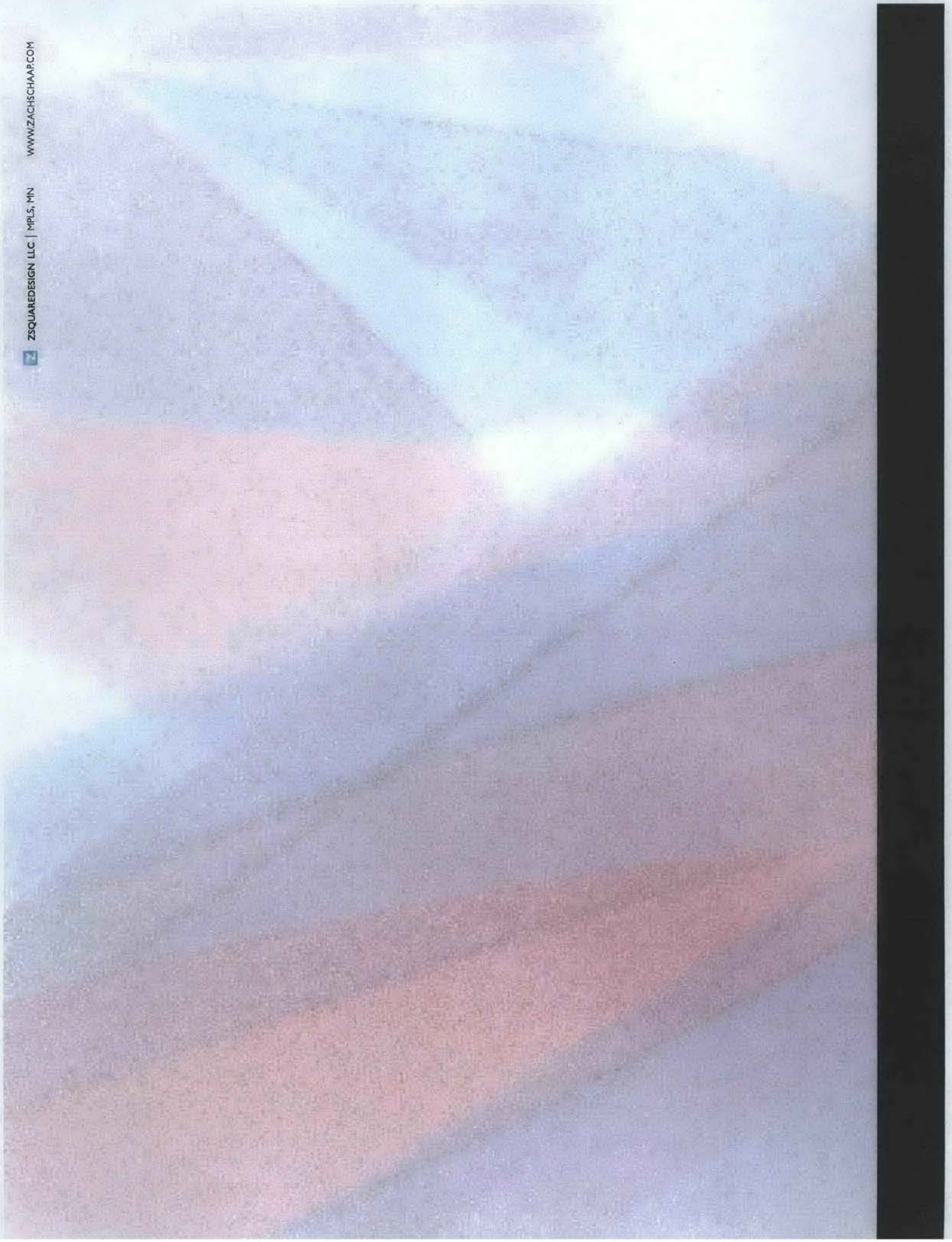
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Department of Veterans Affairs
Veterans Health Administration
Washington, DC 20420

VHA DIRECTIVE 2013-003

February 8, 2013

PROVIDING HEALTH CARE FOR TRANSGENDER AND INTERSEX VETERANS

1. PURPOSE: This Veterans Health Administration (VHA) Directive establishes policy regarding the respectful delivery of health care to transgender and intersex Veterans who are enrolled in the Department of Veterans Affairs (VA) health care system or are otherwise eligible for VA care.

2. BACKGROUND: In accordance with the medical benefits package (title 38 Code of Federal Regulations (CFR) section 17.38), VA provides care and treatment to Veterans that is compatible with generally accepted standards of medical practice and determined by appropriate health care professionals to promote, preserve, or restore the health of the individual.

a. VA provides health care for transgender patients, including those who present at various points on their transition from one gender to the next. This applies to all Veterans who are enrolled in VA's health care system or are otherwise eligible for VA care, including those who have had sex reassignment surgery outside of VHA, those who might be considering such surgical intervention, and those who do not wish to undergo sex reassignment surgery but self-identify as transgender. Intersex individuals may or may not have interest in changing gender or in acting in ways that are discordant with their assigned gender.

b. VA does not provide sex reassignment surgery or plastic reconstructive surgery for strictly cosmetic purposes.

c. **Definitions**

(1) **Sex.** Sex refers to the classification of individuals as female or male on the basis of their reproductive organs and functions.

(2) **Gender.** Gender refers to the behavioral, cultural, or psychological traits that a society associates with male and female sex.

(3) **Transgender.** Transgender is a term used to describe people whose gender identity (sense of themselves as male or female) or gender expression differs from that usually associated with their sex assigned at birth.

(a) Transsexual (Male-to-Female). Male-to-female (MtF) transsexuals are a subset of transgender individuals who are male sex at birth but self-identify as female and often take steps to socially or medically transition to female, including feminizing hormone therapy, electrolysis, and surgeries (e.g., vaginoplasty, breast augmentation).

THIS VHA DIRECTIVE EXPIRES FEBRUARY 28, 2018

(b) Transsexual (Female-to-Male). Female-to-male (FtM) transsexuals are a subset of transgender individuals who are female sex at birth but self-identify as male and often take steps to socially or medically transition to male, including masculinizing hormone therapy and surgeries (e.g., phalloplasty, mastectomy).

(4) **Sex reassignment surgery.** Sex reassignment surgery includes any of a variety of surgical procedures (including vaginoplasty and breast augmentation in MtF transsexuals and mastectomy and phalloplasty in FtM transsexuals) done simultaneously or sequentially with the explicit goal of transitioning from one sex to another. This term includes surgical revision of a previous sex reassignment surgery for cosmetic purposes. ***NOTE:*** *This term does not apply to non-surgical therapy (e.g., hormone therapy, mental health care, etc.) or intersex Veterans in need of surgery to correct inborn conditions related to reproductive or sexual anatomy or to correct a functional defect.*

(5) **Gender Identity Disorder (GID).** GID is a conflict between a person's physical sex and the gender with which the person identifies.

(6) **Intersex.** Intersex individuals are born with reproductive or sexual anatomy and/or chromosome pattern that do not seem to fit typical definitions of male or female. People with intersex conditions are often assigned male or female gender by others at birth (e.g., parents), although the individual may or may not later identify with the assigned gender.

3. POLICY: It is VHA policy that medically necessary care is provided to enrolled or otherwise eligible intersex and transgender Veterans, including hormonal therapy, mental health care, preoperative evaluation, and medically necessary post-operative and long-term care following sex reassignment surgery. Sex reassignment surgery cannot be performed or funded by VA.

4. ACTION

a. **Veterans Integrated Service Network (VISN) Director.** Each VISN Director must ensure that necessary and appropriate health care is provided to all enrolled or otherwise eligible Veterans based on the Veteran's self-identified gender, regardless of sex or sex reassignment status.

b. **Medical Facility Director, Chief of Staff, and Associate Director for Patient Care Services or Nurse Executive.** The medical facility Director, Chief of Staff, and Associate Director for Patient Care Services or Nurse Executive are responsible for ensuring:

(1) Transgender patients and intersex individuals are provided all care included in VA's medical benefits package including but not limited to: hormonal therapy, mental health care, preoperative evaluation, and medically necessary post-operative and long-term care following sex reassignment surgery to the extent that the appropriate health care professional determines that the care is needed to promote, preserve or restore the health of the individual and is in accord with generally-accepted standards of medical practice.

(a) Patients will be addressed and referred to based on their self-identified gender. Room assignments and access to any facilities for which gender is normally a consideration (e.g., restrooms) will give preference to the self-identified gender, irrespective of appearance and/or surgical history, in a manner that respects the privacy needs of transgender and non-transgender patients alike. Where there are questions or concerns related to room assignments, an ethics consultation may be requested.

(b) The documented sex in the Computerized Patient Record System (CPRS) needs to be consistent with the patient's self-identified gender. In order to modify administrative data (e.g., name and sex) in CPRS, patients must provide official documentation as per VHA guidance and policy on Identity Authentication for Health Care Services and Data Quality Requirements for Identity Management and Master Patient Index Functions.

(c) Sex reassignment surgery as defined in subparagraph 2c(4), will not be provided or funded.

(d) Non-surgical, supportive care for complications of sex-reassignment surgery must be provided. For example, a MtF patient over the age of 50 may be offered breast cancer screening and may wish to discuss the benefits and harms of prostate cancer screening with her provider. A FtM transsexual patient may be offered screening for breast and cervical cancer.

(e) A diagnosis of GID, or other gender dysphoria diagnoses, is not a pre-condition for receiving care consistent with the Veteran's self-identified gender.

(2) All other health services are provided to transgender Veterans without discrimination in a manner consistent with care and management of all Veteran patients.

(3) All staff, including medical and administrative staff, are required to treat as confidential any information about a patient's transgender status or any treatment related to a patient's gender transition, unless the patient has given permission to share this information.

(4) VA Mandates diversity awareness and maintains a zero-tolerance standard for harassment of any kind.

5. REFERENCES

Title 38 CFR § 17.38 (c).

6. FOLLOW-UP RESPONSIBILITY: The Office of Patient Care Services (10P4) is responsible for the contents of this Directive. Questions related to medical care may be referred to Specialty Care Services (10P4E) at (202) 461-7120. Questions related to mental health care may be referred to the Office of Mental Health Services (10P4M) at (202) 461-7310.

7. RESCISSIONS: VHA Directive 2011-024, Providing Health Care for Transgender and Intersex Veterans, is rescinded. This VHA Directive expires February 28, 2018.

Robert A. Petzel, M.D.
Under Secretary for Health

Attachment

DISTRIBUTION: E-mailed to the VHA Publications Distribution List 2/11/2013

Attachment A

FREQUENTLY ASKED QUESTIONS (FAQ) REGARDING THE PROVISION OF HEALTH CARE FOR TRANSGENDER AND INTERSEX VETERANS

1. What is the prevalence of transgender individuals? Is there a difference between transgender and transsexual individuals?

a. The prevalence of transgender individuals is not known in general or in the Veteran population. This is because of challenges in defining gender identity, the reluctance of individuals to identify themselves to others as transgender, and measures that are narrowly focused on subsets of individuals who either have been diagnosed with gender identity disorder (GID) or have had sex reassignment surgery. It is for these reasons that the Institute of Medicine issued their report "The Health of Lesbian, Gay, Bisexual, and Transgender People: Building a Foundation for Better Understanding" (March 31, 2011) and called on Health and Human Services (HHS) and other Federal agencies to "implement a research agenda designed to advance knowledge and understanding of Lesbian, Gay, Bisexual, and Transgender (LGBT) health. This agenda includes appropriate data gathering on sexual orientation and gender identity in public health research tools and electronic health records.

b. Current estimates of the prevalence of transsexual individuals with GID are approximately 1:11,000 natal males and 1:30,000 natal females. The prevalence of all transgender individuals is much higher since "transgender" is an umbrella term that includes individuals who do not have GID.

c. Based on these data, the estimated prevalence of Male-to-Female (MtF) to Female-to-Male (FtM) transsexual individuals is approximately 3:1 in the general population. This prevalence ratio is likely to be higher in the predominantly male Veteran population. It is important to note that FtM transsexual individuals are also part of the Veteran population.

d. Intersex Veterans, that is, individuals who are born with reproductive or sexual anatomy and/or chromosome pattern that do not seem to fit typical definitions of male or female, may or may not identify as transgender.

2. Is transgender the same as being "gay" or "lesbian?"

No. The term "transgender" refers to gender identity or the sense of oneself as male, female, or other, (e.g., androgynous, eunuch, etc.). The terms "gay" (in the case of men) and "lesbian" (in the case of women) refer to sexual orientation. The sexual orientation of gay and lesbian persons is attraction to the same gender whereas heterosexual persons are attracted to the opposite gender. A transgender Veteran may identify as heterosexual ("straight"), gay, lesbian, bisexual (i.e., attracted to both genders), queer, pansexual, asexual, etc. Knowing someone's gender identity gives you no information about their sexual orientation.

3. What is intersex?

Intersex individuals are born with reproductive or sexual anatomy and/or chromosome pattern that do not seem to fit typical definitions of male or female. People with intersex conditions are often assigned male or female gender by others at birth (e.g., parents), although the individual may or may not later identify with the assigned gender.

4. Do all intersex individuals identify as transgender?

No. For example, an individual may be assigned the physical status of "female" at birth and identify as female throughout her lifetime, with or without knowledge of an intersex condition. Some intersex persons with male chromosomes who have been assigned female become gender dysphoric even without knowing that they were "reassigned" at, or near, birth. Knowing someone has an intersex condition gives you no information about their gender identity or sexual orientation.

5. What is sex reassignment surgery?

Sex reassignment surgery includes any of a variety of surgical procedures done simultaneously or sequentially with the explicit goal of transitioning from one gender to another. This term includes surgical revision of a previous sex reassignment surgery for cosmetic purposes. This term does not apply to non-surgical therapy (e.g., hormone therapy, mental health care, etc.) or to intersex Veterans in need of surgery to correct inborn conditions related to reproductive or sexual anatomy or to correct a functional defect.

6. Will VA provide sex reassignment surgery and plastic reconstructive surgery if needed?

VA does not provide sex reassignment surgery in VA facilities or through non-VA care. In addition, VA does not provide plastic reconstructive surgery for strictly cosmetic purposes in VA facilities or through non-VA care. However, patients with GID or other gender dysphoria conditions may elect to have one or more medical or surgical procedures over their lifetime to bring their bodies into a closer alignment with their perceived gender. ***NOTE:*** *Only a minority of transgender Veterans will undergo sex reassignment surgery, as their symptoms may often be adequately treated with other therapeutic interventions.* Some Veterans receiving care at the VA may have had sex reassignment surgery somewhere else. The VA does provide health care to pre- and post-operative transsexual Veterans, including treatment of surgical complications.

7. Will the VA provide for electrolysis through non-VA care for male-to-female transsexual (MtF) Veterans?

No. VA will not provide electrolysis as this is considered by VHA to be cosmetic rather than medically necessary to promote, preserve, or restore health of the Veteran.

8. What are the guidelines for clinical care and the informed consent process?

a. Effective clinical care for transgender and intersex patients ideally involves an interdisciplinary, coordinated treatment approach with special attention to the needs of the individual patient and collaboration among multiple specialties, notably: gynecology, mental health, primary and specialty care, women's health, pharmacy, and urology. For all treatments and procedures, informed consent and shared decision-making needs to be the basis for individualized care that weighs the possible benefits and harms, with an emphasis on the lowest (safest) dose to achieve benefits. ***NOTE:*** *Procedures regarding informed consent can be found in VHA Handbook 1004.01, Informed Consent for Clinical Treatments and Procedures at: http://www1.va.gov/vhapublications/ViewPublication.asp?pub_ID=2055.*

b. For treatment plans that include cross-sex hormone therapy, VA clinicians must, consistent with requirements of informed consent (VHA Handbook 1004.01), discuss the risks, benefits, and limitations of cross-sex hormone therapy with the patient. Signature consent is not required for cross-sex hormone therapy. Ongoing monitoring of treatment is required.

9. Will VA provide feminizing or masculinizing hormone therapy?

Yes, if it is consistent with the patient's wishes, the treatment team's clinical recommendations, and VA treatment guidance.

10. What guidance is available to clinicians regarding hormone therapy?

VA Pharmacy Benefits Management Services has developed guidance for the use of hormone therapy in transgender and intersex patients in VA. This guidance is located at: http://vaww.national.cmop.va.gov/PBM/default.aspx. ***NOTE:*** *This is an internal Web site and is not available to the public.*

11. What are the goals of cross-sex hormonal treatment? What effects and risks are associated with hormonal treatment?

a. Cross-sex hormonal treatment is used to reduce or eliminate gender dysphoria and other symptoms related to the discordance between a transgender or intersex individual's gender identity and their biological sex at birth or the gender they were assigned at birth. The treatment produces changes in hormonally-sensitive sex characteristics (i.e., reducing characteristics of the original sex and inducing those of the opposite sex). VA clinicians need to provide transgender and intersex patients with a careful evaluation prior to providing a prescription for cross-sex hormonal therapy.

b. The goal of cross-sex hormone therapy in treatment of MtF transgender patients is to suppress testosterone levels and introduce estrogen to achieve a pre-menopausal female hormonal range. The effects are decreased facial and body hair, redistribution of fat, breast development and prostate and testicular atrophy. Risks include venous thromboembolism, liver dysfunction, hypertension, and cardiovascular disease. As with any medical therapy, benefits

and harms of treatment need individualization using principles of shared decision-making, with an emphasis upon the lowest (safest) dose to achieve benefits.

c. The goal of cross-sex hormone therapy in treatment of FtM transgender patients is to maintain testosterone and estrogen levels in the normal male range, generally through testosterone supplementation and sometimes in combination with a Gonadotropin Releasing Hormone (GnRH) agonist or progestins to suppress menses. The effects are increased facial and body hair and muscle, acne, permanent deepening of the voice, cessation of menses, redistribution of fat mass, and clitoral enlargement. Risks include hypertension, erythrocytosis, liver dysfunction, lipid changes, weight gain, and sodium retention.

12. Are there specific diagnostic criteria to consider in prescribing cross-sex hormone therapy?

a. A diagnosis of GID or other dysphoria condition should be the basis for prescription for cross-sex hormonal therapy for transgender patients. There may be clinical exceptions to the diagnosis for prescribing cross-sex hormone therapy (e.g., transgender individuals with "GID not otherwise specified").

b. Intersex patients are excluded from the GID diagnosis by DSM IV criteria. Transgender patients with intersex conditions who are seeking hormonal treatment need to fulfill DSM IV criteria for "GID not otherwise specified." Intersex and transgender individuals may have different mental health considerations.

13. Transgender and intersex Veterans are presenting to VA providers with prescriptions for hormones from outside sources, such as from another provider, the internet, or illicit sources. Should we stop these medications while we do a full evaluation or should a VA provider rewrite the prescriptions so they can be filled in a VA pharmacy and continued?

Under current VHA National Dual Care Policy, VA providers are not permitted to simply re-write prescriptions from an outside provider, unless the VA provider has first made a professional assessment that the prescribed medication is medically appropriate. However, cross sex hormones cannot generally be stopped abruptly without negative physical and psychiatric consequences. If the patient has records that support a thorough evaluation and psychotherapy prior to initiation of hormones, then it may be appropriate for a VA provider to rewrite the prescriptions so they can be filled in a VA pharmacy and continued while the evaluation is in progress and to monitor hormone levels. A mental health exam in this situation is not required and is based on the clinical situation. Very high doses of cross-sex hormones are associated with a greater likelihood of side effects, and a reduction in dose may be required. Additionally, the benefits and harms of hormonal therapy differ based upon the presence or absence of risk factors for, or occurrence of, serious complications (cardiovascular, thrombotic-embolic) and thus dosage needs to be individualized.

14. What if a transgender or intersex Veteran presents to VA and self-reports that they have been taking cross sex hormones that they would like to continue but can provide no supportive documentation from a physician?

Consistent with the VHA National Dual Care Policy, VA clinicians need to provide transgender patients with a careful medical and mental health evaluation prior to providing a prescription for cross-sex hormonal therapy.

15. Is a mental health evaluation necessary or required?

A thorough and careful mental health evaluation needs to be completed prior to provision of hormone therapy and needs to include evaluation and treatment for psychiatric comorbidities that may have overlapping presentations, such as depression, anxiety, Post Traumatic Stress Disorder (PTSD) or substance use disorders. The presence of other psychiatric and physical conditions is not necessarily a barrier to initiating treatment. For patients who enter VA with well-documented cross-sex hormone therapy from outside clinicians, mental health evaluations are optional based on the clinical presentation.

16. I understand that VA does not provide sex reassignment surgery, but are there any special considerations regarding a mental health evaluation prior to sex reassignment surgery?

Mental health evaluation prior to surgery includes specialized exams by knowledgeable doctoral level clinicians. Some professional associations with expertise on transgender issues (see resources in paragraph 28 of this Attachment) recommend that individuals contemplating genital surgery need to participate in a minimum of a 1-year "real life experience" i.e., living full time in the preferred gender role, prior to any genital surgical intervention.

17. In what ways would a pre-operative medical evaluation differ for these Veterans?

Medical evaluation prior to surgery includes pre-operative cardiac risk assessment and careful evaluation of current medications including hormone dosing.

18. What types of surgeries might transgender Veterans consider?

a. As part of their transition, FtM patients might consider undergoing several types of surgery including mastectomy, hysterectomy or oopherectomy, and neophallus construction. The common complications of neophallus construction include flap or graft necrosis, fistulae, urinary tract infection, donor site scarring, and infections. Mastectomy and hysterectomy have far fewer complications. Clinicians need to be aware that VA does not provide sex reassignment surgery or plastic reconstructive surgery for strictly cosmetic purposes in VA facilities or through non-VA care.

b. As part of their transition, MtF patients might consider undergoing several types of surgery including orchiectomy, penectomy, vaginoplasty, breast implants, laryngeal shave, and facial feminization procedures. Common complications of genital surgeries include strictures,

infections, fistulae, urinary tract complications and loss of genital sensation. Clinicians need to be aware that VA does not provide sex reassignment surgery or plastic reconstructive surgery for strictly cosmetic purposes in VA facilities or through non-VA care. MtF patients may consider undergoing electrolysis for hair removal. Clinicians need to be aware that VA does not provide electrolysis as this is considered a cosmetic rather than a medically necessary procedure.

19. If a patient has had sex reassignment surgery, how do we handle preventive screening requirements?

In addition to treatments related to their new gender identity, transgender patients need appropriate medical screening and/or treatment specific to their birth sex. This includes prostate exams and mammograms for MtF patients and vaginal exams and mammograms for FtM patients, as indicated.

20. Can a transgender Veteran request a change of gender or sex in Computerized Patient Record System (CPRS) before having sex reassignment surgery?

Amending the gender or sex of the Veteran in CPRS is based on the Veteran making a request to the facility Privacy Officer and providing the official documentation as required by VHA policies. Sex reassignment surgery is not a prerequisite for amendment of gender or sex in the Veteran's record.

21. What constitutes "official documentation" in order for gender or sex to be changed in CPRS?

A Veteran's request for amendment to gender or sex in the record is considered a Privacy Act "amendment request."

a. One of the following is required as supporting documentation: Legal documentation (i.e., amended birth certificate or court order), passport or a signed original statement on office letterhead, from a licensed physician. Sex reassignment surgery is not a prerequisite for amendment of gender/sex in the Veteran's record.

b. The licensed physician's statement must include all of the following information:

(1) Physician's full name;

(2) Medical license or certificate number;

(3) Issuing state of medical license or certificate;

(4) Drug Enforcement Administration (DEA) registration number assigned to the physician or comparable foreign designation, if applicable;

(5) Address and telephone number of the physician;

(6) Language stating that the physician has treated the patient or reviewed and evaluated the medical history of the applicant. The physician also has a doctor patient relationship with the applicant, which is evident in having one or more clinical encounters between doctor and patient;

(7) Language stating that the patient has had appropriate clinical treatment for gender transition to the new gender (specifying male or female); and

(8) Language stating, "I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct."

22. Do I need to become an expert in treating transgender Veterans?

a. All clinicians and staff who provide clinical services to transgender Veterans need to become more knowledgeable about transgender health issues. Everyone needs to be aware that transgender Veterans deserve to receive health care at VA and need to be treated with dignity and respect. Primary Care and Mental Health providers need to be encouraged to consult with specialty physicians on any aspect of management for which they need advice or for ongoing management, as they would for any other complex patient. The initial VA prescription for cross-sex hormone therapy need to be restricted to facility-designated providers experienced with the use of cross-sex hormone therapy (e.g., women's health specialist, endocrinologist, psychiatrist, or other local designee).

b. The potential lack of clinical expertise in specialties such as endocrinology, mental health, and surgery regarding clinical care of transgender and intersex Veterans, may necessitate establishing a mechanism for timely expert consultation on complicated cases within Veterans Integrated Service Networks (VISN) or facilities.

23. What education will be provided to VA staff?

Cultural awareness and sensitivity education for field staff was developed and implemented in fiscal year 2012. The VA standard of zero tolerance for discrimination, harassment, or abuse of Veterans applies to VHA treatment of transgender and intersex Veterans.

24. What is the correct pronoun to use when speaking with a transgender Veteran and in documentation of the clinical encounter in a progress note?

Transgender Veterans should always be addressed and referred to based on their self-identified gender, in conversation and in documentation in the patient record, irrespective of the Veteran's appearance. Neither sex reassignment surgery nor official documentation of change in sex is required for Veterans to be identified by their preferred gender or for documentation of preferred gender in the patient record.

25. Are transgender Veterans allowed to use the bathroom of their choice?

Transgender Veterans who presently self-identify as female are allowed to use bathrooms for women. Likewise, those who presently self-identify as males are allowed to use bathrooms for

men. This is irrespective of the Veteran's appearance or whether the Veteran has had sex reassignment surgery. The privacy needs of other patients must also be considered; availability of "unisex" bathrooms (for men and women) throughout facilities is a practical approach to this issue and is common practice in some facilities.

26. What about room assignments?

Patient room assignments are made in accordance with the patient's self-identified gender irrespective of the Veteran's appearance or whether the Veteran has had sex reassignment surgery, and in consideration of the needs of other patients. ***NOTE:*** *Ethics consultations are encouraged when concerns arise related to the provision of respectful care for transgender and intersex Veterans and other patients.*

27. In situations where shared inpatient rooms are common, might assignments be made such that a MtF transsexual patient and a biologic female would be assigned to share a room or a FtM transsexual patient and a biologic male would be assigned to share a room?

Yes. According to current VHA policy, "*room assignments will give preference to the self-identified gender, irrespective of appearance and/or surgical history, in a manner that respects the privacy needs of transgender and non-transgender patients alike.*" Privacy and confidentiality dictate that staff may not share any information about one patient with another without express permission. If a room assignment leads to distress for either patient, then efforts need to be made to assign one of them to a private room. When this cannot be accommodated or when there are questions or concerns related to room assignments, an ethics consultation needs to be requested.

28. Are there any recommended resources for further information?

VA does not currently have clinical practice guidelines for the care of transgender and intersex Veterans. While VA does not endorse the following private sector guidelines, they may serve to provide information and education about the complexities of caring for this patient population.

a. World Professional Association for Transgender Health's Standards of Care for Gender Identity Disorders, Version 7, 2011. Available from www.WPATH.org

b. Endocrine Society Guidelines http://www.endo-society.org/guidelines/final/upload/Endocrine-Treatment-of-Transsexual-Persons.pdf

c. Clinical Protocol Guidelines for Transgender Care http://www.vch.ca/transhealth or http://transhealth.vch.ca/resources/careguidelines.html

d. The Joint Commission: *Advancing Effective Communication, Cultural Competence and Patient-and-Family Centered Care for the Lesbian, Gay, Bisexual and Transgender (LGBT) Community: A Field Guide*. Oak Brook, IL, Oct. 2011. http://www.jointcommission.org/lgbt/

29. REFERENCES

a. Brown, G. R. (2010). Autocastration and autopenectomy as surgical self-treatment in incarcerated persons with gender identity disorder. *International Journal of Transgenderism, 12*(1), 31-39 doi:10.1080/15532731003688970.

b. Institute of Medicine. (2011). *The health of lesbian, gay, bisexual, and transgender people: Building a foundation for better understanding.* Washington, DC: The National Academies Press: http://www.iom.edu/Reports/2011/The-Health-of-Lesbian-Gay-Bisexual-and-Transgender-People.aspx.

c. Murad, M. H., Elamin, M. B., Garcia, M. Z., Mullan, R. J., Murad, A., Erwin, P. J., &Montori, V. M. (2010). Hormonal therapy and sex reassignment: A systematic review and meta-analysis of quality of life and psychosocial outcomes. *Clinical Endocrinology, 72*(2), 214-231. doi:10.1111/j.1365-2265.2009.03625.x.

UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF NORTH CAROLINA

JOAQUÍN CARCAÑO ET AL., *Plaintiffs*, v. PATRICK MCCRORY ET AL., *Defendants*.	No. 1:16-cv-00236-TDS-JEP

EXPERT DECLARATION OF DEANNA ADKINS, M.D.

PRELIMINARY STATEMENT

1. I have been retained by counsel for Plaintiffs as an expert in connection with the above-captioned litigation. I have actual knowledge of the matters stated in this declaration. My professional background, experience, and publications are detailed in my curriculum vitae, a true and accurate copy which is attached as Exhibit A to this declaration. I received my medical degree from the Medical College of Georgia in 1997. I am currently the Fellowship Program Director of Pediatric Endocrinology at Duke University School of Medicine and the Director of the Duke Center for Child and Adolescent Gender Care.

2. I have been licensed to practice medicine in the state of North Carolina since 2001.

3. I have extensive experience working with children with endocrine disorders and I am an expert in the treatment of children with differences or disorders of sex development and gender dysphoria.

4. I am a member of the American Academy of Pediatrics, the North Carolina Pediatric Society, the Pediatric Endocrine Society, and The Endocrine Society. I am also a member of the World Professional Association for Transgender Health ("WPATH"), the leading association of medical and mental health professionals in the treatment of transgender individuals.

5. I am the founder of the Duke Center for Child and Adolescent Gender Care ("Gender Care Clinic"), which opened in 2015. I currently serve as the Director of the clinic. The Gender Care Clinic treats children, adolescents, and young adults between the ages of 7 and 22 who have gender dysphoria and/or differences or disorders of sex development. I have been caring for these individuals in my routine practice for many years prior to opening the clinic

6. I currently treat approximately 90 transgender and intersex young people from North Carolina and across the southeast at the Gender Care Clinic. I have treated approximately 150 transgender and intersex young people in my career.

7. As part of my practice, I stay familiar with the latest medical science and treatment protocols related to differences or disorders of sex development and gender dysphoria.

8. I am regularly called upon by colleagues to assist with the sex assignment of infants who cannot be classified as male or female at birth due to a range of variables in which sex-related characteristics are not completely aligned as male or female.

9. In preparing this declaration, I reviewed the materials listed in the attached Bibliography (Exhibit B). I may rely on those documents as additional support for my opinions. I have also relied on my years of experience in this field, as set out in my curriculum vitae (Exhibit A), and on the materials listed therein. The materials I have relied upon in preparing this declaration are the same types of materials that experts in my field of study regularly rely upon when forming opinions on the subject.

10. In the past four years, I have testified as an expert at trial or deposition in the following matter: *United States v. Oversby, Brandon R.*, SPC, U.S. Army, B Company (Second Judicial Circuit, Fort Bragg Oct. 15, 2014).

11. I am being compensated at an hourly rate for actual time devoted, at the rate of $275 per hour. My compensation does not depend on the outcome of this litigation, the opinions I express, or the testimony I provide.

WHAT DOES IT MEAN TO BE TRANSGENDER OR INTERSEX?

12. A transgender individual is an individual who has a gender identity that differs from the person's birth-assigned sex.

13. Individuals who are intersex (also known as having "differences of sex development") have sex characteristics that are a mixture of those typically associated with both "male" and "female" sex designations.

14. At birth, infants are generally classified as male or female based on observation of their external genitalia. This classification becomes the person's birth-assigned sex but may not be the same as the person's gender identity.

15. A person's gender identity refers to a person's inner sense of belonging to a particular gender, such as male or female.

16. Gender identity is a deeply felt and core component of a person's identity.

17. Everyone has a gender identity.

18. Children usually become aware of their gender identity early in life.

19. Most people have a gender identity that aligns with the sex they were assigned at birth. However, for some people, their deeply felt, core identification and self-image as a particular gender does not align with the sex they were assigned at birth. This lack of alignment can create significant distress for individuals with this experience and can be felt in children as young as 2 years old.

20. Gender identity cannot be voluntarily altered including for individuals whose gender identity does not align with their birth-assigned sex.

21. Although research regarding the precise determinant of gender identity is still ongoing, evidence strongly suggests that gender identity is innate or fixed at a young age and that gender identity has a strong biological basis.

22. Both post-mortem and functional brain studies that have been done on the brains of individuals with gender dysphoria show that these individuals have brain structure, connectivity, and function that do not match their birth-assigned sex. Variations in these studies include overall brain size, intra- and inter-hemispheric connectivity (number of connections within each half of the brain and between halves of the brain). Differences have been shown in visuospatial and verbal fluency tasks and their activation patterns in the brain. Variations in cortical thickness in the sensory motor

areas, the white matter microstructure, and regional cerebral blood flow are also present in those with gender incongruence compared to those without.

HOW DO EXPERTS ASSIGN OR "DETERMINE" SEX?

23. From a medical perspective, the appropriate determinant of sex is gender identity.

24. For many people, gender identity aligns with the sex assigned to the individual at birth, so assigning sex based on sex-characteristics such as external genitalia is a proxy for assigning sex based on one's gender identity.

25. For transgender people and people with differences or disorders of sex development, however, there is not complete alignment among sex-related characteristics. Medicine and science require that where a more careful consideration of sex assignment is needed that it be based on gender identity rather than other sex characteristics.

26. In the past, when mental health and medical practitioners identified a disconnect between a person's gender identity and assigned sex at birth, treatment often focused on efforts to bring the individual's gender identity into alignment with the assigned sex. These practices were unsuccessful and incredibly harmful. Deep depression, psychosis, and suicide frequently resulted.

27. Medical science has since recognized that appropriate treatment for individuals who are transgender must focus on alleviating distress through supporting outward expressions of the person's gender identity and bringing the body into alignment with that identity to the extent deemed medically appropriate based on assessments

between individual patients and their medical and mental health providers. These treatments have been very successful.

28. In infants with sex-characteristics associated with both males and females, if an assignment is made that later conflicts with gender identity, then the only appropriate medical course is to re-assign or re-classify the individual's sex to align with gender identity.

29. It is harmful to make sex assignments based on characteristics other than gender identity. For example, in cases where surgery was done prior to the ability of the child to understand and express their gender identity, there has been significant distress in these individuals who then have to endure further surgeries to reverse the earlier treatments. It has become standard practice to wait until the gender identity is clear to make permanent surgical changes in these patients unless the changes are required to maintain the life or health of the child.

30. A person's gender identity (regardless of whether that identity matches other sex-related characteristics) is fixed, cannot be changed by others, and is not undermined or altered by the existence of other sex-related characteristics that do not align with it.

31. Today, medical and mental health care providers who specialize in the treatment of these individuals with gender dysphoria recognize that being transgender is a normal developmental variation.

32. For individuals with gender dysphoria and individuals with differences of sex development, gender identity is the only medically supported determinant of sex when sex assignment as male or female is necessary. It would be unethical and

extremely harmful to, for example, force a man with congenital adrenal hyperplasia, discussed below, to be classified as a woman simply because he was classified as female at birth. Likewise it would be unethical and extremely harmful to force a man who has gender dysphoria to be classified as female simply because he was assigned female at birth.

33. The cost of not assigning sex based on gender identity is dire. It is counter to medical science to use chromosomes, hormones, internal reproductive organs, external genitalia, or secondary sex characteristics to override gender identity for purposes of classifying someone as male or female. Gender identity does and should control when there is a need to classify an individual as a particular sex.

34. With the exception of some serious childhood cancers, gender dysphoria is the most fatal condition that I treat because of the harms that flow from not properly recognizing gender identity. Attempted suicide rates in the transgender community are over 40%, which is a risk of death that far exceeds most other medical conditions. The only treatment to avoid this serious harm is to recognize the gender identity of patients with gender dysphoria and differences of sex development.

WHAT IS "BIOLOGICAL SEX"?

35. Rather than assign sex based on gender identity, North Carolina, because of H.B. 2, now by law requires sex assignment in single-sex facilities within public buildings to be based on "biological sex," defined as "the physical condition of being male or female, which is stated on a person's birth certificate." In addition to being

counter to medical science as explained above, this definition and conception of "biological sex" is inherently flawed.

36. Although we generally label infants as "male" or "female" based on observing their external genitalia at birth, external genitalia do not account for the full spectrum of sex-related characteristics nor do they "determine" one's sex. Instead, sex-related characteristics include external genitalia, internal reproductive organs, gender identity, chromosomes, secondary sex characteristics and genes. These sex-related characteristics do not always align as completely male or completely female in a single individual. In fact, this occurs frequently enough that doctors use a scale called the Prader Scale to describe the genitalia on a spectrum from male to female.

37. Particularly for individuals with a difference or disorder of sex development, sex assignment at birth can involve the evaluation of the sex chromosomes, the external genitalia, the internal genitalia, hormonal levels, and sometimes, specific genes. There are also cases in which the appearance of the external genitalia can change at puberty as well as variations in the appearance of secondary sex characteristics that may signal that there is a difference in sex development in a person.

38. Many individuals, including individuals who have intersex traits or gender dysphoria, have biological, sex-related characteristics that are typically associated with both men and women. For example:

a. Individuals with Complete Androgen Insensitivity have 46-XY chromosomes, which are typically associated with males, but do not have the tissue receptors that respond to testosterone or other androgens. The body, therefore, does not develop external genitalia or secondary sex

characteristics typically associated with males but does, generally, have testes. At birth, based on the appearance of the external genitalia, individuals with Complete Androgen Insensitivity are generally assigned female.

b. Individuals with Klinefelter Syndrome have 47-XXY chromosomes and internal and external genitalia typically associated with males, however, the testicles in individuals diagnosed with Klinefelter Syndrome lose function over time. This may lead to breast development and infertility in addition to a number of other health issues.

c. Individuals with Turner Syndrome have 45-XO chromosomes, which means they have one less chromosome than everyone else. In utero, these individuals form sex characteristics typically associated with females including all internal structures but the ovaries begin to die soon after birth and the individuals are unable to make estrogen. Without treatment, individuals with Turner Syndrome do not develop secondary sex characteristics typically associated with women.

d. Individuals with Mosaic Turner Syndrome may have two different sets of chromosomes. They lose a sex chromosome in the early stages of embryonic development. The cells that are descendants of the cell that lost a chromosome will have Turner Syndrome features. The cells that are descendants of the cells that did not lose a sex chromosome will have features of the embryo's initial chromosomal sex. Sometimes this initial sex was XX and sometimes it is XY. When there are cells with XY

chromosomes present, the fetus produces testosterone and there is at least some testicular tissue. There may also be ovarian tissue. The external genitalia can then be a mixture of external genitalia typically associated with both males and females.

e. Individuals with congenital adrenal hyperplasia (CAH) are individuals who have XX chromosomes and external genitalia typically associated with women but are born with extra androgens, including testosterone, and from early in gestation, their brains are exposed to high levels of androgen. Despite frequently being assigned female at birth because of external genitalia, many individuals with this condition have a male gender identity.

f. Individuals with 5-alpha reductase are chromosomally XY but they have an enzyme deficiency that does not allow them to convert testosterone to dihydrotestosterone, the active form of testosterone. At birth, based on external genitalia, they are often assigned female, but their gender identity is almost always male as adults. Their external genitalia also changes at puberty because hormonal changes allow them to make more dihydrotestosterone which is needed for the physical changes that occur causing the development of external genitalia typically associated with males. During early development there is enough testosterone to affect the brain, which often results in a male gender identity.

g. Individuals with cloacal exstrophy have external genitalia at birth that is often split in half and most of their internal pelvic organs are located on

the outside of their bodies. They are born with both XX and XY chromosomes. However, because of the severity of the changes in their external genitalia, most of the XY patients had sex reassignment in infancy and were raised as females. Follow-up studies of these patients as adults show that almost all of the XY patients have a gender identity of male, despite their female sex assignment. This is powerful evidence that one's core gender identity cannot be changed.

h. A transgender person who transitioned at a young age and takes hormone blockers would not develop the secondary sex characteristics typically associated with their birth-assigned sex. This process suspends their pubertal development until the blockers are stopped or until gender affirming hormones are added.

i. A woman who is transgender may have XY chromosomes, undergo hormone treatment and surgery, and have external genitalia and secondary sex characteristics typically associated with women.

j. A man who is transgender may undergo hormone therapy, have hormone levels comparable to non-transgender men, and thus develop masculine secondary sex characteristics.

39. As the examples above underscore, "biological sex" as used in H.B. 2 is not an accurate or useful medical term with respect to individuals whose sex-related characteristics are not in alignment with each other. Rather, the medically appropriate determinant of sex is gender identity.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed on 5/13, 2016.

By: _____
Deanna Adkins, M.D.

UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF NORTH CAROLINA

UNITED STATES OF AMERICA, Plaintiff, v. STATE OF NORTH CAROLINA; PATRICK MCCRORY, in his official capacity as Governor of North Carolina; NORTH CAROLINA DEPARTMENT OF PUBLIC SAFETY; UNIVERSITY OF NORTH CAROLINA; and BOARD OF GOVERNORS OF THE UNIVERSITY OF NORTH CAROLINA, Defendants, STATE OF NORTH CAROLINA; PATRICK MCCRORY, in his official capacity as Governor of North Carolina; NORTH CAROLINA DEPARTMENT OF PUBLIC SAFETY, Counterclaim Plaintiffs, v. UNITED STATES OF AMERICA, Counterclaim Defendant.	Case No. 1:16-cv-425

EXPERT DECLARATION OF DEANNA ADKINS, MD, IN SUPPORT OF THE UNITED STATES' MOTION FOR PRELIMINARY INJUNCTION

Qualifications and Background

1. I have been retained by counsel for United States as an expert in connection with the above-captioned litigation. I have also been retained by counsel for the Plaintiffs in the related matter of *Carcaño, et al. v. McCrory, et al.*, No. 16-236, and submitted a report in that case and the above-captioned case on August 12, 2016. A true and accurate copy of that report is attached as Exhibit A. I have actual knowledge of the matters stated in this declaration and in the report attached as Exhibit A. My professional background, experience, and publications are detailed in my curriculum vitae, a true and accurate copy of which is included in Exhibit A.

2. As detailed in my attached report and CV, I am currently the Fellowship Program Director of Pediatric Endocrinology at Duke University School of Medicine and the Director of the Duke Center for Child and Adolescent Gender Care. *See* Exhibit A.

3. I have extensive experience working with children with endocrine disorders and I am an expert in the treatment of children with differences of sex development and gender dysphoria. As part of my practice, I stay familiar with the latest medical science and treatment protocols related to differences of sex development and gender dysphoria.

4. In preparing this declaration, I reviewed the materials listed in the Bibliography included in Exhibit A as well as the expert declarations submitted in opposition to the United States' motion for a preliminary injunction. I may rely on those documents as support for my opinions. I have also relied on my years of experience in this field, as set out in my CV and on the materials listed therein. *See* Exhibit A. The materials I have relied upon in preparing this declaration are the same types of materials

that experts in my field of study regularly rely upon when forming opinions on the subject.

5. In the past four years, I have testified as an expert at trial or deposition in the following matter: *United States v. Oversby, Brandon R.*, SPC, U.S. Army, B Company (Second Judicial Circuit, Fort Bragg Oct. 15, 2014).

Standards of Care for Treatment of Gender Dysphoria

6. In my current practice, I treat over 125 patients who have gender dysphoria.

7. I treat my patients based on their individual medical needs and follow the protocols for treatment set out by the World Professional Association for Transgender Health (WPATH) Standards of Care and clinical guidelines for treatment of gender dysphoria developed by the Endocrine Society. These standards recommend gender transition, including social transition, hormone therapy, and surgery depending on the age and medical needs of the patient.

8. The WPATH Standards of Care are recognized by the major medical and mental health groups in the United States–including the American Medical Association, the American Psychiatric Association, and the American Psychological Association–as the authoritative protocols for treating gender dysphoria.

9. Dr. Van Meter suggests that the WPATH Standards of Care should be disregarded because WPATH is "an agenda-driven advocacy organization." (Van Meter, ¶ 53). WPATH, like many other medical associations, is an organization of hundreds of professionals who work to share information about the best ways to treat a medical condition. Just like the American Diabetes Association or the American Heart

Association puts on conferences, develops guidelines for treatment, and educates its members and the community, so too does WPATH. Members of WPATH are invested in the care of individuals with gender dysphoria just like members of the American Diabetes Association are invested in the care of individuals with diabetes. This is not a "social and political agenda." It is about improving outcomes and treatment for individuals with medical needs.

10. The American College of Pediatricians, which rejects the well-established medical protocols for the treatment of gender dysphoria, is not the major medical association of pediatricians in this country. In fact, I had never heard of them until my involvement in this case. The American Academy of Pediatrics, which is the major pediatric professional association with approximately 66,000 members, has called for the repeal of North Carolina's HB 2. The CEO and Executive Director of the American Academy of Pediatrics called for repeal of H.B. 2, saying: "Adolescents who are transgender are already at heightened risk for violence, bullying and harassment, and are already more prone to depression and engaging in self-harm, including suicide . . . HB2 and other measures making their way through state legislatures across the country exacerbate those risks by creating hostile environments for transgender youth, all implying the same message; 'you're different, something is wrong with you, you need to change in order to fit in here.'" American Academy of Pediatrics, AAP News, "AAP calls for repeal of N.C. transgender law" (April 20, 2016) (http://www.aappublications.org/news/2016/04/20/Transgender042016

The Consensus Regarding treatment of Adolescents and Adults with Gender Dysphoria

11. The Defendants' experts mistakenly focus on questions related to the treatment of pre-pubertal children (i.e., pre-Tanner Stage 2, generally around age 10) to challenge well-established treatment protocols for adolescents and adults. There are different approaches within the community of experts treating gender dysphoria about how to treat pre-pubertal children. Some support social transition for pre-pubertal children and others, like Dr. Kenneth Zucker—who is cited repeatedly by Defendants—do not in most cases based in significant part on the fact that there are studies that found that many children with gender incongruence in early childhood did not have gender dysphoria by the time they reached adolescence.

12. When it comes to adolescents and adults, there is no evidence that gender incongruence ceases over time and there is a clear medical consensus recognized by the major medical associations (and Dr. Zucker, who is an author of the most recent WPATH Standards of Care) that gender transition–including social transition, hormone therapy and/or surgeries where medically necessary–is appropriate treatment. Defendants' conflation of pre-pubertal children and adolescents reflects their lack of knowledge about treatment in this field. In fact, the Diagnostic & Statistic Manual (DSM) has completely separate diagnoses for the condition in childhood and the condition in adolescence. *See* American Psychiatric Association, Diagnostic and Statistical Manual of Mental Disorders, Fifth Ed., "Gender Dysphoria in Children" and "Gender Dysphoria in Adolescents and Adults" (2013).

13. It is incorrect and unsupported by the data to suggest that studies on the treatment of gender incongruence and gender dysphoria in children who are pre-Tanner Stage 2 can be used to draw conclusions about the treatment of adolescents and adults with the condition. Such suggestions misrepresent the understanding and consensus view of experts who research and treat gender dysphoria.

14. For younger children who are pursuing social transition as part of a medically supervised treatment plan, that social transition includes use of single-sex spaces consistent with gender identity. For the young children that I treat, access to such spaces has greatly improved their health and well-being.

15. Dr. Van Meter's description of the nature of puberty blocking treatment for gender dysphoric patients is not accurate. This treatment has been used for decades on children with precocious puberty and none of the potential health consequences cited by Dr. Van Meter have been documented in that population. We only administer hormone blockers to delay the onset of puberty within the typical range. Even the articles cited by Dr. Van Meter to support his contentions in fact say the opposite of what he claims. For example, Dr. Van Meter claims that "[t]here is evidence that bone mineral density is irreversibly decreased if puberty blockers are used." (Van Meter, ¶ 44). But the article that Dr. Van Meter cites to support that claim says the opposite, concluding instead that the use of puberty blockers "is safe and reversible for the reproductive system, [Bone Mineral Density] BMD, and [Body Mass Index] BMI." (Van Meter, n. 25).

Sex Assignment and the Nature of Gender Identity

16. Dr. Mayer's opinion that "biological sex can still be defined strictly in terms of the structure of reproductive systems" is an extremely outdated view of biological sex. (Mayer, ¶ 29). In the past when assigning sex to an individual with sex-related characteristics that did not completely align as stereotypically male or stereotypically female, doctors would assign sex based solely on how the individual would be able to reproduce. This has long since been abandoned as an approach as even Defendants' other experts recognize in favor of a more nuanced approach that takes into account the range of sex-related characteristics with the goal of assigning sex consistent with gender identity.

17. The experience of Dr. John Money's patients discussed by Dr. Mayer demonstrates that a person's gender identity cannot be altered through socialization. The lessons of Dr. Money's failed experiments have significantly influenced how endocrinologists and other doctors assign sex for individuals with differences of sex development (DSDs)—that assignment should be based on gender identity, once it is known. For those of us involved in the care of infants with DSDs, we are deeply concerned about any permanent surgical treatment on an infant before the infant is able to communicate gender identity.

18. The occurrence of intersex conditions (also known as DSDs) are not "rare" as Drs. Hruz and Van Meter suggest. (Hruz, ¶ 20; Van Meter, ¶ 14). The statistic cited by Dr. Van Meter (one in every 4500 to 5500 births) refers to just one subset of intersex conditions—ambiguous genitalia at birth. The article he cites for that statistic also notes

that Klinefelter syndrome–a DSD–is estimated in one of 500 to 1000 births, and that "when all congenital genital anomalies are considered . . . the rate may be as high as [one in 200 to 300]." Lee PA et al., Global Disorders of Sex Development Update since 2006: Perceptions, Approach and Care, 2016 Horm Res Paediatr., at 159-60. *See* Exhibit A, ¶¶ 36-38 for a discussion of the nature of the more common intersex conditions. This makes DSDs significantly more common than other common genetic variations such as Down Syndrome, which occurs in approximately 1 in every 1,000 live births. See World Health Organization, Genes and Human Disease, http://www.who.int/genomics/public/geneticdiseases/en/index1.html.

Defendants' Experts are not Individuals Known in the Field of Treatment of Gender Dysphoria

19. To effectively treat my patients, I stay current on the research and literature in the field of treatment for gender dysphoria and I attend conferences and lectures where the latest research is discussed and clinicians share their experience. I have never seen any of the Defendants' experts at a conference or meeting regarding gender dysphoria; nor do I recognize their names as individuals who publish in this field.

20. Physicians who treat children and adolescents with gender dysphoria regularly encounter each other at meetings and conferences regarding treatment, even those of us who take different approaches to the management of the condition. For example, Dr. Kenneth Zucker, who is cited extensively by Drs. Hruz, Van Meter, and Mayer, is a member of WPATH and speaks regularly at meetings regarding the treatment of the condition. I have seen him speak twice in the past year.

21. As in any medical field, attending conferences and being part of a professional community of clinicians provides a doctor with an opportunity to learn about the clinical experience of hundreds of colleagues, which in turn informs the development of generally accepted practices of experts in the field. Clinical experience is an important part of the body of knowledge about any medical condition, including gender dysphoria.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct.

Executed on this 13 day of September, 2016.

By: _____
Deanna Adkins, M.D.

EXHIBIT 35

George Brown Declaration

UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF NORTH CAROLINA

UNITED STATES OF AMERICA, Plaintiff, v. STATE OF NORTH CAROLINA; PATRICK MCCRORY, in his official capacity as Governor of North Carolina; NORTH CAROLINA DEPARTMENT OF PUBLIC SAFETY; UNIVERSITY OF NORTH CAROLINA; and BOARD OF GOVERNORS OF THE UNIVERSITY OF NORTH CAROLINA, Defendants.	Case No. 1:16-cv-00425

EXPERT DECLARATION OF GEORGE R. BROWN, MD, DFAPA

PRELIMINARY STATEMENT

1. I have been retained by counsel for Plaintiff as an expert in connection with the above-captioned litigation. I have actual knowledge of the matters stated in this declaration.

2. I am a Professor of Psychiatry and Associate Chairman of the Department of Psychiatry at East Tennessee State University in Johnson City, Tennessee. I am board certified in adult psychiatry. I was named a Fellow of the American Psychiatric Association in 1998 and a Distinguished Fellow in 2003. Additional information about my professional background, experience, and publications are detailed in my curriculum vitae, which is attached as Exhibit A to this declaration.

3. I have specialized training and expertise in the diagnosis and treatment of Gender Dysphoria, also known as Gender Identity Disorder. I have authored or coauthored 38 papers in peer-reviewed journals and 19 book chapters on topics related to Gender Dysphoria, including the chapter on Gender Dysphoria in Treatments of Psychiatric Disorders (3d ed. 2001), a definitive text on the diagnosis and treatment of psychiatric disorders published by the American Psychiatric Association.

4. I began seeing patients in 1983, and I have been a practicing psychiatrist since 1987. Over the last 33 years, I have evaluated, treated, and/or conducted research with between 600 and 1000 individuals with gender disorders in person, and over 5100 patients with Gender Dysphoria during the course of research-related chart reviews.

5. Since 1987, I have been extensively involved with the World Professional Association of Transgender Health ("WPATH"), an internationally recognized association of medical, surgical, and mental health professionals specializing in the evaluation and treatment of transgender and gender non-conforming people. With over 1000 members worldwide, WPATH is comprised of physicians, psychiatrists, psychologists, social workers, surgeons, and other health professionals who specialize in the diagnosis and treatment of Gender Dysphoria and other gender-related issues. I served on the Board of Directors of WPATH from 1993-1997, 2001-2007, and 2010-2014. I also served on the Executive Committee of WPATH as Secretary-Treasurer from 2007-2009.

6. In addition, I am a coauthor in the development and publication of WPATH's Standards of Care for the Health of Transsexual, Transgender, and Gender-Nonconforming People, Version 7 ("Standards of Care" or "SOC") (published in 2011 and currently in use), as I was in the previous two versions (Versions 5 and 6). I served as a member of WPATH's

Standards of Care Revision Committee from 1990-1998 and have been Co-Chairman or a member of that committee from 2001 to present. The WPATH standards for the medical treatment of Gender Dysphoria represent the consensus of specialists in the field and have been recognized as the definitive standards by a number of jurisdictions in the United States and Canada.

7. My current responsibilities involve conducting the largest studies ever developed concerning the health of, and health disparities in, transgender / gender dysphoric people, as well as providing national training programs on transgender health care on a national basis in the Veterans Health Administration and for the Department of Defense.

8. In preparing this declaration, I relied on my scientific education and training, my research experience, my knowledge of the scientific literature in the pertinent fields (a non-exhaustive list of those references is included as Exhibit B to this document), and my 33 years of clinical experience in evaluating, treating, and conducting research with patients with Gender Dysphoria and other issues related to gender identity. I may wish to supplement these opinions or the bases for them as a result of new scientific research or publications or in response to statements and issues that may arise in my area of expertise.

9. I am being compensated at an hourly rate for actual time devoted, at the rate of $500 per hour for any clinical services, review of records, or preparation of reports or declarations; $600 per hour for deposition and trial testimony; $2000 per half day for travel time (or otherwise); and $4000 per full day spent out of the office. My compensation does not depend on the outcome of this litigation, the opinions I express, or the testimony I provide.

OPINIONS AND CONCLUSIONS

DISCUSSION PART I – SCIENTIFIC UNDERSTANDING OF SEX

10. In most cases, the sex assigned at birth to newborns on their birth certificate is based solely on a cursory examination of their external genitalia. However, this method of assigning sex amounts to nothing more than a "best guess" of a child's sex. At birth, sex can be recorded as only "male" or "female" and, as such, is an administrative binary terminology that does not take into account the complexity of human experience. "Sex" is much more complicated, as it involves biological constructs that may or may not be readily observed, and includes the important component of gender identity (Richardson, 2013).

11. A person's "sex" is not exclusively or solely defined by one's anatomy or ability to procreate as was often believed in the past (Ovesey & Person, 1973). "Biological sex" is a broad and complex concept that consists of a number of variables that includes gender identity, genital anatomy (internal and externally visible), secondary sexual characteristics, brain anatomy, hormonal levels in the brain and body, and chromosomal complement.

12. The American Psychological Association defines "sex" as "a person's biological status and is typically categorized as male, female, or intersex (i.e., atypical combinations of features that usually distinguish male from female)."

13. Primary sexual characteristics are a factor when determining a person's sex. Genital anatomy, which includes both internal (not observable) and external (observable) components, is an example of a primary sexual characteristic. The appearance of the observable external genitalia is usually the sole basis for determining whether a baby's sex is recorded on a birth certificate as either "male" or "female." As a general category, however, primary sexual characteristics include those features that are not subject to the hormonal changes associated with

puberty: *e.g.*, testes, prostate, seminal vesicles, penis, ovaries, vagina, uterus, fallopian tubes, clitoris, and labia.

14. Secondary sexual characteristics are yet another factor in determining a person's sex. Secondary sexual characteristics are those physical features that develop under the influence of rising levels of sex steroid hormones beginning at puberty. Examples include breasts in women; "Adam's Apple" (enlargement of the front part of the laryngeal cartilage) in men; facial hair in men; widening of the pelvis in women; deepening of the voice in men; and hip-to-waist measurement ratios that are higher in adult females, on average, compared to adult males. The development of secondary sexual characteristics is dependent on production of adequate amounts of estrogens in females and testosterone in males.

15. Brain anatomy is another determinant of a person's sex. As discussed in greater detail below, many areas of the brain are different between males and females ("sexually dimorphic" areas of the brain) due to genetics and the amounts of sex steroid hormones present in the developing fetal brain (from any source, including from the woman carrying the fetus).

16. The relative levels of the hormones estrogen and testosterone (and their metabolites, or what is left after they are processed by the body) present in the brain and body are also factors that determine a person's sex. Both the brain and the body have receptors for estrogen and testosterone, which means that the brain and various organs in the body are changed by the presence, or absence, of these two major hormone classes. For example, both testosterone and estrogen are present in all people, but the relative amount of estrogen compared to testosterone is typically far, far higher in female bodies than in male bodies, whereas the amount of testosterone is typically far greater in male bodies than in female bodies.

17. Variability in the amount of these sex hormones, both before and after birth, can have major consequences on the primary and secondary sexual characteristics and the gender identity of people with these variances. Defects in prenatal sex hormone production can result in ambiguously appearing genitalia at birth, or misassignment of sex at birth (MacGillivray and Mazur 2005). For example, babies with much higher levels of androgens early in life (*e.g.*, congenital adrenal hyperplasia, a genetic absence of an important sex steroid enzyme) may appear to have male genitalia at birth even though they have typically female chromosomes (46XX; see below) and a female gender identity. There are many such conditions, which collectively are referred to as "intersex" conditions, disorders of sex development, or "atypical sexual development" (Mazur et al., 2007).

18. Chromosomes are also a determinant of sex. Typically, most people have 46 total chromosomes, two of which are "sex chromosomes" known as X and Y. Babies assigned the female sex at birth based on the appearance of external genitalia typically have a 46XX pattern; likewise, babies assigned the male sex at birth based on the appearance of their external genitalia typically have a 46XY pattern. Uncommonly (but not rarely), there are genetic abnormalities in the fertilized egg that lead to chromosome patterns that are different from either 46XX or 46XY. Examples are numerous and can be found in Mazur et al., 2007. Classic examples include Turners' Syndrome, estimated at 1:2500 live births (46XO, where one sex chromosome is missing), and Klinefelter's Syndrome, where extra chromosomes are present (for example, 47XXY, 48XXYY). This nonheritable genetic abnormality is present in 1:600 live births (Nielsen and Wohlert, 1991).

19. Some, but not all, disorders of the sex chromosomes are associated with atypical sexual organ appearance and higher rates of homosexuality, bisexuality, or asexuality (that is, little to no sexual attraction to anyone or interest in having sexual relations). Some people with disorders of the sex chromosomes, but not all, may have atypical gender identity and/or gender role development as well. The key point is that the presence of a typical 46XX or 46XY chromosome pattern is relevant for determining a person's sex, but not sufficient, in and of itself, to determine a person's sex (Richardson, 2013).

20. Gender identity is an internal sense of oneself as a particular gender, such as male or female. The American Psychiatric Association (APA) defines gender identity as a "category of social identity and refers to an individual's identification as male, female, or occasionally, some category other than male or female" (APA, Diagnostic and Statistical Manual of Mental Disorders (DSM-5), 2013 at 451). Everyone has a gender identity.

21. Gender identity is usually established early in life, by the age of two to three years old, and displays very little malleability over time for the vast majority of people (Stoller, 1968), especially after the onset of puberty. Children as young as one year old may display gender-specific behaviors readily recognizable as associated with the "opposite" sex (Zucker & Bradley, 1995, at 11).

22. From a medical perspective, gender identity is a critical determinant of a person's sex. From a social perspective (which is also relevant when considering the appropriate medical approach to these issues), the appropriate determinant of sex is gender identity, as that is the underlying basis for how one presents oneself to others in society in ways that typically communicate what sex one is in our culture.

23. The term "transgender" is a relatively recent term used as an umbrella concept for anyone who experiences any significant degree of "mismatch" between gender identity and physical anatomy. The term "transgender" is also used to describe people who have transitioned to living as a gender different from what they were assigned at birth ("birth-assigned sex"). "Transgender," however, is not a medical or psychiatric diagnosis.

24. Although the precise etiology of such gender identity issues is unknown (Ettner, 2007; Lev, 2004), most experts agree that there is likely a biological, rather than a psychological, basis for gender identity in general, including transgender identity. Even those who espouse the idea that postnatal factors, such as familial interactions, play an important role in gender identity development suspect that biological factors play a role in "inducing a vulnerability that then allows the psychosocial factors within the family to exert their effect" (Bradley, 1985, at 175). The evidence for gender identity arising from strictly, or mostly, postnatal influences (such as family interactions, social factors, maternal/paternal rearing styles) is neither persuasive nor compelling; nor is the notion that being transgender is "a lifestyle choice."

25. Much of the evidence in support of a biological basis for gender identity is based on comparison studies of the brains of transgender persons[1] using imaging techniques with live subjects or measurements taken post-mortem (after death). Such techniques were not possible a short time ago, but nonetheless, the concept of a "critical period effect" during fetal brain development was espoused decades ago as an explanation for why some (few) individuals develop a gender identity different from the sex assigned at birth (Kimura, 1992). Although it is not

[1] In some of the research that I am discussing, the subjects have been described as transsexual rather than as transgender. The term "transsexualism" is no longer a diagnostic term, having been replaced by Gender Dysphoria, but the term "transsexual" is still used in professional circles, scholarly works, and treatment guidelines, and is usually used to refer to persons on the extreme end of a continuum of gender dysphoric symptoms (Coleman et al., 2012). To avoid confusion, I will simply refer to such individuals as transgender.

possible to directly study the developing human brain before birth, it was proposed that the hormones present in the bloodstream surrounding the developing brain at certain, undetermined critical periods in brain sexual differentiation was altered to the extent that the "brain sex" did not align with other aspects of physical anatomy (*e.g.*, genitals). This theory more recently received support in a study of fetal testosterone exposures, which showed that the level of testosterone present in the amniotic fluid correlated positively with male-typical play patterns regardless of whether the fetus was female (XX chromosomes) or male (XY chromosomes) (Auyeung et al., 2009).

26. It is well known that the brains of non-transgender men and non-transgender women differ in size in many regions of the brain. These include specific parts of the brain that are visible on MRI studies, including the hippocampus, caudate nucleus, and anterior cingulate gyrus, to name a few, that are larger in non-transgender women and the amygdala and gray matter volumes that are larger in non-transgender men. Most studies of male and female brains in non-transgender subjects also indicate that the right hemisphere is larger in men than in women.

27. Zhou and others reported in 1995 that areas of the brain known to differ in size between men and women generally could be studied in transgender persons. At least one of these sexually dimorphic brain regions in transgender women (referred to in the literature as "male-to-female" or "MtF") was consistent with the size seen in non-transgender females, rather than non-transgender males.

28. Additional support for a biological basis for gender identity was reported by Luders and colleagues, who analyzed MRI data of 24 transgender women not yet treated with cross-sex hormones in order to determine whether gray matter volumes in their brains more closely resemble people who were assigned the same sex as birth as the transgender women (30 control men), or people who share their gender identity (30 control women). Results revealed that transgender females showed a significantly larger volume of regional gray matter in the right putamen compared to the 30 control group men – non-transgender men assigned the male sex at birth. These researchers concluded that their findings provided new evidence that gender dysphoria (*i.e.*, being transgender) is associated with a distinct cerebral pattern, which supports the assumption that brain anatomy plays a role in gender identity.

29. Savic and Stefan (2011) studied the brains of persons identified as MtF / transgender females compared to non-transgender control groups of the same sexual orientation. The brains of the transgender females subjects differed from the non-transgender male control group in several regions (*e.g.*, smaller volumes in the putamen and thalamus in transgender females). They concluded: "Gender dysphoria is suggested to be a consequence of sex atypical cerebral differentiation."

30. Additional studies in support of the hypothesis that gender dysphoria is caused by sex atypical differentiation of parts of the brain before birth due to genetic and/or an early organizational effect of testosterone levels during fetal brain development include: Giedd et al., 1997; Green & Keverne, 2000; van Goozen et al., 2002; and Swaab, 2007.

31. Finally, several other post-mortem studies have also found distinctive brain patterns in transgender subjects that differ from what would be expected to be seen in non-transgender subjects assigned the same sex at birth as the transgender subject (*i.e.*, non-transgender males compared to transgender women who were assigned the male sex at birth). Kruijver et al., 2000; Berglund et al., 2008.

32. Consequently, clinical evidence supports the view that transgender females – *i.e.*, individuals who were assigned the male sex at birth but who have a female gender identity – should be considered to be women, and not men, whether or not they have had any surgery to alter the appearance or function of their genitalia. Likewise, transgender men – *i.e.*, individuals who were assigned the female sex at birth but who have a male gender identity – should be considered to be men and not women irrespective of whether they have had any surgical interventions to change their bodies.

DISCUSSION PART II – CLINICAL APPROACH TO GENDER DYSPHORIA

33. When an individual experiences significant incongruity between the sex assigned at birth and one's gender identity, this can result in a set of clinically significant symptoms described in psychiatric manuals as gender dysphoria. Not all people who experience some level of distress resulting from a lack of congruity between gender identity and other aspects of their sex, however, meet the threshold for a clinical diagnosis of Gender Dysphoria.

34. As a set of symptoms, gender dysphoria is a mixture of mood symptoms (irritability, depression, anxiety) and mental distress or discomfort based on the experience of a mismatch between the sex assigned at birth, which (as noted previously) was likely based on the appearance of external genitalia, and the internal sense of gender.

35. Specifically, an individual who experiences gender dysphoria may have been assigned the male sex at birth, but feels female in their mind and emotions. Individuals experiencing gender dysphoria are, in essence, psychologically in the "wrong body" and suffer significant emotional distress as a result.

36. Gender dysphoric persons may live for a significant period of their lives in denial of those symptoms. Many people initially do not understand their cross-gender feelings and do not have a language for such feelings until well into adulthood. It is therefore not uncommon for adults later in life to first "come out" or acknowledge to others their transgender feelings (Lev, 2004).

37. The Diagnostic and Statistical Manual of Mental Disorders of the American Psychiatric Association (DSM-5) (2013) is the current, generally recognized authoritative handbook on the diagnosis of mental disorders relied upon by mental health professionals in the United States, Canada, and other countries. Its content reflects a non-ideological, science-based, and peer-reviewed process by experts in the field who have varying perspectives.

38. The diagnosis of GD in the DSM-5 (pps. 451-459) involves two major diagnostic criteria for adolescents and adults, synopsized below:

a. A marked incongruence between one's experienced/expressed gender and assigned gender, of at least six months' duration, as manifested by at least two of the following:

1. A marked incongruence between one's experience/expressed gender and primary and/or secondary sex characteristics.
2. A strong desire to be rid of one's primary and/or secondary sex characteristics because of a marked incongruence with one's experience/expressed gender.
3. A strong desire for the primary and/or secondary sex characteristics of the other gender.

4. A strong desire to be of the other gender.

5. A strong desire to be treated as the other gender.

6. A strong conviction that one has the typical feelings and reactions of the other gender.

b. The condition is associated with clinically significant distress or impairment in social, occupational, or other important areas of functioning.

39. Diagnoses of Gender Dysphoria may also be designated by one, or both, of two "specifiers." One such specifier is "Gender Dysphoria *with a disorder of sex development*" (emphasis added), which is a subcategory for gender dysphoric individuals with one of the disorders of sex development described above. Another is "*Post-transition* gender dysphoria" (emphasis added), which would be used to refer to an individual who has socially transitioned, and either has undergone, or is preparing to have, a medical intervention, such as hormonal treatment or surgery. Like all psychiatric diagnoses, symptoms must be of significant severity to cause notable distress and/or dysfunction in a person's life. The presence of gender nonconformity alone is insufficient to warrant a psychiatric diagnosis.

40. In spite of research evidence in support of a biological basis for Gender Dysphoria, there are no commercially available or reliable biological, physical examination, or laboratory tests that are used in clinical practice to diagnose Gender Dysphoria. But this is true for virtually all of the mental disorders in the DSM-5 and its predecessors. In fact, Strategic Objective No. 1 of the National Institute of Mental Health (NIMH) is to "define the mechanisms of complex behaviors," including molecules and genomic factors (NIMH, 2015). This statement is in recognition that even in 2016, we do not know the definitive root cause for mental disorders listed

in DSM-5, and we do not have objective tests of body, brain, or fluids that definitively diagnose any mental disorders.

41. A diagnosis of Gender Dysphoria is made by a mental health professional who has training and experience with gender conditions and who conducts an in-depth evaluation of the patient, preferably with access to past medical records and collateral history from others who know the individual. The American Psychiatric Association and WPATH (Coleman et al, *Standards of Care, Version 7*, 2012) recognize that such diagnoses can be made by a range of trained and experienced mental health professionals.

42. Treatment of Gender Dysphoria is guided by the WPATH Standards of Care. The SOC were first developed in 1979. Currently in their seventh version, the SOC are considered to be authoritative for the evaluation and treatment of Gender Dysphoria and related gender conditions (Coleman et al., 2012). There are no other comprehensive, widely accepted, medical standards of care for treating individuals with these issues. As with all medical standards, the SOC are guidelines that can be modified based on the individualized patient circumstances and the health care professional's clinical judgment. With appropriate treatment, individuals with a Gender Dysphoria diagnosis can be fully cured of all symptoms.

43. A treatment plan for persons diagnosed with Gender Dysphoria involves both psychological and medical aspects. Psychotherapy is often part of a treatment plan. Social transition (*i.e.*, living in a gender role that is congruent with a patient's gender identity) is an important – and often the most important – component of a treatment plan. Social transition has been commonly described as the "real life experience" of living publicly in the gender role consistent with gender identity. Medical aspects of treatment may include hormonal reassignment to the experienced gender identity and surgery to change the genitalia and, in some

cases, secondary sexual characteristics. The combination of hormone therapy, social role transition, and surgical intervention has been referred to as "triadic therapy." What is required in any individual case, however, may vary. Moreover, other treatments may be sought, including electrolysis, voice therapy, breast augmentation, facial reconstruction, etc. (Coleman et al., 2012).

44. Social role transition is sometimes the first critical step in treatment for transgender people who have the diagnosis of Gender Dysphoria, but even for those without this diagnosis, social role transition is often embarked upon by transgender people who seek to lead an authentic life as who they are rather than what their birth certificate would otherwise dictate. The social role transition occurs in all aspects of a person's life. The purpose of this transition is to allow the development of an integrated, consolidated identity.

45. Access to sex-segregated bathrooms and changing facilities consistent with gender identity is an essential part of the social role transition, as all people, transgender or not, need to access these facilities multiple times each day. Excluding transgender men from men's facilities and transgender women from women's facilities can result in depression, anxiety, trauma, and isolation that exacerbates the mental health issues associated with Gender Dysphoria (Burgess et al., 2008; Grossman & D'augelli, 2008).

46. Under the SOC, hormone therapy and surgery have established eligibility and readiness criteria that should be met prior to approval for these medical interventions. Eligibility criteria generally involve timelines of successful experience with one mode of therapy before the next step should be undertaken. Readiness criteria involve the clinician's assessment of whether the client has demonstrated sufficient consolidation of an evolving gender identity to move on to the next step of transition.

47. Cross-sex hormone therapy has significant effects on a person's appearance and physiology. In transgender adolescent boys and men, the voice permanently deepens; facial and body hair increase dramatically; body fat is redistributed in a male pattern; and overall muscle mass increases, most noticeably in the arms and chest. For transgender adolescent girls and women, breasts develop; body fat is redistributed to the hips and breasts; the skin softens; muscle mass decreases; and body and facial hair lessens. In addition, as a result of cross-sex hormone therapy, the penis, prostate and testes atrophy, which inhibits the normal functioning of the penis, particularly with respect to penetrative sexual intercourse.

48. Transgender individuals undertaking cross-sex hormone therapy who had not previously begun the process of social transition will often do so after starting cross-sex hormones, due in part to the significant changes in physical appearance that result from this treatment.

49. Most transgender people never undergo sex reassignment surgery (also referred to as gender affirming, or gender confirming, surgery). This is also the case for transgender people who are severely gender dysphoric. Other treatments–*i.e.*, social role transition (including access to gender appropriate facilities), counseling, and, in some cases, hormone therapy–are frequently sufficient to alleviate their gender dysphoria, making invasive, expensive genital surgery unnecessary.

50. Other transgender people who may be appropriate for, and desire, sex reassignment surgery may have medical problems that preclude surgical treatment. Examples include neoplastic disease, severe cardiovascular disease, significant pulmonary disease, blood clotting abnormalities, and other conditions for which lengthy general anesthesia is contraindicated.

51. Even where sex reassignment surgery may be medically appropriate, for many transgender people, surgery is out of the question because of the high cost and the fact that it is frequently not covered by health insurance plans.

52. The minimum criteria for genital reassignment surgery includes the requirement that one have a persistent, well-documented history of gender dysphoria; the capacity to consent to treatment; be of the age of majority; and have any significant medical or mental health care conditions well controlled. Lastly, a person seeking genital surgery must generally undergo 12 continuous months of living in a gender role that is congruent with the patient's identity, and obtain two letters of referral from experienced clinicians in a qualifying mental health discipline. Living in a gender role necessarily includes the use of facilities associated with the gender identity of the person undergoing transition.

53. Early attempts at treatment to change transgender individuals' gender identity to that congruent with the sex assigned to them at birth were demonstrated to be ineffective in most cases, prompting the American Medical Association (AMA) as early as 1972 to support medical and surgical interventions as the treatment of choice for Gender Dysphoria (then called "Transsexualism") (AMA, 1972). Others noted that psychotherapy, often with associated cross-sex hormonal treatment, was of benefit for some gender dysphoric people with respect to life adjustment, but not for changing one's gender identity (Lothstein & Levine, 1981; Seikowski, 2007). In fact, with respect to attempts to change an individual's gender identity to bring it into alignment with the sex assigned at birth, it has been stated that there are no demonstrable, successful "conversions" through the use of a form of psychotherapy (Monstrey et al., 2007, at 89), known today as "reparative therapy" or "conversion therapy." These types of therapy are widely considered to be unethical by professional organizations not only because of their ineffectiveness,

but also because of the emotional harm that has been demonstrated in many who have received such therapies in the past (Daniel et al., 2015).

54. The federal Substance Abuse and Mental Health Services Administration recently issued a report showing that "conversion therapy" is not an appropriate therapeutic approach based on the evidence. The report also included similar consensus statements developed by an expert panel held by the American Psychological Association in July 2015. The professional organization that was arguably the most involved with attempting to convert both homosexual and transgender persons' identities decades ago has also come out strongly against the use of psychotherapy to attempt to change either sexual or gender identity: "Psychoanalytic technique does not encompass purposeful attempts to 'convert,' 'repair,' change or shift an individual's sexual orientation, gender identity, or gender expression. Such directed efforts are against fundamental principles of psychoanalytic treatment and often result in substantial psychological pain by reinforcing damaging internalized attitudes." (American Psychoanalytic Association, 2012).

55. Many people who identify as transgender do not come to clinical attention and therefore may not have a formal diagnosis of Gender Dysphoria or be under a specific treatment plan. There are many reasons for this, including the fact that many transgender people lack access to health care providers who feel competent to treat gender identity issues. Moreover, some transgender people have a stable gender identity different than the sex assigned at birth, but do not experience clinically significant distress as a result of the discontinuity between their gender identity and their physical anatomy. For these individuals, social transition is all that is required to alleviate any dysphoria that would result from their trying to live according to their sex assigned at birth, rather than consistent with their gender identity.

56. Transgender people, irrespective of whether they have a clinical diagnosis, report enduring discrimination, teasing, bullying and other harmful attacks, including hate crimes that may result in death (Clements-Nolle et al., 2008; Stotzer, 2009; Altschiller, 2015). Discrimination can have negative and harmful effects on the daily functioning and emotional and physical health of transgender persons, whether or not they have a Gender Dysphoria diagnosis (Bradford et al., 2013; Herman et al., 2014; Nadal & Griffin, 2011; Nadal, 2010; Goldblum et al., 2012). Conversely, transgender people who live in states with antidiscrimination and hate crime legal protections based on gender identity status are less likely to suffer from a variety of mental illnesses and symptoms compared to those who do not live in states with these protections (Blosnich et al., 2016).

57. Being denied access to gender appropriate single-sex bathrooms and changing facilities is one of the most common and acute forms of discrimination that transgender people experience. As such, restrictive restroom and locker room policies can contribute to negative general health and mental health outcomes for transgender people.

58. In sum, laws and policies that require transgender women to be treated as though they were male (or, conversely, that require transgender men to be treated as though they were female) are psychologically harmful to those individuals, and are inconsistent with evidence-based best practices designed to promote the health and well-being of transgender people (Coleman, 2012).

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct.

Executed on this 20th day of June, 2016.

By: _____
George R. Brown, MD, ~~DFAPA~~

EXHIBIT A

Exhibit A to George Brown Declaration

CURRICULUM VITAE

GEORGE RICHARD BROWN, MD, DFAPA

Professor of Psychiatry
Associate Chairman for Veterans Affairs
East Tennessee State University

Research, Teaching, Consulting Psychiatrist
James H. Quillen VAMC
Mountain Home
Johnson City, TN

Mailing address:
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Bluff City, Tennessee 37618-4103

(423) 676-5291 (cell)
(423) 538-8655 (fax)
Email: BrownGR@etsu.edu

Date of Preparation: June 29, 2016

EDUCATION:

Undergraduate: University of Rochester, Rochester, New York, 1975-1979;
Bachelor of Science with Highest Honors and Distinction in Research, Summa Cum Laude.

Medical School: University of Rochester School of Medicine, Early Acceptance Program (Rochester Plan), 1979-1983; Doctor of Medicine with Honors; Health Professions Scholarship Program.

Internship: United States Air Force Medical Center, Wright-Patterson Air Force Base, Ohio, 1983-1984.

Residency: Wright State University - United States Air Force Integrated Residency in Psychiatry, Dayton, Ohio, 1984-1987.

CREDENTIALS:

FLEX, December, 1983 (Behavioral Sciences, 94%; Psychiatry, 93%).
Full licensure to practice medicine, State of Ohio, December, 1983 to present; license #50119
Full licensure to practice medicine, State of Texas, August, 1989 to present; license #H5847
Full Licensure to practice medicine, Commonwealth of Kentucky, 1993 to 1995, #30100; allowed to expire with no intent of practicing in Kentucky.
Full licensure to practice medicine, State of Tennessee, 1994-present, license #25192

Psychiatry Resident In-Training Examinations;
1986: 98th percentile - all U.S. residents, psychiatry.
1985: 90th percentile - all U.S. residents, psychiatry.
1984: 98th percentile - all U.S. residents, psychiatry.

1983: 98th percentile - all U.S. residents, psychiatry.
American Board of Psychiatry and Neurology, Part I, April 1988 (92nd percentile); Part II, June 1989; ABPN Certificate #31377.
Electroconvulsive Therapy Administration Certification, 1985-1990.
Courtesy Staff Privileges, Charter Real Hospital, San Antonio, Texas, 1990-1994.
Courtesy Hospital Staff, Bexar County Hospital District, San Antonio, Texas, 1988-1994.
Full Admitting Privileges, Wilford Hall Medical Center, San Antonio, Texas, 1987-1993.
Full Admitting Privileges, James H. Quillen VAMC Hospital, Johnson City, TN, 1994-2016
Basic Life Support Certification, renewed March 2015

PROFESSIONAL EXPERIENCE:

Current Positions:

Professor and Associate Chairman for Veterans Affairs, Department of Psychiatry and Behavioral Sciences, Quillen College of Medicine, East Tennessee State University. 1995-present. Advisory duties to the Chairman, signature authority in absence of the Chair, contributing to administrative, teaching, and research missions of the Department, liaison between the VAMC and ETSU psychiatry administrations.

Research, Teaching, and Resident supervision appointment, James H. Quillen VAMC. February 1, 2016-present. Responsibilities include providing teaching, research services, clinical consultation, and resident supervision/mentoring in the Psychiatry Service.

Past Positions:

Staff Psychiatrist, Mental Health Outpatient Clinic, James H. Quillen VAMC. December, 2014-January 31, 2016. Responsibilities included treating veterans with chronic, persistent, mental illnesses in an outpatient setting and providing consultation services to junior staff and residents in psychiatry. Direct supervision of third year psychiatry residents in the Mental Health Clinic.

Transgender Health Care Facility Lead, Mountain Home Health Care System. 2014-January 31, 2016. Responsibilities included providing direct patient care for transgender veterans, providing national training for VHA health care providers learning how to provide transgender health care, direct supervision of other health care providers in teaching evaluation and treatment techniques, leading a multidisciplinary team of health care providers assigned to provide transgender health care in our 70,000 patient health care system.

Program Officer, Health Care Outcomes, Office of Health Equity (10A6), VA Central Office, Washington, D.C. December, 2012, to December, 2014. Responsibilities included researching medical and psychiatric health disparities in vulnerable populations of Veterans treated by the Veterans Health Administration, and assisting top officials in VHA in the development of policies that lead to elimination of health care outcome disparities in these subpopulations. Continued to see patients at Mountain Home VAMC throughout this appointment.

Chief of Psychiatry, James H. Quillen VAMC. November 22, 1995-December 16, 2012. Responsibilities included direct supervision of a staff of 34-42professional staff, including 24-28 psychiatrists, 2 Clinical Nurse Specialists, and 9-12 psychiatric nurse practitioners. Represented the Department in all meetings requiring the input of the Chief of Service. Attended executive

meetings in the Medical Center and University. Contributed to long range planning of services in the Medical Center.

Research Appointment (WOC), VHA Center of Excellence for Suicide Prevention, Canandaigua, New York. 2011-2014. Responsibilities of this position included developing research protocols collaboratively with CoE staff that have national implications related to suicide in VHA.

Director of Psychiatric Research, James H. Quillen VAMC Dept. of Psychiatry. 1994-2012. Responsibilities included creating a research program de novo and leading a research team at the VAMC, teaching resident seminars, didactics, research electives, providing direct patient care for inpatients on research protocols (usually those with severe mental disorders), traveling to conferences to present research findings and providing Grand Rounds to other institutions and medical schools. Major focus of research activities has been working with stigmatized/disenfranchised populations and addressing mental health care aspects and disparities in care.

Staff psychiatrist, Another Chance Recovery Program, Morristown, Tennessee. March 1995-1996. This is an intensive outpatient drug and alcohol treatment program with a heavy emphasis on dual diagnosis patients, outpatient detoxification from chemical dependency, and a blend of the medical and 12-Step approaches to treatment of the chemically dependent patient. One evening clinic per week.

Senior Research Scientist and Director of Psychiatric/Neuropsychiatric HIV Research, Wilford Hall Medical Center, Henry M. Jackson Foundation for the Advancement of Military Medicine, San Antonio, Texas. 1 July 1991 to 1 October 93. Responsibilities included hiring and then directing a team of approximately 15 civilian and military psychiatric researchers conducting HIV-related psychiatric research; Principal Investigator on longitudinal psychiatric natural history study of early HIV infection (males and females), 1989-1993; preparing manuscripts, presenting research findings at national and international meetings; designing and implementing new protocols; interviewing and assisting in the hiring of personnel; managing administrative and personnel issues.

Private practice of adult psychiatry. 1991-November 1993. Part-time practice primarily focusing on sexuality and gender concerns, including endocrine care, and adult psychodynamic psychotherapy.

Consulting Psychiatrist for Quality Assurance and Continuing Quality Improvement Programs:
1) Charter Real Partial Hospitalization Program, San Antonio, Texas. 1990 to 12/93. Responsibilities of this part time position included designing and implementing a medical quality assurance program and assisting Utilization Review personnel with implementing efficient resource utilization procedures.
2) Colonial Hills Hospital Inpatient Services and Adult Partial Hospitalization Program, San Antonio, Texas. 1992. Responsibilities of this part time position included custom designing a four part program to address QA/CQI concerns on all inpatient units, coordinating the implementation of the program with hospital QA/UR personnel, and quantifying/ databasing physician charting performance to analyze trends.

Staff Psychiatrist, Wilford Hall Medical Center, Lackland Air Force Base, San Antonio, Texas:

1987-1989: Primary responsibility for inpatient ward of 25-33 patients, resident and medical student teaching, and professional presentations. 1040 admissions; average length of stay 13 days.

1989-1991: Outpatient Clinic service, responsible for evaluations and treatment of adult

outpatients; supervision of PGY-3 residents in psychiatry and other staff working in the clinic (social workers, psychologists, and mental health technicians). Medical support for comprehensive Smoking Cessation Clinic.

1989-1991: Director of Psychiatric Research, half-time position; developed a research program primarily targeting psychiatric resident involvement with research and related activities, including presentations at regional and national professional meetings. Active in conducting research, reviewing and approving protocols, research design, editing publications submitted from the Department of Psychiatry, and organizing symposia; interviewing and selecting official for research personnel for multicenter collaborative HIV research grant.

ACADEMIC APPOINTMENTS:

Professor of Psychiatry (1998-present), East Tennessee State University, Quillen College of Medicine. VA Academic Faculty appointment.

Adjunct Professor of Psychology, University of Tennessee at Knoxville (1997). Served on doctoral dissertation committee as supervisor and mentor for doctoral candidate in clinical psychology.

Associate Professor of Psychiatry (1994-1998), East Tennessee State University, Quillen College of Medicine. Full time geographic faculty appointment. Renewal of previously awarded academic ranking. Activities include serving on numerous committees (see below), teaching residents, providing electives, working collaboratively with staff to conduct new research projects, interviewing residency and faculty candidates.

Clinical Associate Professor of Psychiatry (1992-1994), University of Texas Health Science Center at San Antonio, San Antonio, Texas. 1987 to 1994. Primary responsibility of this position was teaching medical students and residents in individual, group, and lecture settings; provision of psychodynamic psychotherapy supervision. Lectures and seminars include core material on sexual dysfunction, treatment of paraphilias, gender identity disorders, homosexuality, and psychiatric aspects of HIV infection.

Clinical Associate Professor of Psychiatry (1992-1996), Uniformed Services University for the Health Sciences, School of Medicine, Bethesda, Maryland. Primary responsibility of this position was teaching medical students from the University who travel to San Antonio for clinical rotations in psychiatry and serving as a visiting lecturer for USUHS.

Full time faculty, Department of Psychiatry, Wilford Hall Medical Center, Lackland Air Force Base, San Antonio, Texas, 1987 to 1991. Adjunct clinical faculty, Department of Psychiatry, 1991 to 1993. Responsibilities included supervising psychiatric residents involved in research activities, sponsoring Distinguished Visiting Professors in conjunction with the Department, and teaching core didactic lectures and seminars.

Assistant Clinical Instructor, Wright State University School of Medicine, 1983-1987. Primary responsibility of this position was teaching medical students during clinical rotation in psychiatry.

Chief Resident in Psychiatry, November, 1986 to March, 1987, with administrative, teaching, and research responsibilities.

CONSULTATION EXPERIENCE:

Psychiatric Liaison and Consultant to Oncology Unit, Good Samaritan Hospital, Dayton, Ohio,

1985.
Clinical Supervisor and Psychiatric Consultant to Montgomery County Juvenile Court Diversion Program, Dayton, Ohio, 1986-1987.
Consultation/Liaison Rotation, Keesler AFB, MS, 1986.
Psychiatric Consultant to the United States Air Force Child Abuse Task Force (convened by the Surgeon General of the Air Force), 1989-1991.
Lorain Correctional Institution, psychiatric consultant for inmate mental health evaluations and treatment, July-August 1993.
State of Tennessee Mental Health and Mental Retardation, appointed as consultant to develop Best Practice Guidelines for all State programs for Bipolar Disorder.
Health Ed, The Patient Education Agency: consultant for development of patient education materials for chronic mental illnesses, 2006-2007.
Consultant to Batavia Independent School District in assisting on-the-job gender transition for a transgender high school teacher, 2006.
Consultant to Port Ewan/Kingston BOCES School Program in assisting on-the-job transition for a transgender principal, 2007.
Consultant to the Federal Bureau of Prisons on policies relating to medical management of transgender inmates, 2009, 2014.
Consultant to Department of Defense on policy and medical issues related to transgender service members, 2016-present.

SPECIALIZED TRAINING EXPERIENCES:

School of Aerospace Medicine, Course I, Brooks AFB, San Antonio, Texas, 1981.
Administrative Course for Chief Residents, Tarrytown, New York, June, 1985.
Combat Casualty Care Course, San Antonio, Texas, 1985.
Consultation and Liaison Psychiatry, Keesler AFB, Biloxi, Mississippi, 1986.
Center for the Treatment of Impotence, Case Western Reserve University, Cleveland, Ohio, July, 1986.
Forensic Psychiatry Course and associated clinical work, 6 months, 1986-87; ongoing case work in forensic psychiatry as expert witness and legal consultant, 1987-present.
Gender Identity Clinic, Case Western Reserve University, Cleveland, Ohio, July, 1986.
Paraphilias Clinic, Case Western Reserve University, Cleveland, Ohio, July, 1986.
Chemical Dependency Program, Samaritan Hall, Dayton, Ohio, August, 1986.
Advanced Study of Gender and Sexual Disorders, Institute of Living, Hartford, Connecticut, April, 1987.
Electroconvulsive Therapy Administration Training, Jan-June, 1985; June, 1987.
SCID training seminar, September, 1989.
American Board of Psychiatry and Neurology Examiner, 1991-present.
Administrative psychiatry and leadership training, James H. Quillen VAMC,1996 to 2012.
Physician Executive Training, American College of Physician Executives, (PIM-I Course, 31 hours; PIM-II Course, 31 hours, PIM-III Course, 31 hours), 1998-1999.
Masters and Johnson workshop on trauma, sexual compulsivity/addiction treatment, 11 hours, December, 2003.
Forensic Workshop on sex offenders, National Council on Sexual Addiction and Compulsivity, October, 2002
Forensic workshops, including PREA implementation, managing hunger strikes, mental health issues in prison, sponsored by National Commission on Correctional Health Care, 2010, 2012.
Forensic workshops, including 3 hours of training on medical and legal aspects of providing health care for transgender inmates, sponsored by National Commission on Correctional Health Care, 2015.

COMMITTEE AND BOARD ACTIVITIES:

Mohonasen Public School Board Member, Schenectady, New York, 1974-1975.
Social Chairman, Wright State University Psychiatry Residency, 1984.
Dayton Representative to the Member-in-Training Committee of the Ohio Psychiatric Association, 1984-1986.
Chairman, Member-in-Training Committee, Ohio Psychiatric Association, 1986-1987.
Chairman, Member-in-Training Committee, Dayton Psychiatric Society, 1985-1987.
Peer Review Committee, Ohio Psychiatric Association, 1986-1988.
Long Range Planning Committee, Ohio Psychiatric Association, 1986-1987.
American Psychiatric Association, Area IV Resident Caucus, Ohio Representative, 1987.
American Psychiatric Association, Committee of Residents of the Council on Medical Education and Career Development, Ohio Representative, 1986-1987.
Ohio Psychiatrist's Political Action Committee, Board of Directors, 1987.
Bexar County Psychiatric Society Committee on AIDS, 1990-1993.
World Professional Association for Transgender Health (WPATH) Committee to Revise the Standards of Care, 1990-present; Cochairman of Standards of Care Revision Committee, 2001-2005.
Psychiatric Consultant to the Board of Directors, Boulton and Park Society, San Antonio, Texas, 1988-1998.
President-elect, Society of Air Force Psychiatrists, 1990-1991.
Board of Directors, Alamo Area Resource Center (AIDS/HIV Service Organization), 1991-1992.
Board of Advisors, American Educational Gender Information Service (Atlanta, Georgia), 1992-1998.
Quality Assurance Committee, Texas Society of Psychiatric Physicians, 1992-1993.
Professional Standards Committee, Texas Society of Psychiatric Physicians, 1992-1993.
Board of Directors, Harry Benjamin International Gender Dysphoria Association (WPAth), 1993-1997; 2001-2007
Ethics Committee, Tennessee Psychiatric Association, 1994-present.
Advisory Committee on Publications and Advertising, Southern Medical Association, 1994-1996.
Councilor to the Executive Committee, Tennessee Psychiatric Association, East Tennessee Region, 1995-2005.
Vice-Chairman, Section on Neurology and Psychiatry, Southern Medical Association, 1995-1996.
President, New Health Foundation, 2001-2003.
Secretary of the Section on Neurology and Psychiatry, Southern Medical Association, 1997-2000.
American Psychiatric Association PKSAP and Medical Education Committees, appointed by Herb Sachs, M.D. and Harold Eist, M.D. (APA Presidents), 1997-2001.
Scientific Affairs Committee, Southern Medical Association, 1997-1999.
Consultant to the Joint Commission on Public Affairs, American Psychiatric Association, appointed by Rod Munoz, M.D. (APA President), 1998-1999.
Scientific Program Committee, Southern Psychiatric Association, 1999-2000.
Resident Award Committee, Southern Psychiatric Association, 1997-2009.
Ethics Committee; HIV Committee; Harry Benjamin International Gender Dysphoria Association, 1999-2005
Board of Directors, New Health Foundation, Chicago, IL, 2000-present.
Tennessee Department of Mental Health and Retardation Adult Committee on Best Practices (responsible for recommending guidelines for treatment of bipolar disorder), 2000-2003.
Associate Counselor for Tennessee, Southern Medical Association, 2000-2008.
Resident Award Committee, Southern Psychiatric Association, 2003-2009.
Board of Directors, James H. Quillen VAMC Research Corporation, 2003-2010.

HBIGDA Biennial Symposium Scientific Meeting Committee, 2006-2007.
Board of Regents, Southern Psychiatric Association, 2006.
Southern Medical Association, Section Secretary for Psychiatry and Neurology, 2004-2008.
Scientific Review Committee, World Professional Association for Transgender Health Symposium, 2007-2009; 2015-present.
Board of Regents, Second Year, Southern Psychiatric Association, 2007.
Chairman, Board of Regents, Southern Psychiatric Association, 2009.
WPATH Board of Directors, 3 terms totaling 13 years, with last term 2014 (mandatory rotation off the board).
Secretary-Treasurer, World Professional Association of Transgender Health, 2007-2009.
DSM-V workgroup on Gender Identity Disorders (WPATH advisory work group to American Psychiatric Association DSM-V GID task force), 2009.
World Health Organization advisory committee for ICD-11 (gender identity disorders), 2011-present.
Department of Veterans Affairs Transgender Directive Communication Plan Education Group, 2011-2012.
VHA Transgender Training Workgroup, Patient Care Services, 2012- present.
Numerous VA Central Office national workgroups and committees, including the workgroup to add birth sex and gender identity data fields to all VA medical records, 2012-present.
Commissioner, Palm Center Commission on Transgender Military Service, Appointed by Joycelyn Elders, MD, 2013 to 2014.

PROFESSIONAL ORGANIZATIONS:

American Psychiatric Association (1983-2015); #044933, Fellow, 1998; Distinguished Fellow, 2003
Association for the Advancement of Psychotherapy (1985-1993)
World Professional Association for Transgender Health (1986-present)
Ohio Psychiatric Association (1983-1987)
Texas Society of Psychiatric Physicians (1988-1994)
Tennessee Psychiatric Association (1994-present)
American Medical Students Association (1977-1987)
American Medical Association (1983-1988; 2015-present)
Ohio State Medical Association (1983-1987)
Montgomery County Medical Society (1983-1987)
Dayton Psychiatric Society (1983-1987)
Society of United States Air Force Psychiatrists (1983-1991)
Bexar County, Texas, Psychiatric Society (1987-1990)
Southern Medical Association (1994-2010)
Southern Psychiatric Association (1997-2009)
New Health Foundation (advocacy organization for transgendered health care; 1996-present)
American Psychological Association Society for the Psychological Study of Men and Masculinity, Division 51, 1996-2000.

AWARDS AND SPECIAL RECOGNITION:

Valedictorian, Mohonasen High School, Schenectady, New York, 1975.
New York State Regents Scholarship, 1975-1979.
Bausch and Lomb Science Award and Scholarship, 1975-1979.
Phi Beta Kappa, junior year selection, 1977.
Donald Charles Memorial Award for Research in Biology, 1978.
Recognition for Highest Grade Point Average, Department of Biology-Geology, University of Rochester, 1979.

Dean's Letters of Commendation for Academic Achievement, University of Rochester, 1975-1983.
Letter of Commendation for Excellence in Pathology, University of Rochester, 1981.
Alpha Omega Alpha Medical Honor Society, University of Rochester, 1983.
Wright State University Department of Psychiatry selectee for fellowship in the Group for the Advancement of Psychiatry (GAP), 1984.
Wright State University Department of Psychiatry nominee for Laughlin Fellowship of the American College of Psychiatrists, 1985, 1986.
Physician's Recognition Award of the American Medical Association, 1986 to present.
President's Award of the Ohio Psychiatric Association for outstanding service to the organization, 1987.
Chairman's Recognition Award For Scholarship and Research, Wright State University Department of Psychiatry, 1987.
Air Force Training Ribbon, 1980.
Air Force Outstanding Unit Decoration, 1987; first oak leaf cluster additional award, 1990.
Air Force Expert Marksman Ribbon, 1988.
Air Force Achievement Medal for research accomplishments, 1990.
1990 American Academy of Psychosomatic Medicine Dlin Fischer Award for Significant Achievement in Clinical Research; corecipient.
Who's Who Among Human Services Professionals, 1990 to present.
West's Who's Who in Health and Medical Services, 1991 to present.
Marquis Who's Who of Board Certified Medical Specialists, 1992-present.
Bexar County Medical Society Certificate of Appreciation, 1991.
Air Force Meritorious Service Medal for distinguished clinical and research service to the Department of Psychiatry, Wilford Hall Medical Center, 1991.
Air Force National Defense Ribbon, Desert Storm Campaign, 1991.
Mohonasen High School Hall of Fame for Lifetime Achievement, 1992 inductee.
Health Care Professional of the Year Award, Boulton and Park Society, San Antonio, Texas, 1992-93.
Special Citation Award, Society of Behavioral Medicine, with Coyle C, et al., for presentation at 1993 Society of Behavioral Medicine Annual Meeting, 1993.
Institute for Legislative Action, 1995 Honor Role.
Sterling Who's Who of Health Care Professionals, 1995.
Southern Medical Association 1995 Award for Medical Excellence (Best Scientific Oral Presentation in Neurology and Psychiatry), $1,000 Scholarship prize, 1995.
Janssen Clinical Scholar, 1995.
Mountain Home VAMC Group Special Contribution Award, 1995, 1997.
Marquis Who's Who in the South and Southwest, 1996-1998.
Marquis Who's Who in Medicine and Healthcare, 1997-1998.
Certificate of Appreciation, ETSU Psychiatry Residents, 1997, 1998, 1999.
Fellow, American Psychiatric Association, 1998-2002.
Resident Special Recognition Award, June, 2000.
Distinguished Fellow, American Psychiatric Association, January, 2003
Special Group Contribution Award, VAMC, 2003
Secretary of Defense Certificate of Recognition, Cold War Military Service, 2003
VA Performance Award, 2005
First Annual Irma Bland Award for Excellence in Teaching Residents, presented by the American Psychiatric Association, May, 2005
Special Contribution Award, Mountain Home VAMC, for assisting in obtaining over 2.5 million in new program monies from VA Central Office RFP process, April 26, 2006
Top Psychiatrists of 2006, Consumer Research Council selectee
ETSU Resident Recognition Award for "dedication to the Resident's Journal Club", 2006
Fellow, Southern Psychiatric Association, 2006
ETSU Psychiatry Faculty Mentor of the Year Award, 2007
Cambridge Who's Who, Executive and Professional Registry, 2007
Southern Medical Association, Third Place Award for Scientific Poster Presentation, Dallas,

Texas, December 5, 2009
Twenty-five year U.S. Government service award, January 10, 2010
Joint Commission recognition : "Top Performers on Key Quality Measures" (contributor), 2011
Robert W. Carey Quality Performance Excellence Award (contributor), 2011; Department of Veterans Affairs award using Baldrige criteria
James H. Quillen VAMC selected as VA to be featured in the Commonwealth Fund's article on successful efforts to improve patient safety (contributor), 2011
Gender Identity Research and Education Society (GIRES) 2011 award to the 34 members of the Standards of Care Revision Committee for their work on the WPATH Standards of Care, 7th Version.
Robert W. Carey Quality Trophy Award, Mountain Home VAMC. This is the highest level of the Carey Award for those VAMC's seeking performance excellence using the Baldrige Criteria. Awarded by the Secretary of the VA to the leadership team of which I was a Part, 2012.
Recognized by LGBT Health journal in March, 2016 as having first-authored the #1 and #3 most read articles in that journal since its inception.

UNIVERSITY/VA COMMITTEE ACTIVITIES:

Learning Resources Advisory Committee (ETSU), 1995-1996.
Psychiatric Residency Training Committee /Educational Policy Committee (ETSU), 1993-present.
Peer Review Committee (VAMC), 1995-1996.
Chairman and Founder, Psychiatric Grand Rounds and Visiting Professor Program (ETSU), 1993-1997; 2003-2004.
Clinical Executive Board (VAMC), 1995-2012.
Research and Development Committee, Dean's Appointment (VAMC), 1996-1998.
Chairman, VAMC Research and Development Committee, 1999-2000.
Co-Chairman, Mental Health Council (VAMC), 1995-2009.
Academic Partnership Committee (ETSU), member, 1995-2012.
Facility Master Plan and Space Utilization Committee (VAMC), 1995-2010.
Professional Standards Board (VAMC), 1995-2012.
Safety Committee, Department of Psychiatry, Chairman (VAMC)
ETSU Psychiatry Promotion and Tenure Committee, 1998-present.
Resident Selection Committee, ETSU Psychiatry Program, 1998-2012.
Chairman, VAMC Research and Development Committee, 2001-2002.
Veterans Health Affairs, VISN 9, Budget and Finance Committee, 2002-2004.
Institutional Review Board (ETSU/VAMC), member, 1996-2003; served as acting chair as needed.
Cameron University Department of Psychology, Dissertation Committee Consultant for Beth Ryan, Masters Thesis, 2004-2005 (gender identity disorder research).
VISN 9 Mental Health Leadership Committee.
ETSU/VAMC Subcommittee on Graduate Medical Education, 2008-2012.
Vanderbilt University Department of Nursing, Dissertation Committee member and consultant for Gerald Meredith, 2009-2010.
VA Transgender Directive Education Workgroup; VACO workgroup to advise the Undersecretary on how to educate and implement the 2011 Directive on providing healthcare to transgender and intersex Veterans, 2011-present.
Office of Health Equity (VACO) Health Equity Coalition, 2013-2014.
Numerous research committees and advisory panels for health equity research projects being conducted in VA, 2012-present.
Chairman, Educational Policy Committee (Residency Training Committee), East Tennessee State University Department of Psychiatry, 2015-present.
Self-Identified Gender Identity Data Field Training Workgroup (National VA work group to change electronic medical records data collection to include self-identified gender identity)
Research Committee, East Tennessee State University Department of Psychiatry, 2015-

present.

FORENSIC PSYCHIATRY ACTIVITIES:

1. Military court proceedings, two occasions as expert witness at trial; U.S. Air Force, U.S. Army, c.1990-1992
2. Military Physical Evaluation Board Proceedings, expert testimony, 2/8/02
3. Farmer v. Hawk, United States District Court for the District of Columbia, expert opinion by affidavit on behalf of plaintiff, 1999
4. Yolanda Burt v. Federal Bureau of Prisons/Moritsugu, United States District Court for the District of Columbia, deposition testimony on behalf of plaintiff, 2000
5. Kosilek v. Maloney, 221 F.Supp 2d 156,186 (D.Mass. 2002), expert witness by trial testimony on behalf of plaintiff, 2001
6. Family Court expert witness trial testimony, Missouri, (custody issues for transgendered parent),1993
7. Thompson v. Idaho Department of Corrections (prison medical care Issues), consultant on behalf of plaintiff, 2002 (citation: Linda Patricia Thompson v. Dave Paskett, et al., Case No. CV00-388-S-BLW)
8. State of Missouri Medical Board, expert opinion by affidavit on behalf of physician, 10/2001
9. State of Tennessee Medical Board, expert opinion by affidavit on behalf of physician, 5/2002
10. Military Administrative Hearing, consultant, U.S. Army, December, 2002
11. Oiler v. Winn-Dixie Louisiana, Inc; USDC, Eastern District of Louisiana, No. 00-3114 "L" (3); consultant on behalf of defendant, 2001-2002
12. Moore v. State of Minnesota, consultant and deposition testimony on behalf of defendant, Attorney General's Office, State of Minnesota, 2003
13. Woods v. US Air Force, administrative discharge board, consultant, San Antonio, TX, 2003
14. Ophelia Azriel De'Lonta vs. Ronald Angelone and Prison Health Services, Inc. (Virginia Department of Corrections) United States District Court, Western District of Virginia, 330 F.3d 630,635 (4th Cir 2003) deposition testimony on behalf of plaintiff, 2003
15. Malpractice case, Tennessee, for defendant (primary care physician) consultant, 2004-2005
16. Josef v. Ontario Minister of Health, Attorney General of Ontario representing Her Majesty the Queen in Right of Ontario; Ontario Superior Court of Justice; expert opinion affidavit and consultant on behalf of plaintiff, 2004-2007.
17. Nubel v. New Jersey Board of Nursing, consultant and deposition testimony for defendant, 2004-2005
18. Malpractice case, Tennessee, consultant for defendant (psychiatrist), 2004-2005
19. Malpractice case, Kentucky, consultant for defendants (psychiatrists), 2005-2006
20. Kosilek v. Mass. Department of Corrections/ Kathleen Dennehy, expert witness by trial testimony and consultant on behalf of plaintiff, 2005-2006 (Kosilek v. Spencer, 889 F.Supp.2d 190 (D. Mass. Sept. 4, 2012); "Kosilek I."
21. Gammett v. Idaho Department of Corrections, expert opinion affidavit and consultant for plaintiff, 2005-2007 (Gammett v. Idaho State Bd. of Corrections, No. CV05-257-S-MHW, 2007 WL 2186896 (D. Idaho July 27, 2007)
22. Isaak v. Idaho Department of Corrections, consultant, and deposition testimony on behalf of plaintiff, 2006-2008
23. May v. State of Tennessee and multiple codefendants; consultant on behalf of defendant, Attorney General's Office, State of Tennessee, 2006
24. Fields/Sundstrom v. Wisconsin Department of Corrections, consultant and deposition testimony on behalf of plaintiff, 2007 (Fields v. Smith, 653 F.3d 550 (7th Cir. 2011)
25. Palmer v. State of TN; malpractice case; consultant and deposition testimony for defendant, Attorney General's Office, State of Tennessee 2007
26. Spray v. Temp Agency, consultant and expert opinion affidavits on behalf of plaintiff, 2007

27. O'Donnabhain v. Internal Revenue Service/Department of the Treasury, expert witness by trial testimony on behalf of plaintiff, 2007 (O'Donnabhain v. Commissioner, 134 T.C. No. 4 (Feb. 2, 2010).
28. Battista v. Mass. Department of Corrections/Kathleen Dennehy, consultant and expert opinion affidavit for plaintiff, 2008-2011.
29. Plumley v. State of TN; malpractice case; consultant for defendant, 2009.
30. Kolestani v. State of Idaho, capital murder case, consultant and expert opinion affidavit for public defender's office, 2009.
31. Smith v. St. Mary's Medical Center, medical malpractice case, consultant for defendant, 2009-2011, expert witness by jury trial testimony, 2011.
32. Finch aka Destiny v. Idaho Department of Corrections, consultant for plaintiff, 2010-2011.
33. Soneeya v. Clarke, Civil Action No. 07-12325 (NG), Massachusetts, consultant for plaintiff, 2011. (see also Soneeya v. Spencer, 851 F.Supp.2d 228 (D. Mass. 2012)
34. Hoyle v. Saha, malpractice case; consultant for defendant, 2011- 2014.
35. Champouillon v. State of TN; malpractice case; consultant for defendant, 2012-present.
36. Equivel v. State of Oregon; access to transgender health care for Oregon State employees; consultant to Lamdba Legal, 2012.
37. Kosilek v. MA DOC, expert witness for plaintiff, 2012-present; ("Kosilek II").
38. Binney v. South Carolina DOC, consultant and expert opinion by affidavit for plaintiff, 2013-present.
39. De'Lonta v. Harold W. Clarke et al. (Virginia Department of Corrections), consultant and expert opinion by affidavit to plaintiff, 2013-2014.
40. U.S. and Tudor v. Southeastern Oklahoma State University, expert consultant for plaintiff and the Department of Justice (Title VII discrimination case), by declaration for plaintiff, 2015-present.
41. Mott v. State of Kansas, consultant and expert opinion by affidavit for plaintiff (birth certificate change), 2015-present.
42. Fuller v. MA Department of Corrections; expert opinion by affidavit and deposition, for plaintiff, 2015-present.
43. Franklin v. Hardy, et al. (Illinois Department of Corrections); expert opinion by affidavit, for plaintiff, 2015-present.
44. Dunn et al. v. Dunn et al. (Alabama Department of Corrections), expert consultant for plaintiff, 2016-present.

PUBLICATIONS:

1. Brown G R: Morphologic complexity and its relationship to taxonomic rates of evolution. J Undergrad Res, 3:139-168, 1978.
2. Brown G R: Stadol dependence: another case. JAMA, 254(7):910, 1985.
3. Brown G R: Letter to the Editor. Newsletter of the Ohio Psychiatric Association, 10(1):8, 1986.
4. Brown G R: Resident Rounds. Column for Newsletter of the Ohio Psychiatric Association. 10(2), 10(3), 11(1),11(2), 1986-1987.
5. Brown G R: Anorexia nervosa complicated by Mycobacterium xenopi pulmonary infection. J Nerv Ment Dis, 175(10):629-632, 1987.
6. Brown G R: Mycobacterium xenopi infection complicating anorexia nervosa. Proceedings of the 29th Annual Meeting of American College of Physicians (Air Force Regional Meeting), 22-25 March, 1987.
7. Brown G R: Buspar, a new anxiolytic. Letter to the Editor, Journal of the Ohio State Medical Association, Spring, 1987.
8. Brown G R: Transsexuals in the military: flight into hypermasculinity. Abstract. Proceedings of the 10th International Symposium on Gender Dysphoria (Amsterdam, The Netherlands) 7 June, 1987.
8. Brown G R: Transsexuals in the military: flight into hypermasculinity. Arch Sex Behav, 17(6):527-537, 1988.
10. Brown G R: Therapeutic effect of silence: application to a case of borderline personality

disorder. Current Issues in Psychoanalytic Practice, 4(3-4):123-131, 1988.
11. Brown G R: Bioethical issues in the management of gender dysphoria. Jefferson J Psychiatry, 6(1):33-44, 1988.
12. Brown G R, Rundell J R: Psychiatric disorders at all stages of HIV infection. Proceedings of the 1988 Annual Session of the Texas Medical Association (San Antonio, Texas), May, 1988.
13. Brown G R, Rundell J R: Suicidal tendencies in HIV-seropositive women. Am J Psychiatry, 146(4):556-557, 1989.
14. Brown G R, Collier L: Transvestites' women revisited: a nonpatient sample. Arch Sex Behav, 18(1):73-83, 1989.
15. Brown G R, Pace J: Hypoactive sexual desire disorder in HIV-seropositive individuals. JAMA, 261(17):2305, 1989.
16. Brown G R: Prospective study of psychiatric morbidity in HIV-seropositive women. Psychosom Med, 51:246-247, 1989.
17. Brown G R: Current legal status of transsexualism in the military. (Letter) Arch Sex Behav, 18(4):371-373, 1989.
18. Rundell J R, Brown G R: Use of home test kits for HIV is bad medicine. JAMA, 262(17):2385-2386, 1989.
19. Rundell J R, Brown G R, Paolucci S L: Psychiatric diagnosis and attempted suicide in HIV-infected USAF personnel. Abstract. Proceedings of the Fifth International Conference on AIDS (Montreal, Canada), June, 1989.
20. Brown G R: Current legal status of transsexualism in the military. Abstract. Proceedings of the Eleventh Inter-national Symposium on Gender Dysphoria (Cleveland, Ohio), September, 1989.
21. Brown G R: A review of clinical approaches to gender dysphoria. J Clin Psychiatry, 51(2):57-64, 1990.
22. Pace J, Brown G R, Rundell J R, et al.: Prevalence of psychiatric disorders in a mandatory screening program for infection with human immunodeficiency virus: A pilot study. Milit Med, 155:76-80, 1990.
23. Rundell J R, Brown G R: Persistence of psychiatric symptoms in HIV seropositive persons. Am J Psychiatry, 147(5):674-675, 1990.
24. Praus D, Brown G R, Rundell J R, et al.: Associations between CSF parameters and high degrees of anxiety or depression in USAF personnel infected with HIV. J Nerv Ment Dis, 178(6):392-395, 1990.
25. Brown G R, Rundell J R: Prospective study of psychiatric morbidity in HIV-seropositive women without AIDS. Gen Hosp Psychiatry, 12:30-35, 1990.
26. Brown G R: The transvestite husband. Med Aspects Human Sexuality, 24(6):35-42, 1990.
27. Drexler K, Brown G R, Rundell J R: Psychoactive drug use and AIDS. JAMA, 263(3):371, 1990.
28. Brown G R, Rundell J R: Psychiatric morbidity in HIV-seropositive women without AIDS. Proceedings of the 143rd Annual Meeting of the American Psychiatric Association, pages 75-76 (New York, New York), May, 1990.
29. Rundell J R, Ursano R, Brown G R: HIV infection and perception of social support. Proceedings of the 143rd Annual Meeting of the American Psychiatric Association, page 76 (New York, New York), May, 1990.
30. Rundell J R, Brown G R, McManis S, et al.: Psychiatric predisposition and current psychiatric findings in HIV-infected persons. Proceedings of the Sixth International Conference on AIDS (San Francisco, California), June, 1990.
31. Drexler K, Rundell J R, Brown G R, et al.: Suicidal thoughts, suicidal behaviors, and suicide risk factors in HIV-seropositives and alcoholic controls. Proceedings of the Sixth International Conference on AIDS (San Francisco, California), June, 1990.
31. Brown G R: The inpatient database as a technique to prevent junior faculty burnout. Acad Psychiatry, 14(4):224-229, 1990.
32. Rundell J R, Wise M, Brown G R, et al: Relative frequency of HIV disease as a cause of mood disorder in a general hospital. Proceedings of the 1990 Update on Neurological and Neuropsychological Complications of HIV Infection, page PSY-4 (Monterrey,

California), June, 1990.
33. Rundell J R, Praus D, Brown G R, et al: CSF parameters, immune status, serum viral titers, anxiety, and depression in HIV disease. Proceedings of the 1990 Update on Neurological and Neuropsychological Complications of HIV Infection, page PSY-5 (Monterrey, California), June, 1990.
34. Brown G R: Clinical approaches to gender dysphoria. Abstract. Psychiatry Digest, 5:9-10, 1990.
35. Brown G R, Rundell J R, Temoshok L, et al: Psychiatric morbidity in HIV-seropositive women: Results of a three year prospective study. Proceedings of the 37th Annual Meeting of the American Academy of Psychosomatic Medicine, 1990.
36. Rundell J R, Brown G R, Kyle K, et al: Methods employed by and length of knowledge of HIV-seropositivity of HIV-infected suicide attempters. Proceedings of the 37th Annual Meeting of the American Academy of Psychosomatic Medicine, 1990.
37. Brown G R: Unzufriedenheit mit dem eigenen Geschlecht:Klinische Behandlungsmoglichkeiten. Abstract for European readership. Psychiatry Digest, 10:3-4, 1990.
38. Brown G R, Anderson B W: Credibility of patients in psychiatric research. Amer J Psychiatry, 148(10):1423-1424, 1991.
39. Brown G R, Anderson B: Psychiatric morbidity in adult inpatients with childhood histories of physical and sexual abuse. Amer J Psychiatry, 148(1):55-61, 1991.
40. Plotnick E, Brown G R: Use of intravenous haloperidol in nonviolent severely regressed adult psychiatric inpatients. Gen Hosp Psychiatry, 13:385-390, 1991.
41. Brock I, Brown G R, Jenkins R: Affect and health locus of control in early HIV infection. Proceedings of the 144th Annual Meeting of the American Psychiatric Association, 79, 1991.
42. Brock I, Brown G R, Jenkins R: Early HIV infection and health locus of control. Proceedings of the 144th Annual Meeting of the American Psychiatric Association, 79, 1991.
43. Brown G R, Pace J, Brock I, et al: Psychiatric morbidity in HIV-seropositive military women. Proceedings of the 144th Annual Meeting of the American Psychiatric Association, 208, 1991.
44. Pace J, Brown G R: Factors associated with length of inpatient psychiatric hospitalization in a military medical center. Proceedings of the 144th Annual Meeting of the American Psychiatric Association, 95, 1991.
45. Plotnick E, Brown G R: Sexual functioning in HIV-positive women without AIDS. Proceedings of the 144th Annual Meeting of the American Psychiatric Association, 80-81, 1991.
46. Hicks D, Stasko R, Rundell J, Norwood A, Brown G R: Psychiatric treatment in early HIV disease. Proceedings of the 144th Annual Meeting of the American Psychiatric Association, 208, 1991.
47. McManis S, Brown G R, Rundell J, et al: Subtle, early cognitive impairment in HIV disease. Proceedings of the 144th Annual Meeting of the American Psychiatric Association, 77-78, 1991.
48. McManis S, Brown G R, Rundell J, et al: Cognitive impairment and CSF values in HIV disease. Proceedings of the 144th Annual Meeting of the American Psychiatric Association, 78, 1991.
49. McManis S, Brown G R, Zachary R, et al: Cognitive impairment and gender in HIV-positive persons. Proceedings of the 144th Annual Meeting of the American Psychiatric Association, 78, 1991.
50. Carey M, Jenkins R, Brown GR, et al: Gender differences in psychosocial functioning in early stage HIV patients. Proceedings of the 7th International Conference on AIDS, M.B. 4230, 1:447, 1991.
51. McManis S, Brown G R, Zachary R, et al: Neuropsychiatric impairment early in the course of HIV infection. Proceedings of the 7th International Conference on AIDS, M.B. 2064, 1:198, 1991.
52. Brown G R, Rundell J, Pace J, et al: Psychiatric morbidity in early HIV infection in women: results of a 4 year prospective study. Proceedings of the First International Conference

on Biopsychosocial Aspects of HIV Infection, p 22, 1991.
53. Brown G R, Kendall S, Zachary R, et al: Psychiatric and psychosocial status of US Air Force HIV-infected personnel. Proceedings of the First International Conference on Biopsychosocial Aspects of HIV Infection, p 121, 1991.
54. Brown G R, Zachary R, McManis S, et al: Gender effects on HIV-related neuropsychiatric impairment. Proceedings of the First International Conference on Biopsychosocial Aspects of HIV Infection, p 125, 1991.
55. Temoshok L, Smith M, Brown G R, Jenkins R: Perceptions of zidovudine (AZT) and cooperation with treatment or clinical trials. Proceedings of the First International Conference on Biopsychosocial Aspects of HIV Infection, p 198, 1991.
56. Jenkins R, Patterson T, Brown G R, Temoshok L: Social functioning in early stage HIV patients. Proceedings of the First International Conference on Biopsychosocial Aspects of HIV Infection, p P12, 1991.
57. Zachary R, Coyle C, Kendall S, Brown G R: Living with HIV: Mechanisms for coping with psychological distress. Proceedings of the First International Conference on Biopsychosocial Aspects of HIV Infection, p P13, 1991.
58. Brown G R, Rundell J, McManis S, Kendall S, Jenkins R: Neuropsychiatric morbidity in early HIV disease: Implications for military occupational function. Proceedings of the Aerospace Medicine Symposium on Allergic, Immunological, and Infectious Disease Problems in Aerospace Medicine, NATO Advisory Group for Aerospace Research and Development, AGARD-CP-518, (paper 16):1-14, 1992.
59. Brown G R: Single USAF AIDS center offers unique opportunity to research biopsychosocial aspects of HIV infection. San Antonio, M.D., 1(4):8-9,14-15, 1991.
60. Rundell J, Mapou R, Temoshok L, Brown G R: An overview of the U.S. military HIV testing policy. Proceedings of the American Psychological Association Annual Meeting, August, 1991, page 277.
61. Brown G R: The transvestite husband. J Gender Studies, 13(1):14-19, 1991.
62. Rundell J R, Kyle K, Brown G R, Thomasen J: Factors associated with suicide attempts in a mandatory HIV-testing program. Psychosomatics, 33(1):24-27, 1992.
63. Beighley P, Brown G R: Medication refusal in psychiatric inpatients in the military. Military Med, 157:47-49, 1992.
64. McManis S, Brown G R, Zachary R, et al: Screening for subtle neuropsychiatric deficits early in the course of HIV infection. Psychosomatics, 34(5):424-431, 1993.
65. Brown G R, Kendall S, Ledsky R: Sexual dysfunction in HIV-seropositive women without AIDS. J Psychol Human Sexuality, 7(1-2):73-97, 1995.
66. Brock I, Brown G R: Psychiatric length of stay determinants in a military medical center. Gen Hosp Psychiatry,15(6):392-398, 1993.
67. Brown G R, Rundell J, McManis S, Kendall S, Jenkins R: Neuropsychiatric morbidity in early HIV disease: Implications for military occupational function. Vaccine, 11(5):560-569, 1993.
68. Brown G R, Rundell J: Prospective study of psychiatric aspects of early HIV infection in women. Gen Hosp Psychiatry, 15:139-147, 1993.
69. Brown G R, Rundell J, McManis S, Kendall S, Zachary R, Temoshok L: Prevalence of psychiatric disorders in early stages of HIV infection in United States Air Force Personnel. Psychosomatic Medicine, 54:588-601, 1992.
70. Beighley P, Brown G R, Thompson J: DSM-III-R brief reactive psychosis among Air Force recruits. J Clin Psychiatry, 53(8):283-288, 1992.
71. Brown G R: Letter to the editor. Amer J Psychiatry, 149(4):541, 1992.
72. Lothstein L M, Brown G R: Sex reassignment surgery: current concepts. Integ Psychiatry, 8(1):21-30, 1992.
73. Brown G R, Zachary R, Rundell J R: Suicidality before and after HIV seroconversion in men with early stage disease. Proceedings of the 50th Anniversary International Meeting of the American Psychosomatic Society, 43, 1992.
74. Brock I, Brown G R, Butzin C: Predictors of psychiatric inpatient length of stay. Proceedings of the 145th Annual Meeting of the American Psychiatric Association, New Research Volume, 101, 1992.

75. Rundell J R, Brown G R, Jenkins R, Temoshok L: Social support, psychiatric morbidity, and HIV disease. CME Syllabus and Proceedings of the 145th Annual Meeting of the American Psychiatric Association, 281, 1992.
76. Plotnick E, Brown G R: IV haloperidol in severe nonviolent psychosis. Psychiatry Drug Alerts, 6(5):40, 1992.
77. Goethe K, Richie D, Brown G R, Kendall S: Longitudinal neuropsychological findings in HIV-positive males. Proceedings of the 8th International AIDS Conference, Vol. 2, Abstract PuB 3770, Amsterdam, The Netherlands, 1992.
78. Brown G R, Zachary R, McManis S, Coyle C, Kendall S, Kozjak J: Stability of personality disorder diagnoses in early HIV infection. Proceedings of the 8th International AIDS Conference, Vol 3, Abstract PuB 7063, Amsterdam, The Netherlands, 1992.
79. Mapou R, Goethe E, Law W, Kendall S, Rundell J, Brown G R, Nannis E, et al.: Minimal impact of self-reported mood on neuropsychological performance in HIV-infected military personnel. Proceedings of the 8th International AIDS Conference, Vol 3, Abstract PuB 7338, Amsterdam, The Netherlands, 1992.
80. Nannis E, Temoshok L, Jenkins R, Rundell J, Brown G R, Patterson T: Noncompliance with zidovudine: Psychosocial factors. Proceedings of the 8th International AIDS Conference, Vol 3, Abstract PuB 7377, Amsterdam, The Netherlands, 1992.
81. Brown G R: 106 women in relationships with crossdressing men: a descriptive study from a nonclinical setting. Arch Sex Behav, 23(5), 515-530, October, 1994.
82. Nannis E, Temoshok L, Jenkins R, Blake S, Sharp E, Jenkins P, Brown G, Patterson T, Coyle C, Brandt U, Johnson C: Gender differences in transmission risk behavior, affect, and social support in HIV positive individuals. Proceedings of the Fourteenth Annual Meeting of The Society of Behavioral Medicine, San Francisco, CA, 1993, #D17; Annals of Behavioral Medicine 15:S105.
83. Coyle C, Blake S, Brown GR, Ledsky R, Temoshok L: Methodological issues in assessing risk behaviors in an HIV seropositive military sample (Special Citation Award). Proceedings of the Fourteenth Annual Meeting of The Society of Behavioral Medicine, San Francisco, CA, March, 1993, #D02. Also in Annals of Behavioral Medicine 15:S101.
84. Zachary R, Brown GR, Kendall S, Coyle C, McManis S: Psychosocial stressors and vulnerability to psychiatric distress in early-stage HIV. Proceedings of the Fourteenth Annual Meeting of The Society of Behavioral Medicine, San Francisco, CA, March, 1993, #D08.
85. Suter E, Cassem E, Murray G, Brown G R, et al: Violence in America-Effective solutions. Journal of the Medical Association of Georgia 84(6):253-263, 1995.
86. Brown G R: Use of methylphenidate in treating the cognitive decline associated with HIV disease. Intl J Psychiatry Med, 25(1):21-37, 1995.
87. Brown G R: Teen transvestites. Psychiatric Times, Letter to the Editor, 11(11):9, 1994.
88. Brown G R: New onset of sexual dysfunction in HIV-seropositive women: Results of a prospective study. Proceedings of the 88th Annual Scientific Meeting of the Southern Medical Association, November 3, 1994, page S54.
89. Brown G R: Cross-dressing men lead double lives. Menninger Letter, April, 1995.
90. Richards J, McManis S, Brown G R: Personality disorders in HIV-positive persons: association with other measures of psychiatric morbidity. (abstract) Proceedings of the Annual Meeting of the American Psychiatric Association, NR1, page 53, Philadelphia, PA, May 23, 1994.
91. Brown G R, Wise T, Costa P, Herbst J, Fagan P, Schmidt C: Personality characteristics and sexual functioning of 188 cross-dressing men. J Nerv Ment Disease, 184(5):265-273, 1996.
92. Brown G R: The transvestite husband. Tapestry 72:52-54, 1995 (substantially similar to publication #26 above).
93. Brown G R, Wise T, Costa P: Personality characteristics and sexual functioning of 188 American transgendered men: Comparison of patients with nonpatients. Proceedings of the 14th Harry Benjamin International Gender Dysphoria Symposium, pages 12-13, 1995.
94. Brown G R, Radford M, Greenwood K, Matthew H: Sertindole Hydrochloride: A novel

antipsychotic with a favorable side effect profile. Southern Medical Journal, (abstract), 88(10):S58, 1995.

95. Brown G R, Radford M: Sertindole Hydrochloride: A novel antipsychotic with a favorable side effect profile. Southern Medical Journal, 90(7):691-693, 1997.
96. Zimbroff D, Kane J, Tamminga C, et al: Controlled, dose-response study of sertindole and haloperidol in the treatment of schizophrenia. Amer J Psychiatry, 154(6):782-791, 1997.
97. Ceniceros S, Brown G R, Swartz C: Tattoos, body piercing, and psychiatric disorders. Proceedings of the Fourteenth Annual ETSU Student Research Forum, abstract 501; winner of the best scientific poster in resident/fellow category, 1998.
98. Ceniceros S, Brown G R, Swartz C: Tattoos, body piercing, and psychiatric disorders. Proceedings of the Annual Meeting of the American Psychiatric Association, Toronto, Canada, June 1, 1998.
99. Ceniceros S, Brown G R: Acupuncture: A review of its history, theories, and indications. Southern Medical Journal 91(12):1121-1125, 1998.
100. Levine S, Brown G R, Coleman E, et al.: The Standards of Care for Gender Identity Disorders. International Journal of Transgenderism, 2(2):2-20, 1998.
101. Ceniceros S, Brown GR, Swartz,C: Tattoos, body piercing, and psychiatric disorders. Southern Medical Journal 91(10):S52-53, 1998.
102. M N Miller, B E Miller, R Chinouth, B Coyle, GR Brown: Increased premenstrual dosing of nefazodone relieves premenstrual magnification of depression: a double-blind, crossover study. Proceedings of the 1999 Annual Meeting of the Society for Neuroscience, Miami Beach, Florida.
103. Brown G R: Gender identity comorbid with dissociative identity disorder. Proceedings of the XVI Biennial Symposium of the Harry Benjamin International Gender Dysphoria Association, London, England, August, 1999.
104. Levine SB, Brown G R, Coleman E, et al.: The newly revised Standards of Care for Gender Identity Disorders. J Sex Educ Therapy 24(3):117-127, 1999.
105. McKenzie D, Brown G R: A study of internet usage. Southern Medical Journal 93(10):S83, 2000.
106. M N Miller, B E Miller, R Chinouth, B Coyle, GR Brown: Increased premenstrual dosing of nefazodone relieves premenstrual magnification of depression. Depression and Anxiety 15:48-51, 2002.
107. Best Practice Guidelines, Adult Behavioral Health Services, Tennessee Department of Mental Health and Developmental Disabilities, Task Force coauthor (Chairman, Cliff Tennison), July 2002.
108. Brown GR: Application of the HBIGDA Standards of Care to the Prison Setting: Recent Victories for Transgender Care in the USA. Proceedings of the 18th Biennial Symposium of the HBIGDA, Gent, Belgium, 2003.
109. Ettner R, Brown GR, White T, Shah BJ: Family and Systems Aggression Towards Therapists Working with Transgendered Clients. . Proceedings of the 18th Biennial Symposium of the HBIGDA, Gent, Belgium, 2003.
110. Brown G R: Mental disorders among military personnel. American Journal of Psychiatry, letter to the editor, 160(6):1190-1191, 2003.
111. Brown G R, McBride L, Williford W, Bauer M: Impact of childhood sexual abuse on bipolar disorder. Proceedings of the 5th International Conference on Bipolar Disorders, Pittsburgh, PA, 2003.
112. Brown G R, Bauer M, McBride L, Williford W: Impact of childhood abuse on disease course in veterans with bipolar disorder. Southern Medical Journal Abstract Supplement 96(10):S34-S35, 2003.
113. Brown G R: Tinnitus: The ever-present tormentor. The Hearing Journal 57(4):52-53, 2004.
114. Ettner R, Brown G R, White T, Shah B: Transgender client aggression towards therapists. Proceedings of the XIX Biennial Symposium of the Harry Benjamin International Gender Dysphoria Association, p. 61, Bologna, Italy, April 9, 2005.
115. Brown G R: Gender identity disorder comorbid with dissociative identity disorder:

review of the literature and 7 year followup case presentation. Proceedings of the XIX Biennial Symposium of the Harry Benjamin International Gender Dysphoria Association, p. 80-81, Bologna, Italy, April 9, 2005.

116. Brown G R, Bauer M S, McBride L, Williford W O: Impact of childhood abuse on the course of bipolar disorder: A replication study in U.S. veterans. Journal of Affective Disorders 89:57-67, 2006.
117. Ettner R, White T, Brown G R, Shah, B: Transgender client aggression towards therapists. International Journal of Transgenderism, 9(2): 1-7, 2006. **DOI**: 10.1300/J485v09n02_01
118. Bauer M, McBride L, Williford W, Glick H, Kinosian B, Altshuler L, Beresford T, Kilbourne A, Sajatovic, M, Brown G R, et al: Collaborative Care for Bipolar Disorder, Part I: Intervention and Implementation in a Multi-Site Randomized Effectiveness Trial, Psychiatric Services, 57(7):927-936, 2006.
119. Bauer M, McBride L, Williford W, Glick H, Kinosian B, Altshuler L, Beresford T, Kilbourne A, Sajatovic, M, Brown G R, et al: Collaborative Care for Bipolar Disorder, Part II: Impact, Clinical Outcome, Function, and Costs, Psychiatric Services 57(7):937-945, 2006. [Selected by journal for accompanying editorial, 57:909]
120. Brown G: Autocastration and Autopenectomy as Surgical Self-treatment in Incarcerated Persons with Gender Identity Disorder. Proceedings of the XX Biennial Symposium of the World Professional Association for Transgender Health, Chicago, Illinois, September, 2007.
121. Belkin A, Whitten T, Brown G, Melms, M: Gender Identity and the Military. Abstract. International Journal of Transgenderism 10(3):174, 2008.
122. Brown G, McDuffie E: Healthcare policies addressing transgender inmates in prison systems in the United States, Journal of Correctional Healthcare, 15(4):280-291, 2009. DOI: 10.1177/1078345809340423; online version: http://jcx.sagepub.com/cgi/content/abstract/15/4/280.
123. Brown G: Recommended revisions to the World Professional Association for Transgender Health's Standards of Care section on medical care for incarcerated persons with GID, International Journal of Transgenderism, 11(2):133-139, 2009. DOI: 10.1080/15532730903008073.
124. McDuffie E, Brown G: 70 Veterans with Gender Identity Disturbances: A Descriptive Study, International Journal of Transgenderism, 12(1), 2010. DOI: 10.1080/15532731003688962.
125. Brown G: Autocastration and autopenectomy as surgical self-treatment in incarcerated persons with gender identity disorder, International Journal of Transgenderism, 12(1):31-39, 2010. DOI: 10.1080/15532731003688970.
126. Brown GR, McDuffie E: 70 Veterans with Gender Identity Disturbances: A Descriptive Study. (published abstract), Southern Medical Journal. 102(12):E10, December 2009. DOI: 10.1097/SMJ.0b013e3181c0401d
127. Rachlin K, Dhejne C, Brown G: The Future of GID NOS in the *DSM 5*: Report of the GID NOS Working Group of a Consensus Process Conducted by the World Professional Association for Transgender Health. Interational Journal of Transgenderism 12(2):86-93, 2010. DOI: 10.1080/15532739.2010.509209
128. Crivera C, DeSourza C, Kozma C, Dirani R, et al: Resource utilization in patients with schizophrenia who initiated risperidone long-acting therapy: results from the schizophrenia outcomes utilization relapse and clinical evaluation (SOURCE), BMC Psychiatry 11:168, 2011 (contributor as Site Principal Investigator, but not author; refer to acknowledgments) .
129. Macfadden W, DeSouza C, Crivera C, Kozma C, et al: Assessment of effectiveness measures in patients with schizophrenia initiated on risperidone long-acting therapy: the SOURCE study results. BMC Psychiatry 11:167, 2011 (contributor as Site Principal Investigator, not author; refer to Acknowledgements section)
130. Ettner R, White T, Brown G: Family and systems aggression toward therapists. International Journal of Transgenderism, 12(3):139-143, 2010. DOI: 10.1080/15532739.2010.514218.
131. King R, Brown G, McCrea C: Voice parameters that result in identification or

misidentification of biological sex in male-to-female transgender veterans. International Journal of Transgenderism, 13(3):117-130, 2012.

132 Coleman E, Bockting W, Botzer M, Cohen-Kettenis P, DeCuypere G, Feldman J, Fraser L, Green J, Knudson G, Meyer WJ, Monstrey S, Adler RK, Brown GR, Devor AH, Ehrbar R, Ettner R, Eyler E, Garofalo R, Karasic DH, Lev AI, Mayer G, Meyer-Bahlburg H, Hall BP, Pfaefflin F, Rachlin K, Robinson B, Schechter LS, Tangpricha V, van Trotsenburg M, Vitale A, Winter S, Whittle S, Wylie KR, Zucker K: Standards of Care for the Health of Transsexual, Transgender, and Gender-Nonconforming People, Version 7, International Journal of Transgenderism, 13:4,165-232 (2012). http://dx.doi.org/10.1080/15532739.2011.700873

133. Blosnich, J., Brown, G.R., Shipherd, J.C., Kauth, M., Piegari, R.I., & Bossarte, R. Prevalence of Gender Identity Disorder (GID) and suicide risk among transgender veterans utilizing Veterans Health Administration (VHA) care. Poster presented at the 140th Annual Meeting & Exposition of the American Public Health Association, San Francisco, CA, October 30, 2012.

134. Blosnich J, Brown GR, Shipherd J, Kauth M, Piegari RI, Bossarte R: Prevalence of Gender Identity Disorder (GID) and suicide risk among transgender veterans utilizing Veterans Health Administration (VHA) care. American Journal of Public Health, 103(10):27-32, 2013.

135. Brown GR: Qualitative analysis of transgender inmates' correspondence: Implications for Departments of Correction. Journal of Correctional Health Care, 20(4):334-342, 2014.

136. Brown GR: Qualitative analysis of transgender inmates' letters: Implications for transgender healthcare disparities. Proceedings of the GLMA 31st Annual Conference, page 56, September, 2013.

137. Blosnich J, Brown GR, Wojcio S, Jones KT, Bossarte RM: Mortality among veterans with transgender-related diagnoses in the Veterans Health Administration, FY2000-2009. LGBT Health, 1(4):269-276. 2014.

138. Kauth M, Shipherd J, Lindsay J, Blosnich J, Brown GR, Jones KT: Access to Care for Transgender Veterans in VHA: 2006-2013. American Journal of Public Health, 104(S4):S532-4, 2014.

139. Brown GR, Jones KT: Racial health disparities in a cohort of 5.135 transgender veterans. J Racial Ethnic Health Disparities, 1:257-266, 2014; published online ahead of print, doi: 10.1007/s40615-014-0032-4, July 16, 2014.

140. Elders J, Brown GR, Coleman E, Kolditz TA: Medical aspects of transgender military service. Armed Forces and Society, 41(2): 199-220, 2015; published online ahead of print, DOI: 10.1177/0095327X14545625, August, 2014.

141. Brown GR, Jones KT: Mental health and medical outcome disparities in 5,135 transgender veterans: a case-control study. Proceedings of the 32nd Annual Conference of the Gay and Lesbian Medical Association, September 11, 2014, Baltimore, MD, page 49.

142. Brown GR, Jones KT: Incidence of breast cancer in a cohort of 5,135 transgender veterans. Breast Cancer Research and Treatment, 149(1): pp 191-198, 2015; published online ahead of print, DOI: 10.1007/s10549-014-3213-2, 2014.

143. Brown GR, Jones KT: Health correlates of criminal justice involvement in 4,793 transgender veterans. LGBT Health, 2(4):297-305, 2015. DOI: 10.1089/lgbt.2015.0052

144. Brown GR: Breast cancer in transgender veterans: A ten case series. LGBT Health, 2(1):77-80, 2015.

145. Shipherd JC, Kauth MR, Firek AF, Garcia R,, Mejia S, Laski SJ, Walden B, Perez-Padilla S, Lindsay JA., Brown G, Roybal L, Keo-Meier C, Knapp H, Johnson L, Reese RL, & Byne W: Interdisciplinary transgender veteran care: Development of a core curriculum for VHA providers. Transgender Health, 1(1):54-62, 2016.

146. Brown GR, Jones KT: Mental health and medical outcome disparities in 5135

transgender veterans receiving health care in the Veterans Health Administration: A case-control study. LGBT Health. 3(2):122-131, 2016.
147. Feldman J, Brown G, et al: Priorities for transgender medical and mental health care research. Current Opinion in Endocrinology, Diabetes, and Obesity, February 2016 DOI: 10.1097/MED.0000000000000229
148. Brown GR, Jones KT: Health correlates of criminal justice involvement in 4,793 transgender veterans. Abstract publication, Proceedings of the Annual National Conference on Correctional Health Care, p43, abstract 505, 2015.
149. Blosnich J, Kauth M, Shipherd J, Gao S, Gordon A, Marsiglio M, Brown GR, Fine M: Mental health of transgender veterans in US states with and without discrimination and hate crime legal protection. Amer J Pub Health. 106(3):534-540, 2016
150. Reisner S, Deutsch M, Bhasin S, Bockting W, Brown GR, Feldman J, et al: Advancing methods for US transgender health research. Current Opinion in Endocrinology, Diabetes, and Obesity. February 2016 DOI: 10.1097/MED.0000000000000229
151. Brown GR, Jones KT: Utilization of pharmacy benefits by transgender veterans receiving care in the Veterans Health Administration. In preparation, 2016.

BOOK CHAPTERS:

1. Brown G R: Therapeutic Effect of Silence. In Strean H (ed.): Psychoanalytic Technique, Haworth Press, New York, 1988.

2. Brown G R: Gender reassignment: Psychiatric, endocrinologic, and surgical management (with Leiter E, Futterweit W). Chapter 68. In Webster G, Kirby R, King L, Goldwasser B (eds.): Reconstructive Urology, Blackwell Scientific Publications, London, 1992.

3. Goldschmidt M, Temoshok L, Brown G R: Women and HIV/AIDS. In Niven C, Carroll D (Eds.): The Health Psychology of Women, Harwood Academic Publishers, London, 1993.

4. Brown G R, Philbrick K: Sexual and Gender Identity Disorders in the Consultation-Liaison Psychiatry Setting. In Rundell J, Wise M (Eds.): Textbook of Consultation-Liaison Psychiatry, APA Press, Washington, D.C., 1996.

5. Brown G R: Transvestism. Chapter 71, pages 1977-2000. In Gabbard G (Ed.): Treatments of Psychiatric Disorders: The DSM-IV Edition, APA Press, Washington, D.C., 1995.

6. Brown G R: Women in the Closet: Relationships with Transgendered Men. In Denny D (Ed.): Current Concepts in Cross-Gender Identity: A New Synthesis, Chapter 21, pp. 353-371, Garland Press, New York, 1998.

7. Brown G R, Kendall S, Ledsky R: Sexual Dysfunction in HIV-Seropositive Women Without AIDS. In Ross M (Ed): HIV/AIDS and Sexuality, Haworth Press, New York, 73-98, 1995.

8. Brown G R: Gender Disorders and Sexual Dysfunctions. In Berkow R (Ed): The Merck Manual, 17th (Centennial) Edition, Merck Research Labs, Rahway, N.J., 1999.

9. Brown G R: Gender Disorders and Sexual Dysfunctions. In Berkow R (Ed): The Merck Manual of Medical Information, Home Edition, Merck Research Labs, Rahway, N.J., 1997.

10. Brown G R, Philbrick K: Sexual and Gender Identity Disorders in the Consultation-Liaison Psychiatry Setting. In Rundell J, Wise M (Eds.): Concise Guide to the Textbook of Consultation-Liaison Psychiatry, APA Press, Washington, D.C., 1999.

11. Brown G R: Transvestism. In Gabbard G and Atkinson S (Eds.): Synopsis of Treatments of Psychiatric Disorders, Second Edition, APA Press, Washington, D.C., 829-836, 1996.

12. Brown G R: Transvestism and Gender Identity Disorders. . In Gabbard G (Ed.): Treatments of Psychiatric Disorders, Third Edition, APPI, Washington, D.C., Chapter 73, pages 2007-2067, 2001.

13. Brown G R, Gass G, Philbrick K: Sexual and Gender Identity Disorders in the Consultation-Liaison Psychiatry Setting. In Rundell J, Wise M (Eds.): Textbook of Consultation-Liaison Psychiatry, Second Edition, APA Press, Washington, D.C. Chapter 22, pages 455-476, 2002.

14. Brown G R, Ceniceros S: Human Sexuality in Health and Disease. In Wedding D (Ed.): Behavior and Medicine, 3rd Edition, Hogrefe & Huber, Seattle, Chapter 12, pages 171-183, 2001.

15. Brown G R: Sexuality. In Beers M (Ed): The Merck Manual of Medical Information, Home Edition, 2nd Edition, Merck Research Labs, Rahway, N.J., 2003.

16. Brown GR, Haaser RC: Sexual Disorders in the General Hospital Setting. In Levenson J (ed): Consultation-Liaison Psychiatry, American Psychiatric Press Inc., Washington, D.C., Chapter 17, pages 359-386, 2004.

17. Brown G R: Gender Disorders and Sexual Dysfunctions. In Berkow R (Ed): The Merck Manual of Medical Information, 18th edition, Chapter 203, Merck Research Labs, Rahway, N.J., 2006.

18. Rahimian J, Bergman J, Brown G R, Ceniceros S: Human Sexuality. In Wedding D and Stuber M (Ed): Behavior and Medicine, 4th Edition, Hogrefe & Huber, Seattle, Chapter 12, 2006 (currently being used as the core textbook in a number of medical school curricula, including ETSU).

19. Brown GR: Gender Disorders and Sexual Dysfunctions. The Merck Manual of Women's and Men's Health. Simon & Schuster, Pocket Books, Chapter 2, pages 21-29, 2007.

20. Brown G R: Gender Disorders and Sexual Dysfunctions. In Berkow R (Ed): The Merck Manual of Medical Information, 19th edition, Chapter 203, Merck Research Labs, Rahway, NJ, July, 2011.

21. Brown G R: Sexual Disorders. In Berkow R (Ed): The Merck Home Health Handbook, Second Edition, Chapter 135, pages 627-630, Merck Research Labs, Whitehouse Station, NJ, 2009.

22. Rahimian J, Bergman J, Brown G R, Ceniceros S: Human Sexuality. In Wedding D and Stuber M (Ed): Behavior and Medicine, 5th Edition, Hogrefe & Huber, Seattle, Chapter 12, pages 153-164, 2010 (currently being used as the core textbook in a number of medical school curricula).

23. Brown G R: Gender Dysphoria and Sexual Dysfunctions. In Berkow R (Ed): The Merck Manual of Medical Information, 20th edition, Chapter XX, Merck Research Labs, Rahway, NJ, in press, 2016.

24. Brown G R: Gender Dysphoria and Sexual Dysfunctions. In Berkow R (Ed): The Merck Manual of Medical Information, Home Edition, 20th edition, Chapter XX, Merck Research Labs, Rahway, NJ, in press, 2016.