DRAFT

MINUTES

December 30, 2016

Group Insurance Board
State of Wisconsin

Location:
State Revenue Building – Events Room
2135 Rimrock Rd, Madison, WI 53713

BOARD MEMBERS PRESENT:

Michael Farrell, Chair
Herschel Day, Secretary (via telephone)
Terri Carlson (via telephone)
Chuck Grapentine
Waylon Hurlburt
Ted Neitzke (via telephone)
Stacey Rolston (via telephone)
Nancy Thompson (via telephone)
JP Wieske (via telephone)
Bob Ziegelbauer (via telephone)

BOARD MEMBERS ABSENT:

Bonnie Cyganek, Vice Chair

PARTICIPATING EMPLOYEE TRUST FUNDS (ETF) STAFF:

Bob Conlin, Secretary
John Voelker, Deputy Secretary
Office of Strategic Health Policy:
Lisa Ellinger, Director
Eileen Mallow, Deputy Director
Office of the Secretary:
Cheryllynn Wilkins, Board Liaison

OTHERS PRESENT:

ETF Information Technology Services:
Kadimma Mbanefo
ETF Legal Services:
Diana Felsmann, David Nispel
ETF Office of Communications:
Mark Lamkins
Department of Justice:
Kevin Potter
Department of Transportation:
Richard Way
Fair Wisconsin:
Megin McDonell
General Public:
Caitlyn Allen, Cora Allen-Coleman, Luella Allen-Waller, Kyle Bittorf, DJ Bruce, Brittyn Calyx, Rowan Calyx, Fred Day, Alex Fleagle, Jordan Foley, Alex Frye, Laura Gutknecht, Michele Hatchell, Ronni Hayon, Tracey Janke, Gabriel Javier, Caleb Johnson, Corrine Jutz, Owen Karcher, Autumn Kent, Lex Lancaster, Darla Lannert, Ray McMahon, Jaymee Meier, Jaime Neidermeier, Pamela Oliver,

DAY
EXHIBIT NO. 6
4/2/18 RPTR KB
For the Record, Inc.
(608) 833-0392

Board	Mtg Date	Item #
GIB	2.8.17	1

ETF00141

Roth Decl. Ex. M

General Public (continued):
Kathy Oriel, David Patton, Rachel Perry, Jennifer Pressman, Emily Ptak-Pressman, Melanee Ratman, Dan Ross, Erica Rotondo, Betsy Stovall, Steph Tai, Nick Telson, Jo Tent, Mitchell Turine, Sara Whitworth, CV Vitolo-Haddad

GSAFE:
Sawyer Johnson

Human Rights Campaign (HRC):
Joanne Lee

Madison Area Transgender Association (MATA):
Violet Byrns

Our Lives Magazine:
Patrick Farabaugh, Emily Mills

OutReach:
Ginger Baier

Physicians Plus:
Ron Sebranek

Michael Farrell, chair, called the meeting of the Group Insurance Board (Board) to order at 3:00 p.m. Waylon Hurlburt is attending today's meeting as the Department of Administration designee.

Mr. Potter from the Department of Justice (DOJ) attended the meeting in order to discuss the July 12, 2016, Board action to approve changes to the Guidelines Contract and Uniform Benefits for 2017 (Ref. GIB | 7.12.16 | 3A). These changes are in compliance with the federal Department of Health and Human Services (HHS) final regulations pertaining to Section 1557 of the Affordable Care Act (ACA) issued on May 18, 2016.

The state of Wisconsin has joined a federal lawsuit in Texas challenging the legality of the HHS regulations. The lawsuit requested a preliminary injunction be issued to preclude the enforcement of the HHS regulations, and a decision was expected soon. The request was heard on December 20, 2016, but no decision was issued by the time of the December 30 Board meeting.

The Chair announced the Board would convene in closed session pursuant to the exemptions contained in Wis. Stat § 19.85 (1) (g) to confer with legal counsel concerning advice about strategy to be adopted with respect to litigation in which the Board is or is likely to become involved. Mr. Nispel, Mr. Potter, Ms. Wilkins and Mr. Mbanefo were invited to remain during the closed session.

MOTION: Mr. Grapentine moved to convene in closed session, pursuant to the exemptions contained in Wis. Stat. § 19.85 (1) (g) to confer with legal counsel concerning advice about strategy to be adopted with respect to litigation in which the Board is or is likely to become involved. Mr. Hurlburt seconded the motion, which passed on the following roll call vote:

Members Voting Aye: Carlson, Day, Farrell, Grapentine, Hurlburt, Neitzke, Rolston, Thompson, Wieske, Ziegelbauer

Members Absent: Cyganek

The Board convened in closed session at 3:13 p.m. Mr. Neitzke departed at 5:00 p.m. Other ETF staff were invited into closed session at 6:15 p.m. The Board reconvened in open session at 6:24 p.m.

ANNOUNCEMENT OF ACTION TAKEN ON BUSINESS DELIBERATED DURING CLOSED SESSION

Mr. Farrell announced the Board met in closed session to consult with DOJ and ETF Legal Counsel regarding the final HHS rule. The Board will receive an update on this matter at the January 18, 2017, Board meeting. The Board also reserves the right to revisit the benefit in the future as necessitated by legal action, statutory compliance, potential financial impact, or in keeping with the Board's fiduciary responsibilities.

DISCUSSION AND CONSIDERATION OF 2017 UNIFORM BENEFITS – BENEFITS AND SERVICES RELATED TO GENDER REASSIGNMENT OR SEXUAL TRANSFORMATION - HHS NONDISCRIMINATION RULE

The Board's discussion of the gender reassignment language proposed was based on the legality of the final HHS rule.

MOTION: Mr. Hurlburt moved to reinstate the current exclusion related to benefits and services related to gender reassignment or sexual transformation contingent on all of the following:

- ***Subject to a court ruling or an administrative action that enjoins, rescinds or invalidates the HHS Rule;***
- ***Subject to compliance with Wis. Stat. section 40.03 (6)(c);***
- ***Subject to renegotiation of contacts that maintain or reduce premium costs for the state; and finally***
- ***Subject to the opinion of the DOJ that the action taken does not constitute a breach of board members' fiduciary duties.***

Mr. Wieske seconded the motion, which passed on the following roll call vote:

Members Voting Aye: Carlson, Farrell, Grapentine, Hurlburt, Rolston, Wieske, Ziegelbauer

Members Voting Nay: Day, Thompson

Members Absent: Cyganek, Neitzke

ADJOURNMENT

MOTION: Mr. Grapentine moved to adjourn the meeting. Mr. Hurlburt seconded the motion, which passed unanimously on a voice vote.

The meeting adjourned at 6:32 p.m.

Date Approved: _____

Signed: _____
Herschel Day, Secretary
Group Insurance Board

STATE OF WISCONSIN
Department of Employee Trust Funds
Robert J. Conlin
SECRETARY

Wisconsin Department
of Employee Trust Funds
PO Box 7931
Madison WI 53707-7931
1-877-533-5020 (toll free)
Fax 608-267-4549
etf.wi.gov

THE SECRETARY'S ROLE

The Secretary of the Department of Employee Trust Funds is appointed by the Employee Trust Funds Board pursuant to s. 40.03 (1) (c), Wis. Stats., to administer the public employee trust funds as defined in s. 40.01, Wis. Stats. The Secretary is expected to work to preserve the financial and actuarial soundness of the Wisconsin Retirement System and to provide high quality services to all participants.

The Secretary provides executive leadership for an agency responsible for the policy development and administration of a broad array of public employee fringe benefits offered by more than 1,495 public employers to over 622,000 participants throughout the State of Wisconsin. The largest of these benefits is the Wisconsin Retirement System.

The Secretary's role includes:

- Ensuring the effective administration and oversight of agency operations;
- Keeping members of the Employee Trust Funds, Group Insurance, Teachers Retirement, Wisconsin Retirement, and Deferred Compensation Boards informed on matters relating to their duties and responsibilities carrying out decisions of the Boards and serving as a primary point of contact for Board members about agency operations and benefit programs;
- Developing and recommending policy (legislation, rules, statutory interpretation) to the Legislature, Governor and Employee Trust Funds, Teachers Retirement, Wisconsin Retirement, Group Insurance, and Deferred Compensation Boards;
- Establishing and maintaining effective relationships with the Governor, the Legislature, the State of Wisconsin Investment Board, the Department of Administration, other state and legislative service agencies, and organizations representing participants and employers, and other stakeholder groups;
- Working with a broad array of third party administrators (such as health insurance providers, life insurance providers, deferred compensation investment option providers and record keepers, actuarial consultants, attorneys, etc.) to assure economical, effective coordination and delivery of services; Participating in national benefit industry-related organizations to stay abreast of best practices in the administration and funding of public pension plans and emerging national trends and policy implications of pension and other public employee benefits.

(Revised: January 2018)

Roth Decl. Ex. N

State of Wisconsin
Department of Employee Trust Funds
Robert J. Conlin
SECRETARY

801 W Badger Road
PO Box 7931
Madison WI 53707-7931

1-877-533-5020 (toll free)
Fax 608-267-4549
etf.wi.gov

Correspondence Memorandum

Date: January 30, 2017

To: Group Insurance Board

From: Robert J. Conlin, Secretary

Subject: 2017 Uniform Benefits and Services Related to Gender Reassignment

This memo is for informational purposes only. No Board action is required.

At the December 30, 2017 Group Insurance Board (Board) meeting, the Board approved reinstating the exclusion of health benefits and services based on gender identity after certain contingencies were met. The contingencies included:

1. A court ruling or an administrative action that enjoins, rescinds or invalidates the rules set by the federal Department of Health and Human Services (HHS);
2. Compliance with state law, Section 40.03 (6)(c);
3. Renegotiation of contracts that maintain or reduce premium costs for the state; and
4. A final opinion of the Wisconsin Department of Justice that the action taken does not constitute a breach of the Board's fiduciary duties.

Contingency #1: On December 31, 2016, a federal judge in Texas issued an injunction barring enforcement of the Affordable Care Act provisions that extend anti-discrimination protections to transgender health services.

Contingency #2: On January 23, 2017, the Board's consulting actuary produced a memo (Attachment A), confirming that reinstating the exclusion would not increase program costs, thereby confirming compliance with Wis. Stat. 40.03 (6)(c).

Contingency #4: On January 13, 2017, the Wisconsin Department of Justice provided an opinion to the Board confirming that the action taken does not constitute a breach of the Board's fiduciary duties.

Upon consultation with the Board Chair that contingencies 1, 2 and 4 were addressed, ETF issued a 2017 health plan contract amendment to all participating health plans to reinstate the benefit exclusion, effective February 1, 2017 (Attachment B). This completes **Contingency #3.**

Staff will be at the Board meeting to answer any questions.

Attachment A: Segal Memorandum - Transgender Cost Estimate
Attachment B: 2017 Contract to Participate Under Group Health Benefit Program And Uniform Benefits – Reinstatement of Benefit Exclusion Concerning Gender Reassignment

Reviewed and approved by Lisa Ellinger, Director, Office of Strategic Health Policy
Lisa Ellinger Electronically Signed 1/30/17

Board	Mtg Date	Item #
GIB	2.8.17	4

Boyden Pod 6 – 000059

Attachment A

Segal Consulting

2018 Powers Ferry Road SE Suite 850 Atlanta, GA 30339-7200
T 678.306.3100 www.segalco.com

MEMORANDUM

To: Lisa Ellinger

From: Kirsten R. Schatten, ASA, MAAA
Kenneth C. Vieira, FSA, MAAA

Date: January 23, 2017

Re: Transgender Cost Estimate

Section 1557 of the ACA prohibits group health plans from discriminating on the basis of race, color, national origin, sex, age, or disability in health programs, consistent with existing federal laws, including Title VI of the Civil Rights Act of 1964; Title IX of the Education Amendments of 1972; the Age Discrimination Act of 1975; and Sections 504 and 508 of the Rehabilitation Act of 1973; and the Americans with Disabilities Act of 1990 (ADA). Group health plans and employers that accept federal funding from HHS are covered entities under the law.

The Section 1557 regulations defined discrimination on the basis of "sex" to include discrimination on the basis of pregnancy, false pregnancy, termination of pregnancy or recovery therefrom, childbirth or related medical conditions, sex stereotyping, and gender identity. This interpretation was challenged by the plaintiffs as being an impermissible definition of the term "sex."

In Franciscan Alliance, Inc. v Burwell, et al, several plaintiffs challenged regulations issued by the Department of Health and Human Services (HHS) implementing Section 1557 of the Affordable Care Act (ACA). Plaintiffs included eight states (Texas, Wisconsin, Nebraska, Kansas, Louisiana, Arizona, Mississippi, and the Commonwealth of Kentucky) and three private health care providers. On December 31, 2016, Judge Reed O'Connor of the US District Court for the Northern District of Texas issued a nationwide preliminary injunction enjoining HHS from enforcing the regulation's prohibition against discrimination on the basis of gender identity or termination of pregnancy.

This brief memo is focused on the calculation of potential cost impact to the State of Wisconsin Group Health Insurance Plan for adding transgender dysphoria benefits in 2017. Please note that there is a lack of information and data to provide specific information on estimated cost to the Plan. Therefore, we have provided a range of estimates based on potential utilization information gathered from research and treatment cost estimates from BCBS. Please also note there are wide variations in some of these studies, and past experience from various counties that have provided coverage long enough to have data to review have shown the prior estimates to be overstated.

Key Assumptions

Three key assumptions drive our cost estimates: prevalence of transgender members, percentage of those who seek benefits (including surgery) and the cost of the various treatment options.

Prevalence – According to the Centers for Disease Control and Prevention (CDC) 2015 Behavioral Risk Factor Surveillance System (BRFSS), approximately 0.58% of adults in the United States self-identify as transgender. This has increased slightly from 2014 & 2013.

The Williams Institute in June of 2016 published a paper entitled "How Many Adults Identify as Transgender in the United States?" which goes a little further by drilling down on prevalence by state and also providing ranges. This paper estimated a prevalence range of 0.31% to 0.62% for Wisconsin adults ages 18-64.

Percentage Who Seek Benefits – The number of transgender people seeking benefits is difficult to predict since a new benefit may alter past patterns. One study was published by Olyslager, F. & Conway, L. (September 2007) entitled "On the Calculation of the Prevalence of Transsexualism." This paper was presented at the WPATH 20th International Symposium, Chicago, Illinois. This study from 2007 estimates that, of those who identify as transgender, between 0.1% and 0.5% have taken some steps to transition from one gender to another.

The State of Wisconsin Group Health Insurance Plan membership from age 18 through 64 is approximately 159,000. Applying the prevalence and utilization assumptions above, we would expect 2 to 5 members to use transgender benefits.

For those who seek benefits, the vast majority of cost comes from members choosing to have gender reassignment surgery. There are a couple of sources we found (Mohammed A. Memon, MD; February 22, 2016; "Gender Dysphoria and Transgenderism: Epidemiology" Medscape, as well as HealthResearchFunding.Org) that site prevalence rates for adults seeking reassignment surgery of 1 in 30,000 for males and 1 in 100,000 for females. Using these statistics, we would expect 3 males and 1 female in our expected scenario, and we have applied a range of +/- 50% to get a range of 2-5 adults in total.

Cost of Treatment – Information was provided at a very high level from a national medical vendor. Their pricing analysis was based entirely on external studies and sources:

- For male to female surgery they assumed roughly $28K, with $3,600 in hormonal therapy
- For female to male surgery they assumed about $56K, with $7,200 in hormonal therapy

They also noted that there would be fairly substantial counseling costs associated with the surgery—roughly $10K in a given year.

Financial Impact

Using the above, we have estimated the annual cost to range from $100,000 to $250,000. The costs are highly variable based on the assumptions described above. Below is brief summary;

		Prevalence		Estimated Cost	Cost Estimate	
		Low	High	(per Treatment)	Low	High
Surgical Benefits	Male	1.26	3.79	$ 41,600	$ 52,569	$ 157,706
	Female	0.42	1.13	$ 73,200	$ 30,460	$ 82,738
	Total	1.68	4.92		$ 83,028	$ 240,443
Non-Surgical Benefits	Male	0.61	0.02	$ 17,200	$ 10,525	$ 370
	Female	0.14	-	$ 13,600	$ 1,903	$ -
	Total	0.75	0.02		$ 12,428	$ 370
Total Using Benefits	Male	1.88	3.81	$ 58,800	$ 63,094	$ 158,076
	Female	0.56	1.13	$ 86,800	$ 32,363	$ 82,738
	Total	2.43	4.94		**$ 95,456**	**$ 240,814**
Adult Members (18-64)						159,043
Total PMPM					$ 0.05	$ 0.13

There are a few other sources we found and reviewed that provide similar information and would bring us to a similar range of cost estimates. Based on approximately $1.3 billion of non-Medicare premiums, the cost for the State of Wisconsin Group Health Insurance Plan is estimated to be 0.007% to 0.018% of premium.

The cost to cover services related to transgender dysphoria was not anticipated during rate development and negotiations for 2017; therefore, the 2017 premiums were not changed to reflect potential transgender claims. Also note that many vendors' increases were capped at 5%, leaving no margin to add additional benefits within their current contractual rates. Reinstating the exclusion for coverage of transgender services should have no impact on program costs for 2017.

Attachment B

State of Wisconsin
Department of Employee Trust Funds
Robert J. Conlin
SECRETARY

801 W Badger Road
PO Box 7931
Madison WI 53707-7931

1-877-533-5020 (toll free)
Fax 608-267-4549
etf.wi.gov

Date: January 31, 2017

To: All Health Plans

RE: 2017 Contract To Participate Under Group Health Benefit Program And Uniform Benefits:
Reinstatement of Benefit Exclusion Concerning Gender Reassignment

Pursuant to action taken by the Group Insurance Board on December 30, 2016, the following Exclusion is reinstated in Section IV. Exclusions and Limitations in the 2017 Uniform Benefits:

1. Surgical Services
   c. Procedures, services, and supplies related to surgery and sex hormones associated with gender reassignment.

Health Plan must acknowledge receipt of the amendment referenced above by providing the required information below. We request that an official with authority to bind the Plan sign this form and return it to the Department of Employee Trust Funds. With receipt of this amendment, the contingency to negotiate this contract change is satisfied and the above-noted benefit no longer is part of Uniform Benefits. This rescission of the benefit is effective February 1, 2017.

_____
Name of Health Plan

_____
Authorized Printed Name

_____ _____
Authorized Signature Date

EXPERT WITNESS REPORT OF STEPHANIE BUDGE, Ph.D.

I, Stephanie Budge, Ph.D., a licensed psychologist, have prepared this expert report pursuant to Fed. R. Civ. P. 26(a)(2) in the case of Boyden v. Wisconsin Dep't of Employee Trust Funds. I was retained as an independent consultant with expertise on issues related to gender dysphoria and the medical necessity of transition-related medical care (e.g., hormone therapy, gender confirmation surgery, facial feminization surgery) for transgender individuals. I was retained by the American Civil Liberties Union Foundation, the American Civil Liberties Union of Wisconsin Foundation, and Hawks Quindel, S.C., who represent the Plaintiffs Shannon Andrews and Alina Boyden, who are seeking insurance coverage for transition-related care and challenging the state of Wisconsin's blanket exclusion of such coverage for state employees.

Based on my training, research and clinical experiences, it is my professional opinion that if transgender individuals do not receive appropriate transition-related health care, there are often significant physical and mental health consequences, thus showing the medical necessity of such care for many transgender individuals. In alignment with my professional experiences, there is a substantial body of literature indicating that transition-related medical care is medically necessary for many transgender individuals. In addition, there is no evidence to support a policy of excluding coverage for all transition-related care for transgender individuals. As well, the evidence indicates that the cost to insurance plans of covering transition-related care for transgender individuals is minimal and may well be offset by reductions in other health care expenses that arise from failure to provide such care. It is my professional opinion that both Alina Boyden and Shannon Andrews currently meet criteria for gender dysphoria and have met criteria for gender dysphoria for many years, and that both Alina and Shannon report information

that is consistent with the medical necessity for transition-related medical care (e.g., hormones, gender confirmation surgery, including facial feminization surgery).

A. Professional Qualifications and Experience

I am a licensed psychologist who has been specializing in issues of gender identity and gender transition processes for over 10 years. I received a master's degree in educational psychology from the University of Texas at Austin in 2006 and a Ph.D. in counseling psychology in 2011 from the University of Wisconsin-Madison. My Ph.D. concentration specifically focused on transgender individuals, with a broader focus on lesbian, gay, and bisexual issues. I also received a minor in psychological assessment as part of my Ph.D. degree program. I have been a mental health professional since 2006 and I am currently licensed to practice psychology in the state of Wisconsin (license # 3244-57).

I have expertise working with individuals whose gender assigned at birth is different from their gender identity (hereafter referred to as transgender or trans individuals). I have been a mental health provider to transgender individuals since 2007. Transgender individuals have comprised the majority of my clinical caseload since 2011, and I have worked clinically with over 100 transgender clients (through individual therapy, group therapy, psychological evaluations, and providing supervision of clinical work of transgender individuals). Many of these individuals have met the Diagnostic and Statistical Manual 5 (DSM-5) criteria for gender dysphoria, a psychiatric diagnosis that signifies distress caused by incongruence between a person's assigned gender at birth and their gender identity.

I am currently an assistant professor in counseling psychology at the University of Wisconsin-Madison, where I teach courses that focus on training master's and doctoral students skills to become mental health professionals and psychological researchers. My courses

primarily focus on counseling skills, conducting psychological assessments, and research design. My faculty appointment has included clinical work at the Counseling Psychology Training Clinic (CPTC), which has included providing pro bono therapy to transgender individuals and training students in best practices in clinical work with transgender clients. As part of my faculty appointment, I direct the Trans Research Lab (TRL). As director of the lab, I design research projects that focus on transgender individuals' mental health. Of note, one of the current research projects is a clinical trial focusing on the efficacy of psychotherapy for transgender individuals. As part of this project, I trained all of the therapists in assessing gender dysphoria and writing letters for transition-related medical care for transgender clients. I also hold an appointment as a part-time (summer) clinical health psychologist at UW Health, where I conduct evaluations of transgender adolescents to determine if they require medically necessary treatments (e.g., psychological, social, and medical interventions) related to their gender identity.

I have published 62 invited and peer-reviewed journal articles and book chapters, with the majority of these focusing on transgender individuals. Notably, several of these publications are focused on evaluating transgender individuals to assess their eligibility for transition-related care, including hormone treatment and surgery; how to engage in clinical decision-making related to mental health care for transgender individuals; and effective psychotherapeutic treatment for transgender individuals. I have been involved in more than 100 academic presentations (internationally, nationally, and locally). The majority of these presentations have been focused on transgender individuals. I am an associate editor for the journal *Psychotherapy*. I am also on the editorial board for two peer-reviewed academic journals: *Psychology of Sexual Orientation and Gender Diversity* and the *International Journal of Transgenderism*. Researchers

in the United States and internationally have sought my assistance as an expert reviewer for research focused on transgender individuals.

I have received several awards for my work in the science and clinical practice of working with transgender individuals. Most recently, (along with colleagues) I received the 2017 paper award for *The Counseling Psychologist* related to a major contribution on *Research on Transgender People and Issues*. I received the 2015 American Psychological Association Early Career Award for work with LGBT populations from the Society for Counseling Psychology and I was the first recipient of the APA Transgender Research Award in 2010. Locally, I am also a member of the Wisconsin Trans Health Coalition, which is an organization focused on improving health care for transgender individuals throughout Wisconsin. My primary role on the coalition is to consult on research projects and collect data about transgender individuals in Wisconsin to tailor health care interventions for local community members.

I am also a member of the Society for Lesbian, Gay, Bisexual, and Transgender Issues within the American Psychological Association (APA) (of which I am also a member). I am co-chair of the Science Committee for the Society. The Science Committee is charged with ensuring that the most relevant and up-to-date research regarding LGBT individuals is disseminated through the Society and to full membership of the APA. We provide programming at the annual APA convention to disseminate cutting edge research on the best psychological practices and evidence-based treatments with LGBT individuals. At the 2018 APA annual convention, I will be disseminating up-to-date information about evidence-based treatments for transgender individuals. I am also member of the World Professional Association of Transgender Health (WPATH). WPATH (formerly known as the Harry Benjamin International Gender Dysphoria Association) is an interdisciplinary professional and educational organization of individuals

worldwide specializing in research and practice in transgender health. As a WPATH member, I attend conferences that focus on transgender individuals and present my own research to provide trainings to other professionals.

I am attaching a copy of my current C.V., which lists my qualifications, experience, and publications, as Appendix A to this report.

Prior Expert Witness Experience

I have previous experience as an expert psychologist in an immigration case that was focused on a transgender woman seeking asylum in the United States. Her case was heard by the United States Department of Justice Executive Office for Immigration Review. I prepared an expert report for that case in May 2015. I was also hired as an expert witness in the case *Whitaker v. Kenosha Unified School District.* As part of my role in the case, I prepared and wrote a declaration and expert report describing my psychological assessments of a transgender youth who had reported experiencing discrimination at his high school. I was not deposed and I did not testify in this case.

Compensation

I am being compensated at an hourly rate of $200/hour for actual time devoted for my expert services and testimony in this case, as well as expenses and costs. My compensation does not depend on the outcome of this litigation, the opinions I express, or the testimony I provide.

BASIS FOR OPINIONS

In this report, I use my clinical and academic expertise to provide an overview and discussion of gender identity, the psychological processes surrounding gender identity development for transgender individuals, and the appropriate clinical standards for gender transition and treatment of gender dysphoria in transgender adults. I then discuss the medical

necessity of gender transition-related medical and psychological care for transgender individuals, as informed by authoritative research, prevailing medical and psychological standards, and ethical standards for psychological practice with transgender clients. I also provide reasons why blanket exclusions for transition-related care are not supported by research or policy and why transition-related care is cost-effective treatment. I then provide separate clinical assessments of Alina Boyden and Shannon Andrews, the plaintiffs in the lawsuit, and provide my professional opinion related to their diagnoses of gender dysphoria and whether or not transition-related care would be considered a medical necessity for both plaintiffs, respectively.

In preparing this report, I reviewed the formative and influential psychological and public health research on transgender individuals published over the past decade, including in-press research and recently published studies. I have included a bibliography in Appendix B to this report. The majority of these publications come from highly-respected, peer-reviewed journals on LGBT and/or psychological issues. I also reviewed: the Plaintiffs' Amended Complaint; State Defendants' Responses to Plaintiffs' Requests to Admit, Interrogatories and for Production of Documents; documents produced by the State Defendants concerning insurance coverage of transition-related care; and documents related to appeals of denials of the Plaintiffs' requests for coverage of transition-related care.

As part of my clinical evaluation, I reviewed several of Alina's and Shannon's medical records from their physicians and therapists, and spoke with one of Shannon's prior therapists. The majority of the information used for my psychological evaluations of Alina and Shannon derives directly from face-to-face meetings with the plaintiffs. I met with Shannon for three hours and I met with Alina for 2.5 hours. The purpose of these meetings was to conduct a clinical and diagnostic interview to determine the medical necessity of transition-related care.

Based on my review of these materials and these evaluations, I render the opinions contained in this report, with a reasonable degree of professional certainty in my field of psychology. I understand that investigation and discovery is continuing in this case and may result in additional materials for me to review. I may, if necessary, supplement or amend my opinions based on such materials.

GENDER IDENTITY AND TRANSGENDER INDIVIDUALS

A. Definitions and Key Concepts

The following are several of the most up-to-date definitions and concepts related to transgender identity:

Sex: Sex refers to one's classification as male, female, or neither male or female. The term refers a person's chromosomes, hormones, reproductive organs, secondary sex characteristics, and gender identity (i.e., internal sense of gender) (Singh & dickey, 2016). The majority of individuals born with penises, testes, and XY chromosomes will identify as men and experience themselves as male. As well, the majority of individuals born with vaginas, clitorises, vulvas, ovaries, uteruses, and XX chromosomes will identify as women and experience themselves as female. Transgender individuals and those with intersex conditions and sex chromosome conditions (e.g., Turner Syndrome, Klinefelter Syndrome) will likely experience a different path with their sex (Morselli et al., 2016). There is no single sex-based characteristic that defines an individual's sex; that being said, gender identity is one of the primary factors when defining an individual's sex. When sex-related characteristics such as internal or external genitalia, reproductive capacity, chromosomes, or gender identity are inconsistent—as with many transgender people and people with intersex conditions—it is most appropriate to define sex based on the person's gender identity (Singh & dickey, 2016).

Gender: Gender refers to an individual's social, cultural, and psychological characteristics that are considered masculine or feminine based on cultural stereotypes, norms, and traits. (Gilbert & Scher, 2009).

Gender identity: Gender identity is understood in the psychological and medical professions to mean a person's internal sense of one's own sex, as it is privately experienced in one's behavior and self-awareness of being female, male, or at a defined point along a gender continuum (Singh & dickey, 2016). All human beings have a gender identity. Gender identity is innate and generally considered an immutable characteristic. Gender identity for human beings usually begins to become clear around the age of three (with some variation around this age), although many transgender individuals may not begin to recognize or express their gender identity until later in life. Neuroimaging data demonstrate strong evidence to indicate biological causes for transgender identity (see Sanchez & Pankey, 2017 for a review; Spizzirri et al., 2018). Recent neuroimaging data show that transgender women's brains are similar to cisgender women's brains (Rametti et al., 2011) and that transgender men's brains are similar to cisgender men's brains (Luders et al., 2009; Savic & Arvor, 2011).

Gender expression: Gender expression is defined as the behaviors associated with a public expression of stereotyped masculinity and/or femininity, or a rejection of these stereotypes (Brierley, 2000)**.**

Gender assigned at birth: Gender assignment is usually based on either an assessment of an infant's external genitals or a chromosome analysis. This language is also sometimes referred to as "sex assigned at birth" in the literature, but gender assignment is considered more accurate based on gender socialization and gender expectations that occur from infancy.

Transgender: Transgender identity is indicated by incongruence between a person's gender assigned at birth (male assigned at birth or female assigned at birth) and their gender identity (Singh & dickey, 2016).

Cisgender: Conversely, individuals are considered cisgender if they identify with the gender identity that corresponds with their gender assigned at birth (Singh & dickey, 2016).

Gender Transition: For most transgender individuals, a gender transition or "transitioning" is considered psychologically and medically necessary, as will be noted in the report below. Transition can take either or both of two forms: (a) social transition, and (b) medical transition (American Psychological Association, 2015).

Social Transition: A social transition is considered any aspect of identifying and expressing one's gender identity and usually does not encompass medical interventions—a social transition is considered to be medically necessary, given the psychosocial benefits of social transition (Coleman et al., 2012). An individual will typically, among other things, tell others of their gender identity (also known as coming out), use a different name than their birth name, use pronouns congruent with their gender identity, wear clothing typically associated with their gender identity, change their hairstyle, and use restrooms that fit their gender identity. This list of aspects of social transition is not exhaustive, nor are all of these steps necessary for all transgender persons.

Medical transition: A medical transition usually includes any medical procedure to assist a transgender individual with achieving primary or secondary sex characteristics that are closely aligned with their gender identity. Examples of medical transition can include hormone therapy and/or surgeries (for example, chest/breasts, internal/external genitalia, facial features, and/or body contouring). Not all transgender individuals will desire or need medical

interventions and some medical interventions, including surgeries, may not be developmentally or socially appropriate for some individuals (APA, 2015; Singh & dickey, 2016).

Hormone Therapy: Hormone therapy (HT) for transgender individuals includes the administration of feminizing or masculinizing hormones to induce changes in physical appearance (White-Hughto & Reisner, 2016). Hormone therapy is considered medically necessary for many transgender individuals due to its efficacy in relieving psychological distress associated with gender dysphoria and improving quality of life (Coleman et al., 2012; White-Hughto & Reisner, 2016). Hormone therapy is also referred to as hormone replacement therapy (HRT) in the literature.

Gender confirmation surgery: Gender confirmation surgery (GCS) includes any surgery to alter or adjust an individual's primary or secondary sex characteristics to align with their current gender identity. The most common surgeries include changes to the chest, genitals, and face/neck (Coleman et al., 2012). Gender confirmation surgery is considered medically necessary for many transgender individuals due to its efficacy in relieving psychological distress associated with gender dysphoria and improving quality of life (Coleman et al., 2012). Gender confirmation surgery (GCS) is also commonly referred to as sex reassignment surgery (SRS) or gender affirmation surgery (GAS) in the literature.

Prevalence of Transgender Individuals

Most recent population-based estimates indicate that 0.38% (approximately 1,000,000 people; Meerwijk & Sevelius, 2017) to 0.6% (approximately 2,000,000 people; Flores et al., 2016) of the United States population identifies as transgender. The Flores et al. (2016) report estimated that transgender adults comprise approximately 0.43% of the population in Wisconsin.

However, the authors of these recent publications indicate that these estimates are likely low due to population-based survey instruments that constrain the definition of transgender identity, which can have limitations on how transgender people are defined or recognized in public policy and public health.

Statistics Regarding Medical Interventions for Transgender Individuals

Many transgender people have undergone some form of medical transition, though many more may need such transition-related care than actually receive it. There have been several nation-wide publications estimating the prevalence of transgender individuals seeking or undergoing transition-related care in the United States. In the first nationwide survey of its kind, Grant et al. (2011) surveyed 6,456 participants. They reported that for medical transition-related care, 62% of participants used hormone therapy and an additional 23% planned to use hormone therapy in the future (for a total of 5,487 participants using or planning to seek hormone therapy). Transgender women reported the following information regarding gender confirmation surgery: 20% had had a vaginoplasty (surgical creation of vagina and vulva) and 60% planned to have it someday; 21% had had an orchiectomy (surgical removal of the testes) and 59% planned to have it someday; and 18% had had chest surgery and 54% planned to have it someday. Transgender men reported that 41% had had chest surgery and 51% planned to have chest surgery someday. Regarding additional surgeries for transgender men, fewer men indicated they had genital surgery (2% reported having had a phalloplasty [surgical creation of a penis]), with 26% indicating they planned to have it someday. The authors hypothesize that the difference between the number of people having had surgery and the number who plan to have it in the future might be due to financial barriers or other social barriers. Non-binary individuals' data were not analyzed in the 2011 report.

In 2016, a new report based on a survey of 27,715 transgender respondents from the United States described the health care and discrimination experiences of transgender people (James et al., 2016). In this report, 95% of transgender men and women reported they had or planned to have hormone therapy; only 49% of all respondents had had hormone therapy, despite the large numbers of individuals desiring hormone therapy. Twelve percent of transgender women indicated they had had a vaginoplasty and an additional 54% planned to have the procedure someday (with an additional 22% reporting that they were unsure about the procedure). Eleven percent of trans women had had an orchiectomy and an additional 47% planned to have the procedure someday (with an additional 22% reporting that they were unsure about the procedure). Percentages for transgender men and non-binary individuals are listed in the report on pages 101 and 102.

Clinical Diagnosis and Treatment Standards for Gender Dysphoria

Gender dysphoria (GD) is the medical and psychiatric term for the psychological distress caused by the incongruence between a transgender person's gender assigned at birth and gender identity. This psychiatric diagnosis is codified within the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM-5). The DSM-5 is widely used within psychiatry and psychology. Formal clinical training is necessary to understand and apply the manual in diagnosing psychological conditions (Black & Grant, 2014). The most recent version of the World Health Organization's International Classification of Diseases (ICD-10) uses the term gender identity disorder (GID) to describe the condition the DSM-5 calls gender dysphoria. Gender identity disorder was first identified as a mental health disorder in the DSM-III in 1973 (Zucker & Spitzer, 2005). After several iterations, GID was updated to GD in the DSM-5 in 2013 to account for recent developments in understanding and reflecting that gender

identity is not a disorder, but that the distress related to the incongruence is what leads to a diagnosis (Fraser, 2015; Regier, Kuhl, & Kupfer, 2013).

Individuals who present with gender dysphoria will likely report a variety of symptoms, but with a theme of an intense need to experience themselves as their affirmed gender identity, present themselves in accordance with their affirmed gender identity, and be viewed by others in accordance with their affirmed gender identity. When individuals diagnosed with gender dysphoria do not obtain competent and necessary treatment, serious and debilitating psychological distress (depression, anxiety, self-harm, suicidal ideation/attempts, etc.) often occurs (Bockting et al., 2016; Coleman et al., 2012; Wilson, Chen, Arayasirikul, Wenzel, & Raymond, 2015).

Under the DSM-5, the symptoms under Criterion A for identifying Gender dysphoria in adolescents and adults (302.85) include a marked incongruence between one's experienced/expressed gender and assigned gender, of at least 6 months' duration, as manifested by at least two of the following:

(1) A marked incongruence between one's experienced/expressed gender and primary and or/secondary sex characteristics (or in young adolescents, the anticipated 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 experienced/expressed gender (or in young adolescents, a desire to prevent the development of the anticipated secondary sex characteristics)

(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 (or some alternative gender different from one's assigned gender)

(5) A strong desire to be treated as the other gender (or some alternative gender different from one's assigned gender)

(6) A strong conviction that one has the typical feelings and reactions of the other gender (or some alternative gender different from one's assigned gender).

According to the DSM-5 Criterion B, a diagnosis of gender dysphoria also requires a finding of clinically significant distress or impairment in social, occupational, educational, or other important areas of functioning.

Standards of Care

The World Professional Association for Transgender Health (WPATH) publishes the Standards of Care for the Health of Transsexual, Transgender, and Gender-Nonconforming People ("SOC"), which are considered the international standards for medical and mental health treatment for transgender individuals. The foremost medical and mental health organizations within the United States, and internationally, recognize the SOC as the authoritative standards for treatment of gender dysphoria. These standards are considered authoritative because the foremost experts in the field of transgender health articulate professional consensus regarding the most up-to-date evidence-based research on transgender health. WPATH is the largest transgender health organization in the world and is committed to promoting "evidence based care, education, research, advocacy, public policy, and respect in transgender health" (wpath.org, 2017). WPATH (originally called the Harry Benjamin International Gender Dysphoria Association) has published the SOC since 1979. The seventh and most current version of the SOC was published in 2012. The professional medical and mental health organizations

recognizing the authority of the WPATH SOC include the American Psychological Association, the American Psychiatric Association, the American Counseling Association, and the American Medical Association.

The SOC provide evidence-based protocols for mental health and medical providers to follow in determining the specific treatment regimen that will best fit the needs of the transgender individual. It has been well-established from the SOC and experts in the health care of transgender individuals that each transgender person has their own specific transition needs and that not every transition will look the same. Treatment generally consists of social, psychological, and/or medical support, as needed, which allows the individual to live and be integrated into society in accordance with their gender identity, thus relieving the distress that results from gender incongruence. Interventions are not used to change a person's gender identity; instead, they help to bring the person's external appearance and gender expression in alignment with their gender.

Medical Necessity for Treatment

To date, "every major expert medical association in the United States recognizes the medical necessity of transition-related care for improving the physical and mental health of transgender people and has called for health insurance coverage for treatment of gender dysphoria" (p. 1801, Baker, 2017). Research confirms not only the medical necessity of transition related care, but also that the procedures are safe and have high post-surgical satisfaction rates (Hess et al., 2014; Tran et al., 2018).

The WPATH Standards of Care (SOC v.7; Coleman et al., 2012) outline the specific reasons for the medical necessity of transition-related care for transgender individuals. The SOC first note the medical necessity of masculinizing hormones (for individuals assigned a female

gender at birth) and feminizing hormones (for individuals assigned a male gender at birth) to alleviate or decrease dysphoria. As noted by the SOC, the medical regimen will be individualized to each patient. The SOC note that gender confirmation surgery for transgender individuals is considered reconstructive, not cosmetic or aesthetic, "with unquestionable therapeutic results" (p. 58). As well, the SOC indicate that gender confirmation surgery has been found to alleviate gender dysphoria in many people. Specifically, for many transgender individuals "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" (p. 55).

According to the WPATH SOC, the primary reason for the medical necessity of hormone therapy and gender confirmation surgery is demonstrated in the psychosocial benefits of the treatments. The SOC v.7 outline 37 years of data that focus on the beneficial psychosocial outcomes of hormone therapy and gender confirmation surgery. The SOC indicate that the majority of studies demonstrate an irrefutable beneficial effect of gender confirmation surgery on postoperative outcomes (e.g., well-being and sexual functioning)." (p. 107). One of the first major retrospective studies focused on gender confirmation surgery indicated that 80.7% of transgender men reported positive outcomes (improved social and emotional adjustment) and 71.4% of transgender women reported positive outcomes (Pauly, 1981). Kuiper & Cohen-Kettenis (1988) reported that 88.6% of the sample ($N = 141$) reported feeling very/moderately happy with the results of their surgery.

Since standards of care were released in 1996, the research overwhelmingly indicates that transgender patients are satisfied with surgery and experience positive psychosocial outcomes post-hormones and post-surgery. See bibliography included as Appendix B. There are many studies that are indicative of the positive outcomes of medical treatment, such as general

satisfaction with surgery, satisfaction with sexual functioning, and improved quality of life (e.g., De Cuypere et al., 2005; Krege et al., 2001; Rehman et al., 1999; Wierckx et al., 2011).

Since the most recent version of the SOC were published in 2012, numerous other studies have been published showing even stronger treatment benefits and more specific information about the outcomes of surgery. The most up-to-date research confirms what previous research has shown regarding positive outcomes gender confirmation surgery. These studies indicate that quality of life and mental health outcomes only continue to improve after surgery and that patients do not experience regret related to the procedures (Glynn et al., 2016; van de grift, 2018).

Additional longitudinal studies have noted the importance of hormone-related care on mental health outcomes. For example, Heylens et al. (2014) indicated that hormone therapy was associated with a significant decrease in anxiety, depression, interpersonal sensitivity, and hostility. Additionally, psychopathology scores for transgender people who had received hormone therapy were compared with general population outcomes; after initiating hormones, transgender individuals reported similar levels of functioning to cisgender individuals. Similarly, Colizzi, Costa, & Todarello (2014) reported in a longitudinal study that hormone therapy was associated with lowered anxiety, depression, and general psychological symptoms.

In addition to the substantial body of literature noting the positive psychosocial outcomes of hormone therapy and gender confirmation surgery, research also shows that *failure* to provide transition-related medical care can lead to significant harm. For example, Glynn et al. (2016) report that some transgender women may engage in harmful behaviors, such as self-surgery or use of non-prescribed hormones, primarily if they are denied access to medical care and/or cannot afford the treatment(s). If individuals engage in self-prescribing hormones or in self-surgeries, serious side effects and physical health concerns can occur as a result (Rotandi et al.,

2013)—leading to additional health complications that will require additional medically necessary treatments.

Ethical Standards and Guidelines for Medical and Psychological Care

Within the medical and mental health care fields, gender-related transition care is considered medically necessary. Lambda Legal recently published a document outlining 12 United States major medical and mental health organizations' resolutions and statements documenting the medical necessity of transition-related medical care (Lambda Legal, 2017). Notably, the document indicates that the American Medical Association (AMA) has released at least 10 statements regarding accessibility of medical care for transgender individuals and as early as 2008, AMA Resolution 122, A-08 stated: "An established body of medical research demonstrates the effectiveness and medical necessity of mental health care, hormone therapy and sex reassignment surgery as forms of therapeutic treatment for many people diagnosed with GID... Therefore, be it RESOLVED, that the AMA supports public and private health insurance coverage for treatment of gender identity disorder; and be it further RESOLVED, that the AMA oppose categorical exclusions of coverage for treatment of gender identity disorder when prescribed by a physician" (p. 2).

The American Psychiatric Association's Task Force on Treatment of Gender Identity Disorder (GID) (Byne et al., 2012) indicates: "This resolution concludes that medical research demonstrates the effectiveness and necessity of mental health care, hormone therapy and SRS [sex reassignment surgery] for many individuals diagnosed with GID" (p. 768). As well, the American Psychological Association's Task Force on Gender Identity and Gender Variance (2009) report indicates: "For individuals who experience such distress, hormonal and/or surgical sex reassignment may be medically necessary to alleviate significant impairment in interpersonal

and/or vocational functioning. Indeed, when recommended in clinical practice, gender confirmation surgery is almost always medically necessary, not elective or cosmetic (Bockting & Fung, 2005; Meyer et al., 2001)" (p. 32).

Several years after the release of this Task Force report, the American Psychological Association released guidelines for psychological practice with transgender and gender non-conforming people (APA, 2015). This report also highlights the medical necessity of transition-related care. In addition, the report outlines 16 guidelines for ethical psychological practice with transgender and gender non-conforming people (TGNC). Guideline 5 indicates that psychologists should be able to recognize how discrimination and stigma affect the health and well-being of TGNC. The guidelines indicate: "psychologists are encouraged to provide written affirmations supporting TGNC people and their gender identity [as appropriate] so that they may access necessary services (e.g., hormone therapy)" (p. 841). Finally and relatedly, Guideline 11 states that psychologists should "recognize that TGNC people are more likely to experience positive life outcomes when they receive social support or trans-affirmative care" (p. 846). This guideline indicates that psychologists should be aware of the evidence indicating the positive outcomes in research literature that specifically focus on hormones and surgery and that psychologists may play an essential role in the process of facilitating access to these medically necessary treatments.

In response to some individuals and practitioners who believe that transgender people should adjust or change their gender identity to remain in their gender assigned at birth, several health organizations have indicated that this practice is harmful and unethical. For example, the WPATH Standards of Care (SOC) note that "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…such treatment is no longer considered ethical" (p. 175, Coleman et al., 2012).

The American Psychological Association's statement on gender diversity and transgender identity in adolescents indicates: "attempts to force gender diverse and transgender youth to change their behavior to fit into social norms may traumatize the youth and stifle their development into healthy adults" (p. 2, Mizock, Mougianis, Meier, & Moundas, 2015).

In their *Position Statement on Attempts to Change Sexual Orientation, Gender Identity, or Gender Expression,* the American Psychoanalytic Association (2012) indicates that any attempts to convert, change, or "repair" an individual's gender identity or gender expression "often results in substantial psychological pain by reinforcing damaging internalized attitudes."

The American Counseling Association's report on competencies for counseling with transgender clients (Burnes et al., 2010) indicates that counselors must: "understand that attempts by the counselor to alter or change gender identities and/or the sexual orientation of transgender clients across the lifespan may be detrimental, life-threatening, and are not empirically supported" (p. 144). As such, these organizations report that it is harmful (and thus unethical) to attempt to change a person's transgender identity.

Well-being and Mental Health

In addition to the research that shows specific positive effects on mental health and well-being directly related to hormone therapy and gender confirmation surgery, research also links the overall transition process to better outcomes in well-being. Budge, Adelson, & Howard (2013) found that transgender men and transgender women ($N = 351$) who are further along in their transition process use less avoidant coping mechanisms and have lower levels of anxiety and depression. As well, being further along in the transition process (i.e., "stage of identity")

predicted better well-being in a large community sample ($N = 571$) of transgender individuals (Barr, Budge, & Adelson, 2016).

In addition to improving well-being, several qualitative studies have noted the importance of the transition process on increasing civic engagement, such as becoming educators, activists, volunteers, and creating systems for support and connection (e.g., Budge, Thai, & Orovecz, 2015; Budge, Chin, Minero, 2017; Budge, Katz-Wise, Tebbe, Howard, Schneider, & Rodriguez, 2013).

Blanket Exclusions for Transition-Related Care

In the above sections, I discuss the substantial body of literature indicating the medical necessity of transition-related care for transgender individuals and have listed citations for that literature in Appendix B. As noted in the Plaintiffs' Amended Complaint and in the Employee Trust Funds (ETF) *Uniform Benefits: Exclusions and Limitations* document, ETF excludes all "procedures, services, and supplies related to surgery and sex hormones associated with gender reassignment." Padula, Heru, & Campbell (2016) report that, even though many insurance policies prohibit coverage for transgender individuals for transition-related care, in 2014 the U.S. Department of Health and Human Services lifted a ban on these exclusions for the Centers for Medicare and Medicaid Services (CMS) beneficiaries for two reasons: (1) that the literature demonstrates gender confirmation surgery is efficacious, safe, and effective, and that (2) because it is efficacious, safe, and effective, "exclusions of coverage are not reasonable" (p. 395).

Instead of excluding all procedures, services, and supplies related to transgender care, the WPATH SOC indicate that all treatment plans for transgender individuals should be individualized to the patient (Coleman et al., 2012). In the most recent iteration of their guidelines, the Center of Excellence for Transgender Health at the University of California-San

Francisco released recommendations based on their *Guidelines for the Primary and Gender-Affirmation Care of Transgender and Nonbinary People* (2016). Specifically, these guidelines outline how providers can create individualized treatment plans with transgender patients, noting specific health care concerns that might interact with transition-related care and how to best approach treatment plans with patients. Given the overwhelming evidence and precedent for offering transition-related care pursuant to individualized plans, there is no evidence to support insurance policies that exclude coverage for all transition-related care for transgender individuals.

Costs of Transition-Related Care

Along with transition-related care being considered medically necessary by medical and mental health experts, it is also considered cost effective for insurance companies to cover transition-related care. Padula et al. (2016) analyzed the Grant et al. (2011) dataset that sampled over 6,000 transgender individuals in the United States. Their statistical analysis indicates that it is cost-effective for the patient, the other persons insured, and the insurance company itself to cover transition-related care. They found that coverage would cost members approximately $0.016 a month. When comparing this data to the current case, the differences appear negligible. In a memo dated 9/28/2005, ETF was provided with the cost impact of covering "all surgical procedures and hormone therapies" for the state insurance. The cost impact per paying member was estimated to be $0.05 per month, indicating that the costs estimated per member are similar.

Regarding the cost to the insurance company, results also indicate that it is in the insurance company's financial interest to cover transition-related care. Padula et al. (2016) note that a reason to consider transition-related care cost-effective is that denial of coverage could be costly to payers due to morbidity of failing to provide the care. Padula & Baker (2017) note that it is more costly to deny coverage to transgender patients because denial of care is associated

with increased disparities in depression, drug abuse, HIV, and additional conditions that are costly to treat. In fact, analyses indicate that without transition-related care, the costs related to treating depression, anxiety, drug abuse, etc. are estimated to be $10,712 a year (Beck, 2015) indicating the economic benefit of insurance companies covering transgender-related care. In our study (dickey, Budge, Katz-Wise, & Garza, 2016) we discuss the disparities in health insurance coverage between transgender and cisgender individuals; we found that transgender individuals will often avoid seeking health care when they need it because they are worried about discrimination by providers or that their insurance will deny certain claims (Grant et al., 2011) and thus some health issues may be exacerbated by the lack of preventative or immediate care. This avoidance of health care has been shown to have deleterious health effects in marginalized populations (Becker, 2004)—which in turn would likely have economic consequences.

CLINICAL EVALUATION OF ALINA BOYDEN

As noted above, the American Psychological Association Task Force on Guidelines for Psychological Practice with Transgender and Gender Non-Conforming People (2015) indicate the important role psychologists have regarding transition-related care. Mental health professionals have several roles when they work with transgender clients. These roles can include (but are not limited to) the following: determining if a transgender client experiences dysphoria, if they meet criteria for a diagnosis of gender dysphoria, writing letters to physicians recommending hormones and/or surgery (if appropriate), and assisting clients with their decision-making regarding what types of transition-related care would be appropriate and necessary.

This section summarizes the information gathered from a psychological evaluation of Alina Boyden. I conducted one in-person 2.5-hour psychological evaluation of Alina Boyden on

January 28, 2018. I was asked to conduct a psychological evaluation of Alina to determine if she met criteria for gender dysphoria as well as to determine the medical necessity for gender transition-related medical care for Alina. Along with a psychological evaluation, I also reviewed: several of Alina's medical records and documents related to appeals of denials of the Plaintiffs' requests for coverage of transition-related care.

Relevant Background

Alina Boyden is a 34-year-old woman who currently lives in Madison, Wisconsin with two housemates. Alina identifies as white, heterosexual, and transgender and uses she/her/hers pronouns. She was assigned a male gender when she was born. Other than the medical conditions listed below, she does not report any current physical or cognitive disabilities. Alina is currently a doctoral student in cultural anthropology at the University of Wisconsin-Madison. She has high academic functioning; specifically she has maintained a GPA of 3.9 in graduate school and is meeting all milestones in her academic program thus far. Her current source of income is through the University of Wisconsin-Madison, where she has received a fellowship to study Urdu to prepare her for field study in the fall of 2018. She experiences support from her parents and her younger brother and has several close friendships in Madison.

Alina's Gender Identity and Gender Dysphoria Diagnosis

Alina first started to recognize her gender identity when she was around the age of 4 or 5 and "thought every boy wanted to be a girl." She began to feel mounting distress as she got older, specifically around the age of 9 she considered cutting off her genitals with a knife but was concerned about what she would tell the paramedics and decided not to follow through with cutting them off. However, the distress related to her genitals did not dissipate as she continued

to age. She learned the term "transgender" on the Internet when she was 11 years old and was able to begin to internally consider that her gender identity was female.

As part of her process of learning more about her gender identity, Alina would present as a girl online in chat rooms. She said that she remained "in the closet" in high school, mainly because she thought that being transgender was "rare" and seemed like "bad luck." All of her friends in high school were girls and she consciously sought out female support systems.

Alina came out as transgender to a close friend at the age of 18, right after beginning college at the University of California (UC) Santa Barbara. She was significantly depressed at the time. Her friend had recommended that she see a therapist and that prompted her to seek counseling at the university counseling center at UC Santa Barbara. She said: "it was 2002 and no one knew what to do"—elaborating that the therapists at the counseling center had not yet seen transgender clients at the clinic and that she felt as though she had to do "all of the educating," even though she did not know much about the process of gender transitioning. Alina said that UC Santa Barbara was also a difficult place to transition, specifically that she went to the LGBT center on campus and she was the "only out trans person."

As Alina began to navigate her gender identity, it became clear to her that she needed to both socially and medically transition to lessen her dysphoria. She began taking estrogen and anti-androgens in September/October of 2002. In August 2003, she found the first medical provider (Dr. Kevin Cook) at UC Santa Barbara who felt truly affirming for her. She said that this was helpful to get medical care related to her gender identity, but that by this time, she had been experiencing significant depression and anxiety to the point where she was "almost flunking out of school." She was also prescribed several anti-depressants during this time period, but the medications were not helpful for her and did not resolve the dysphoria.

Around the fall of 2003, Alina came out to her family. Her mother had a negative reaction (e.g., wanting to throw holy water on Alina to "cure" her), her father stopped speaking to her, and her older brother made derogatory comments. She indicated that she had considered having gender confirmation surgery during this time, but she was concerned she did not have the money and she also wanted more stability with school, her family, and her mental health before pursuing surgery.

Regarding Alina's mental health, the timeframe from when she was 18-21 was when she experienced her most challenging mental health concerns. She attributes these challenges partially to not being able to medically transition easily or fully, as well as having unsupportive reactions from others. Her only source of support she felt she had during this time was Dr. Cook at UC Santa Barbara, who was assisting her with her transition process. She said: "I would be dead if it weren't for him." For example, she attempted suicide numerous times during this time period, but Dr. Cook was explicit in his desire to assist her with moving forward in her transition process. She stopped feeling suicidal and stopped attempting suicide in 2006 after her older brother completed suicide and she saw "firsthand" what happens when a person dies by suicide; though she ceased feeling suicidal, her feelings of dysphoria remained.

Alina's distress began to decrease after she had been on hormone therapy for a period of time. She also attributes her decrease in distress when she was living stealth (not telling anyone that she was transgender) and others accurately perceived her gender as a woman. Her family became more supportive and was using the correct name, Alina, and her correct pronouns (she/her/hers).

In the clinical interview conducted with Alina on January 28th, 2018, she met 6 out of 6 symptoms for Criterion A of Gender dysphoria. As noted above, Alina experiences incongruence

between her gender (female) and primary sex characteristics; she noted that this incongruence is associated with a strong desire have her genitals reconstructed since she was 9 years old. She started hormone therapy in 2002, with the intention of transforming secondary sex characteristics that are considered feminine (e.g., breasts, skin, fat distribution). She has strongly felt female since she was 4 or 5 years old and has been living as her affirmed gender since she was 18 years old. Her transition to being female was also aligned with a strong desire to be treated as a woman and she also experiences some stereotypical feelings and reactions that are associated with women and femininity.

Regarding Criterion B for gender dysphoria, Alina previously experienced and continues to experience clinically significant distress and impairment related to several areas of functioning. Of note, the time when she was most significantly distressed was when she was 18-21 years old and first beginning her gender transition. During this time, her academic functioning declined and she also experienced a substantial decline in social support as a result of coming out to others as transgender. During this time, her distress was so significant that she was "suicidal 100% of the time" and attempted suicide many times. Her dysphoria improved (though it did not completely dissipate) once she was able to stabilize her hormone therapy regimen and live her life fully as a woman. She is currently experiencing clinically significant distress derived from dysphoria related to her genitals. She is not currently experiencing a decrease in functioning related to academics, her social life, or occupational functioning; however, she notes that she is experiencing clinically significant distress related to how she was treated during specific medical appointments from 2014-2017. She has clinically significant distress related to being denied insurance coverage for gender confirmation surgery. Medical records spanning almost three

years also indicate that Alina was diagnosed with gender identity disorder/gender dysphoria from multiple providers.

Medical Necessity for Transition-Related Care

In my clinical opinion, Alina Boyden's experiences, cognitions, and emotions indicate the medical necessity for transition-related care. She was alert and able to provide informed consent related to possible future gender confirmation surgery. Alina described experiencing dysphoria since she was a child and the clinical distress related to her dysphoria has not been fully resolved by hormone therapy. As reported by Coleman et al. (2012), gender dysphoria will not be alleviated for some persons with gender dysphoria without modification of an individual's primary sex characteristics. Alina did not describe any mental health issues that would be contraindications to her having surgery and, in fact, her current dysphoric distress has a high likelihood of significantly decreasing if she were able to have gender confirmation surgery. She indicated that there is a likelihood of increased self-harm if she is not allowed access to gender confirmation surgery; this statement is congruent with one of the main reasons why surgery is considered medically necessary for many transgender individuals. It appears that Alina feels as though she has tried all avenues to receive the care she needs to decrease her dysphoria and that the barriers to this care have only exacerbated her dysphoria. A letter written by Dr. Webster on 5/19/2016 shows that he recommended genital surgery as a way of keeping her testosterone levels low, since she has experienced some difficulty regulating her testosterone levels. Thus, her medical provider has indicated additional reasons for the medical necessity of surgery for Alina.

CLINICAL EVALUATION OF SHANNON ANDREWS

In the previous section, I provide information based on the American Psychological Association's Task Force on Guidelines for Psychological Practice with Transgender and Gender

Non-Conforming People (2015) and the guidelines explicit statement of the role psychologists have regarding transition-related care. To reiterate, a psychologist's roles can include (but is not limited to) the following: determining if a transgender client experiences dysphoria, if they meet criteria for gender dysphoria, writing letters for hormones and/or surgery (if appropriate), and assisting clients with their decision-making regarding what types of transition-related care would be appropriate and necessary.

This section summarizes the information gathered from a psychological evaluation of Shannon Andrews and reviews of her records and communications with her other providers. I conducted one in-person 3-hour psychological evaluation of Shannon Andrews on January 27, 2018. I was asked to conduct a psychological evaluation of Shannon to determine if she met criteria for gender dysphoria as well as to determine the medical necessity for gender transition-related care for Shannon. Along with conducting a psychological evaluation, I also reviewed several of Shannon's medical records, specifically letters from her former therapist and from a psychologist and documents related to appeals of denials of the Plaintiffs' requests for coverage of transition-related care. I also spoke with her former therapist, Nyle Biondi, MA, LMFT.

Shannon Andrews is a 35-year-old woman who currently lives in Madison, Wisconsin with her girlfriend and a housemate. Shannon was assigned a male gender at birth. She identifies as a white, bisexual or lesbian, transgender woman and uses she/her/hers pronouns. She did not report any cognitive or physical disabilities during her clinical interview. Shannon grew up in Sun Prairie, Wisconsin, and moved away for educational reasons before moving back to Wisconsin. Shannon is currently a researcher at the Carbone Cancer Center at the University of Wisconsin-Madison. She enjoys the work she does, feels efficacious in her work, and receives

positive feedback about her employment. Shannon has several sources of support, namely her girlfriend, a close friend, and work colleagues.

Shannon's Gender Identity and Gender Dysphoria Diagnosis

Shannon did not learn about what the word transgender meant until she was a teenager. She remembers dressing in her mother's clothing when she was young, around the age of 4. She had a sense that she should not tell people about her feelings about being a girl when she was young, so she made a conscious effort to not talk about her gender identity with others. The first time she realized that there might be a word to describe her identity was when she was in 7th grade and she saw a movie that referenced transgender people in a derogatory manner.

When Shannon first started to understand her gender identity, she began to feel depressed and suicidal. She said she had been taught to feel ashamed of her identity and that there was something "wrong" with people who were like her. When she told her mother about her gender identity the first time when she was young, her mother did not react positively and Shannon told her mother that she would never dress in feminine clothes again (since she had been borrowing feminine clothes at home and secretly wearing them) and that she needed to "try to be normal" and pushed her identity aside.

She tried to ignore her gender identity for a couple of years, but she heard a couple of fellow high school students discussing the concept of gender confirmation surgery at school, which helped her realize that "being a trans woman was possible" and that she distinctly remembers thinking "I wish I could do that [have surgery]." However, she was reminded about how marginalized transgender women are and she was frightened for her future. She also felt as though she wanted to be taken seriously as a scientist and was worried that she would not be able to pursue a career in science if she transitioned in high school. Despite these fears, she "almost

came out as trans" at the age of 17 due to experiencing "turmoil," including significant depression and feelings of withdrawal and alienation.

Shannon felt as though she was able to suppress her gender identity until around the years of 2007/2008. She thought she might be having a "nervous breakdown" about concealing her identity, but she met a woman whom she started dating and felt as though the timing was not right for her to begin transitioning. In 2009, she moved back to Wisconsin after completing a Ph.D. at Princeton University. Over the next couple of years, she was experiencing panic attacks related to concealing her identity from others. During this time, she was working as a post-doc at the University of Wisconsin-Madison and her distress related to concealing her gender identity was significantly impacting her ability to work. She said that she was in a "deep depression." Throughout her post-doc years, she was starting to feel that it was "too late" to transition and contemplated suicide regularly. When the funding for her post-doc ended and she was no longer employed, she said "I felt like I lost everything and it felt like I would either die or be homeless." This low point in her life prompted her to see at therapist in Madison.

Shannon started coming out to others as a woman and began her medical transition in 2012. She received her first official diagnosis of gender dysphoria from her therapist, Nyle Biondi, MS, LMFT. She began hormone therapy in 2012 when she sought services from a medical provider in Chicago. She was hired at the Wisconsin Institute for Discovery (WID) at the University of Wisconsin-Madison in October of 2013. During her employment, she experienced difficulties with a supervisor described as "hostile" and her employment was terminated in December of 2013. At this time, her mental health was steadily declining and she felt as though hormones were "my only lifeline." Two months after her employment ended at

WID, she was hired at the Carbone Research Center at the university, which felt "like a turning point."

When Shannon was hired in her current employment, she felt as though she was appreciated at work and she was able to excel at her job. Having this comfort of performing well at work increased her confidence to begin telling more people about her gender identity. She started telling friends and gave them permission to tell others within their social circle. She also came out to her parents who "took it well, were upset for a day, but were supportive after that." After her probationary period ended at her current place of employment, she came out to her supervisors, both of whom were "very supportive."

After having been on hormones and coming out to most people in her life, 2014 felt like the year when she could truly be herself. She started changing her name in legal documents. Susanne Gill, Ph.D., a psychologist, wrote a letter on 7/6/2015 confirming Shannon's gender identity disorder (now known as gender dysphoria) diagnosis and recommended gender confirmation surgery for Shannon. Her therapist, Nyle Biondi, MA, LMFT, also wrote a letter confirming the diagnosis on 6/17/15 and recommended surgery as the appropriate next step in her transition process. Shannon then took funds out of her retirement account and funded gender confirmation surgery, which took place in 2015.

In the clinical interview conducted with Shannon on January 27, 2018, she met 6 out of 6 symptoms for Criterion A of gender dysphoria. Shannon expressed incongruence between her experienced gender (female) and primary sex characteristics. When asked specifically about her primary sex characteristics, Shannon said that the genitals she was born with felt like an "alien entity that had been grafted onto my body." As a young child, she experienced her genitals feeling "out of place," but they significantly distressed her when she began puberty. As Shannon

began puberty and continued through her 20's, she expressed having a strong desire to not have her genitals any longer, resulting in her seeking gender confirmation surgery in 2015. Her dysphoria was related to additional characteristics prior to starting hormone therapy or having surgery, such as discomfort when her chest was bare (which felt inappropriate to her), discomfort with body hair, wanting to hide her facial features, discomfort with the breadth of her shoulders and rib cage. She also expressed some dysphoria related to her voice, her hair, and how she felt in masculine clothes. Some of her dysphoria has dissipated with time, since she has experienced positive outcomes from hormone therapy, training her voice, and expressing her gender through feminine clothing. It was clear from the clinical interview that she has felt female from a young age and that she has been living as her affirmed gender for several years. When describing "typical" feelings related to being a woman, Shannon said that she knows there is not a "correct way to be a woman"; however, she has always been drawn to femininity and expressions that explicitly are not male.

Regarding Criterion B for gender dysphoria, Shannon was formerly and continues to be clinically significantly distressed. She has had previous experiences of impairment related to several areas of functioning and she also continues to experience impairment in several areas of functioning. When describing distress and impairment, her gender-related distress was so strong when she was younger that she started feeling suicidal at 8 years old. Throughout childhood and young adulthood, she assumed she would kill herself at some point, due to not being able to be herself. As noted above, she experienced impairment in functioning related to employment at several points in her life due to gender-related distress. She also continues to experience impairment in social functioning, specifically related to social anxiety and fears of how people perceive her gender.

According to her records, Shannon was given a diagnosis of gender dysphoria in June 2015 from her therapist, Nyle Biondi, MS LMFT. A separate record indicates she was also given a diagnosis of gender identity disorder in June 2015 from Susanne Gill, PhD.

Medical Necessity for Transition-Related Care

In my clinical opinion, Shannon Andrews reports experiences, cognitions, and emotions that indicated the medical necessity for previous (hormone therapy and genital surgery) and indicate the need for future (facial feminization surgery) transition-related care. Shannon describes experiencing dysphoria since she was a child. She reported that a significant amount of her distress was alleviated through hormone therapy and genital surgery; she anticipates that her remaining dysphoria related to her facial features will decrease after her planned surgery in February 2018. The past and anticipated reduction in dysphoria is in alignment with Coleman et al.'s (2012) indication that surgery to reconstruct one's secondary sex characteristics can be medically necessary to reduce dysphoria. She was alert and able to provide informed consent related to facial feminization surgery. Shannon continues to experience symptoms of anxiety, which are closely related to her experiences of dysphoria. Shannon does not describe any mental health issues that would have contraindicated her gender confirmation surgery or would be a contraindication for her having facial feminization surgery. It does appear that she will have a reduction in her remaining dysphoria after she is able to access the surgery in February 2018.

When asked about her perception of the medical necessity of transitioning, Shannon said that the medical necessity of these treatments was clear to her. After she began hormone therapy, it was like "the blood was removed from my body and replaced with lightening…everything was sharper, clearer, and more immediately present." When describing her experiences after having genital surgery, she said: "this feeling of low-grade omnipresent horror was gone and the world

made sense for the first time." She compared the feeling to being buried alive but then exhumed and able to breathe. When asked what would have happened if she had not been able to access hormone therapy or genital surgery, she said: "I would have killed myself if I had not been able to transition. No question. The choice was clear between transition and suicide and no third option…life would not be worth living." When speaking with her former therapist, Nyle Biondi, MA, LMFT, he confirmed what Shannon had said in the clinical interview. He said, with confidence, that Shannon would "not be alive today if she had not been able to transition." He also confirmed that it was medically necessary for Shannon to have facial feminization surgery to reduce her remaining dysphoria.

Conclusion

I was retained as an expert witness to answer the following questions: (1) is transition-related medical care for transgender individuals medically necessary? (2) is there a health care justification for a policy of excluding coverage of all "procedures, services, and supplies related to surgery and sex hormones associated with gender reassignment" (ETF Uniform Benefits: Exclusions and Limitations, p. 39)? (3) is there evidence indicating that covering transition-related care will be costly to insurance providers? (4) does Alina Boyden meet criteria for gender dysphoria? (5) does Shannon Andrews meet criteria for gender dysphoria? and (6) if either or both individuals meet criteria for gender dysphoria, would transition-related care for the plaintiffs be considered medically necessary?

Above, I outlined the evidence indicating that transition-related medical care is medically necessary for many transgender individuals. Notably, every major psychological and medical association in the United States indicates that transition-related medical and mental health care is necessary for improving mental and physical health for many transgender individuals (Baker,

2017). The preeminent international organization (World Professional Association for Transgender Health) focused on transgender related care has outlined the wide basis of evidence indicating why these treatments are considered medically necessary (see Coleman et al., 2012) and this report outlines more recent evidence that continues to support the necessity and efficacy of these treatments. In addition, there is no evidence to support ETF excluding coverage for all transition-related care for transgender individuals. As well, the evidence indicates that the cost of covering transition-related care for transgender individuals is minimal. It is my professional opinion that both Alina Boyden and Shannon Andrews currently meet criteria for gender dysphoria and have met criteria for gender dysphoria for many years. Both Alina and Shannon report information that is consistent with the medical necessity for transition-related medical care, including hormone therapy, gender confirmation surgery and, for Shannon, facial feminization surgery. Notably, they also report that not being able to access transition-related care exacerbated and exacerbates their symptoms of dysphoria.

Respectfully submitted,

_____

Stephanie Budge, Ph.D.

DATE:_____02/19/2018____

Appendix B

Bibliography:

Burnes, T. R., Singh, A. A., Harper, A. J., Harper, B., Maxon-Kann, W., Pickering, D. L., & Hosea, J. U. L. I. A. (2010). American Counseling Association: Competencies for counseling with transgender clients. *Journal of LGBT Issues in Counseling*, *4*(3-4), 135-159.

American Medical Association. (2008). *Resolution 122 (A-08).*Retrieved from http://www.tgender.net/taw/ama_resolutions.pdf.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

American Psychological Association. (2015). Guidelines for psychological practice with transgender and gender nonconforming people. *The American Psychologist*, *70*(9), 832.

American Psychoanalytic Association (2012). *Position Statement on Attempts to Change Sexual Orientation, Gender Identity, or Gender Expression.* Retrieved from: http://www.apsa.org/content/2012-position-statement-attempts-change-sexual-orientation-gender-identity-or-gender.

American Psychological Association, Task Force on Gender Identity and Gender Variance. (2009). *Report of the Task Force on Gender Identity and Gender Variance.* Washington, DC: Author.

Baker, K. E. (2017). The future of transgender coverage. *New England Journal of Medicine*, *376*(19), 1801-1804.

Barr, S. M., Budge, S. L., & Adelson, J. L. (2016). Transgender community belongingness as a mediator between strength of transgender identity and well-being. *Journal of counseling psychology*, *63*(1), 87.

Beck, J. (2015). Covering transgender related care is good economics for insurance companies. *The Atlantic*. Retrieved from: https://www.theatlantic.com/health/archive/2015/12/covering-transgender-health-care-is-good-economics-for-insurance-companies/417804/.

Becker, G. (2004). Deadly Inequality in the Health Care "Safety Net": Uninsured Ethnic Minorities' Struggle to Live with Life-Threatening Illnesses. *Medical Anthropology Quarterly*, *18*(2), 258-275.

Black, D. W., & Grant, J. E. (2014). *DSM-5 guidebook: the essential companion to the diagnostic and statistical manual of mental disorders*. Washington, DC: Author.

Bockting, W. O., Miner, M. H., Swinburne Romine, R. E., Hamilton, A., & Coleman, E. (2013). Stigma, mental health, and resilience in an online sample of the US transgender population. *American journal of public health*, *103*(5), 943-951.

Brierley, H. (2000). Gender identity and sexual behaviour. In P. C. Rodriguez-Rust (Ed.), *Bisexuality in the United States: A social science reader* (pp. 104-126). New York, NY: Columbia University Press.

Budge, S. L., Adelson, J. L., & Howard, K. A. (2013). Anxiety and depression in transgender individuals: The roles of transition status, loss, social support, and coping. *Journal of Consulting and Clinical Psychology, 81,* 545–557.

Budge, S. L., Chin, M. Y., & Minero, L. P. (2017). Trans individuals' facilitative coping: An analysis of internal and external processes. *Journal of counseling psychology*, *64*(1), 12.

Budge, S. L., Katz-Wise, S. L., Tebbe, E. N., Howard, K. A. S., Schneider, C. L., & Rodriguez, A. (2013). Transgender emotional and coping processes: Facilitative and avoidant coping throughout gender transitioning. *The Counseling Psychologist, 41*, 601–647.

Budge, S. L., Orovecz, J. J., & Thai, J. L. (2015). Trans men's positive emotions the interaction of gender identity and emotion labels. *The Counseling Psychologist, 43*, 404 – 434.

Byne, W., Bradley, S. J., Coleman, E., Eyler, A. E., Green, R., Menvielle, E. J., ... & Tompkins, D. A. (2012). Report of the American Psychiatric Association task force on treatment of gender identity disorder. *Archives of sexual behavior*, *41*(4), 759-796.

Center of Excellence for Transgender Health (2016). *Guidelines for the Primary and Gender-Affirmation Care of Transgender and Nonbinary People.* San Francisco, CA: Author.

Coleman, E., Bockting, W., Botzer, M., Cohen-Kettenis, P., DeCuypere, G., Feldman, J., ... & Monstrey, S. (2012). Standards of care for the health of transsexual, transgender, and gender-nonconforming people, version 7. *International Journal of Transgenderism*, *13*(4), 165-232.

Colizzi, M., Costa, R., & Todarello, O. (2014). Transsexual patients' psychiatric comorbidity and positive effect of cross-sex hormonal treatment on mental health: results from a longitudinal study. *Psychoneuroendocrinology*, *39*, 65-73.

De Cuypere, G., TSjoen, 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.

dickey, l.m., Budge, S. L., Katz-Wise, S. L., & Garza, M. V. (2016). Health disparities in the transgender community: Exploring differences in insurance coverage. *Psychology of Sexual Orientation and Gender Diversity*, *3*(3), 275.

Flores, A.R., Herman, J.L., Gates, G.J., & Brown, T.N.T. (2016). *How Many Adults Identify as*

Transgender in the United States? Los Angeles, CA: The Williams Institute.

Fraser, L. (2015). Gender Dysphoria: Definition and Evolution Through the Years. In *Management of Gender Dysphoria* (pp. 19-31). Springer Milan.

Gilbert, L. A., & Scher, M. (2009). *Gender and sex issues in counseling and psycho- therapy*. Boston, MA: Allyn & Bacon.

Glynn, T. R., Gamarel, K. E., Kahler, C. W., Iwamoto, M., Operario, D., & Nemoto, T. (2016). The role of gender affirmation in psychological well-being among transgender women. *Psychology of sexual orientation and gender diversity*, *3*(3), 336.

Grant, J. M., Mottet, L. A., Tanis, J., Harrison, J., Herman, J. L., & Keisling, M. (2011). *Injustice at every turn: National Trans Discrimination Survey.* Washington, DC: National Center for Trans Equality and National Gay and Lesbian Task Force.

Hess, J., Neto, R. R., Panic, L., Rübben, H., & Senf, W. (2014). Satisfaction with male-to-female gender reassignment surgery: Results of a retrospective analysis. *Deutsches Ärzteblatt International*, *111*(47), 795.

Heylens, G., Verroken, C., De Cock, S., T'sjoen, G., & De Cuypere, G. (2014). Effects of different steps in gender reassignment therapy on psychopathology: a prospective study of persons with a gender identity disorder. *The journal of sexual medicine*, *11*(1), 119-126.

James, S. E., Herman, J. L., Rankin, S., Keisling, M., Mottet, L., & Ana , M. (2016). *The Report of the 2015 U.S. Transgender Survey*. Washington, DC: National Center for Transgender Equality.

Krege, S., Bex, A., Lümmen, G., & Rübben, H. (2001). Male-to-female transsexualism: A technique, results and long-term follow-up in 66 patients. *BJU international*, *88*(4), 396 402.

Kuiper, B., & Cohen-Kettenis, P. (1988). Sex reassignment surgery: a study of 141 Dutch transsexuals. *Archives of sexual behavior*, *17*(5), 439-457.

Lambda Legal (2017). *Professional organization statements supporting transgender people in health care*. Retrieved from: https://www.lambdalegal.org/sites/default/files/publications/downloads/ll_trans_professional_statements_17.pdf

Luders, E., Sánchez, F. J., Gaser, C., Toga, A. W., Narr, K. L., Hamilton, L. S., & Vilain, E. (2009). Regional gray matter variation in male-to-female transsexualism. *Neuroimage*, *46*(4), 904-907.

Meerwijk, E. L., & Sevelius, J. M. (2017). Transgender population size in the United States: A

meta-regression of population-based probability samples. *American journal of public health*, *107*(2), e1-e8.

Meyer, J. K., & Reter, D. J. (1979). Sex reassignment: Follow-up. *Archives of General Psychiatry*, *36*(9), 1010-1015.

Mizock, L., Mougianis, E., Meier, C., & Moundas, S. (2015). Gender Diversity and Transgender Identity in Youth. *Journal of Sexual Medicine*, *5*, 1892-1897.

Morselli, E., Frank, A. P., Santos, R. S., Fátima, L. A., Palmer, B. F., & Clegg, D. J. (2016). Sex and Gender: Critical Variables in Pre-Clinical and Clinical Medical Research. *Cell metabolism*, *24*(2), 203-209.

Padula, W. V., & Baker, K. (2017). Coverage for Gender-Affirming Care: Making Health Insurance Work for Transgender Americans. *LGBT health*, *4*(4), 244-247.

Padula, W. V., Heru, S., & Campbell, J. D. (2016). Societal implications of health insurance coverage for medically necessary services in the US transgender population: a cost-effectiveness analysis. *Journal of general internal medicine*, *31*(4), 394-401.

Pauly, I. B. (1981). Outcome of sex reassignment surgery for transsexuals. *Australian & New Zealand Journal of Psychiatry*, *15*(1), 45-51.

Rametti, G., Carrillo, B., Gómez-Gil, E., Junque, C., Segovia, S., Gomez, Á., & Guillamon, A. (2011). White matter microstructure in female to male transsexuals before cross-sex hormonal treatment. A diffusion tensor imaging study. *Journal of psychiatric research*, *45*(2), 199-204.

Regier, D. A., Kuhl, E. A., & Kupfer, D. J. (2013). The DSM-5: Classification and criteria changes. *World Psychiatry*, *12*(2), 92-98.

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.

Rotondi, N. K., Bauer, G. R., Scanlon, K., Kaay, M., Travers, R., & Travers, A. (2013). Nonprescribed hormone use and self-performed surgeries:"do-it-yourself" transitions in transgender communities in Ontario, Canada. *American journal of public health*, *103*(10), 1830-1836.

Sanchez, F.J. & Pankey, T. (2017). *Essentialist views on sexual orientation and gender identity*. In DeBord, Kurt A. (Ed); Fischer, Ann R. (Ed); Bieschke, Kathleen J. (Ed); Perez, Ruperto M. (Ed). Handbook of sexual orientation and gender diversity in counseling and psychotherapy , (pp. 51-74). Washington, DC, US: American Psychological Association.

Savic, I., & Arver, S. (2011). Sex dimorphism of the brain in male-to-female transsexuals. *Cerebral Cortex*, *21*(11), 2525-2533.

Singh, A.A. & dickey, l.m. (2017). *Introduction*. In Singh, Anneliese (Ed); dickey, lore m. (Ed). Affirmative counseling and psychological practice with transgender and gender nonconforming clients., (pp. 4-18). Washington, DC, US: American Psychological Association.

Spizzirri, G., Duran, F. L. S., Chaim-Avancini, T. M., Serpa, M. H., Cavallet, M., Pereira, C. M. A., ... & Abdo, C. H. N. (2018). Grey and white matter volumes either in treatment-naïve or hormone-treated transgender women: a voxel-based morphometry study. *Scientific reports*, *8*(1), 736.

Stroumsa, D. (2014). The state of transgender health care: policy, law, and medical frameworks. *American journal of public health*, *104*(3), e31-e38.

Tran, B. N. N., Epstein, S., Singhal, D., Lee, B. T., Tobias, A. M., & Ganor, O. (2018). Gender Affirmation Surgery: A Synopsis Using American College of Surgeons National Surgery Quality Improvement Program and National Inpatient Sample Databases. *Annals of Plastic Surgery*. (Published online ahead of reprint).

van de Grift, T. C., Elaut, E., Cerwenka, S. C., Cohen-Kettenis, P. T., & Kreukels, B. P. (2018). Surgical satisfaction, quality of life, and their association after gender-affirming surgery: a follow-up study. *Journal of sex & marital therapy*, 44, 138-148.

White Hughto, J. M., & Reisner, S. L. (2016). A systematic review of the effects of hormone therapy on psychological functioning and quality of life in transgender individuals. *Transgender health*, *1*(1), 21-31.

Wierckx, K., Van Caenegem, E., Elaut, E., Dedecker, D., Van de Peer, F., Toye, K., ... & T'sjoen, G. (2011). Quality of life and sexual health after sex reassignment surgery in transsexual men. *The journal of sexual medicine*, *8*(12), 3379-3388.

Wilson, E. C., Chen, Y. H., Arayasirikul, S., Wenzel, C., & Raymond, H. F. (2015). Connecting the dots: examining transgender women's utilization of transition-related medical care and associations with mental health, substance use, and HIV. *Journal of Urban Health*, *92*(1), 182-192.

WPATH.org (2017). World Professional Association for Transgender Health mission and values. Retrieved from http://www.wpath.org/site_page.cfm?pk_association_webpage_menu=1347&pk_association_webpage=3910 on February 17, 2017.

Zucker, K. J., & Spitzer, R. L. (2005). Was the gender identity disorder of childhood diagnosis introduced into DSM-III as a backdoor maneuver to replace homosexuality? A historical note. *Journal of Sex & Marital Therapy*, *31*(1), 31-42.

Appendix A

Stephanie L. Budge, PhD, Licensed Psychologist
Curriculum Vitae
Department of Counseling Psychology, School of Education, Room 305, University of Wisconsin-Madison, Madison, WI 53706, 608-262-4807, budge@wisc.edu

EDUCATION

Doctor of Philosophy **8/2006 - 8/2011**
University of Wisconsin-Madison
APA Accredited Counseling Psychology Program
Minor: Psychological Assessment
Dissertation Title: *Distress in the transition process for transgender individuals: The role of loss, community, and coping*.

Master of Science **8/2004 - 5/2006**
University of Texas at Austin
Educational Psychology
Thesis Title: *Sexual pressure in gay, lesbian, and bisexual relationships.*

Bachelor of Science **1/2003 - 12/2003**
University of Utah
Major: Psychology

Pace University **9/2000 - 12/2002**
Major: Psychology
Minor: Women's and Gender Studies

POSITIONS HELD

Health Psychologist **6/2017 - current**
University of Wisconsin Hospital & Clinics
American Family Children's Hospital

Assistant Professor, tenure-track, **8/2016 - current**
Department of Counseling Psychology,
University of Wisconsin-Madison

Assistant Professor, visiting, **8/2014 - 7/2016**
Department of Counseling Psychology,
University of Wisconsin-Madison

Postdoctoral Clinical Training **7/2013 - 6/2014**

University of Louisville Trans Project

Assistant Professor, tenure-track, **8/2011 - 8/2014**
Department of Educational and Counseling Psychology,
University of Louisville

Postdoctoral Clinical Training, **9/2011 - 8/2012**
University of Louisville Counseling Center

Predoctoral Internship, **8/2010 - 8/2011**
University of Minnesota, University
Counseling and Consulting Services,
APA-Accredited, APPIC listed predoctoral internship

PROFESSIONAL LICENSE

Licensed Psychologist in Wisconsin - 3244-57 **2/2015 - current**

Licensed Psychologist in Kentucky - 2012-42 **8/2011 - 6/2014**
(under supervision to gain hours for Health Service Provider status)

SPECIAL HONORS AND AWARDS

Outstanding Paper Award **6/2017**
American Psychological Association Division 17 (Counseling Psychology) award for a 2016 major contribution published in *The Counseling Psychologist*

Division 17 Early Career Award **7/2015**
American Psychological Association Division 17 (Counseling Psychology) award for social justice work and research with LGBT populations

Division 29 Early Career Award **5/2015**
American Psychological Association Division 29 (Society for the Advancement of Psychotherapy) award for psychotherapy research

Most Valuable Paper Award (Runner Up) **1/2014**
American Psychological Association Division 29 (Society for the Advancement of Psychotherapy) runner up award for a 2013 article published in *Psychotherapy*

University of Louisville Trustees Award Nomination **2/2013**
Nomination provided to faculty for excelling in mentoring students

APA Student Travel Award **5/2011**

Outstanding Graduate Student Award **7/2010**
American Psychological Association Division 17 (Counseling Psychology) LGBT award given for community contributions with the LGBT population during my doctoral studies

Graduate Student Research Award **7/2010**
American Psychological Association Division 17 (Counseling Psychology)
Society for Vocational Psychology/ACT for career research regarding transgender individuals

Transgender Research Award **6/2010**
Recipient of the inaugural American Psychological Association Division 44 (Society for the Psychological Study of Lesbian, Gay, Bisexual, and Transgender Issues) award for research with transgender populations

APA Student Travel Award **5/2010**

John W. M. Rothney Memorial Research Award **2/2010**
University of Wisconsin-Madison Counseling Psychology Department award provided to an outstanding doctoral student excelling in research

Outstanding Student Poster Award **8/2009**
American Psychological Association Division 17 (Counseling Psychology)

APA Student Travel Award **5/2009**

APA Student Travel Award **5/2008**

RESEARCH

JOURNAL PUBLICATIONS

Underlining denotes student, * denotes peer reviewed publication, ° denotes invited publication

1. ***Budge, S.L.,** Orovecz, J., Owen, J.J., & Sherry, A.R. (In Press). The relationship between conformity to gender norms, sexual orientation, and gender identity for sexual minorities. *Counselling Psychology Quarterly.* (Available online ahead of print.)
2. *Salkas, S., Conniff, J. & **Budge, S.L.** (In Press). Provider quality and barriers to care for transgender people: An analysis of data from the Wisconsin transgender community health assessment. *International Journal of Transgenderism.* (Available online ahead of print.)
3. *Katz-Wise, **Budge, S.L.** Fugate, E., Flanagan, K., Touloumtzis, C., Rood, B…Leibowitz, S. (In Press). Transactional pathways of transgender identity development in transgender and gender nonconforming youth and caregiver perspectives from the Trans Youth Family Study. *International Journal of Transgenderism.* (Available online ahead of print.)

4. *Nienhuis, J. B., Owen, J., Valentine, J. C., Black, S. W., Halford, T. C. , Parazak, S. E., **Budge, S.,** & Hilsenroth, M. J. (in press). Therapeutic alliance, empathy, and genuineness in individual adult psychotherapy: A meta-analytic review. *Psychotherapy Research.* (Available online ahead of print.)
5. ***Budge, S.L.,** Israel, T., Merrill, C. (2017). Improving the lives of sexual and gender minorities: The promise of psychotherapy research. *Journal of Counseling Psychology, 64*, 376-384.
6. ***Budge, S.L.,** Chin, M.Y. , & Minero, L.P. (2017). Trans individuals' facilitative coping: An analysis of internal and external processes. *Journal of Counseling Psychology, 64, 12-25.*
7. ° Imel, Z.E., **Budge, S.L.**, & Owen, J. (2017). Introduction to special section on advanced methodology: Counseling the dog to wag its methodological tail. *Journal of Counseling Psychology*, *64*, 601-603.
8. *Katz-Wise, S. L., Williams, D. N., Keo-Meier, C. L., **Budge, S. L**., Pardo, S., & Sharp, C. (2017). Longitudinal associations of sexual fluidity and health in transgender men and cisgender women and men. *Psychology of sexual orientation and gender diversity*, *4*, 460-471
9. ° Matsuno, E. & **Budge, S.L.** (2017). Non-binary/genderqueer identities: A critical review of the literature. *Current Sexual Health Reports*, *9*, 116-120.
10. *Katz-Wise, S.L., Reisner, S.L., White, J.M., & **Budge, S.L.** (2017). Self-reported changes in attractions and social determinants of mental health in transgender adults. *Archives of Sexual Behavior, 46*, 1425-1439.
11. ***Budge, S.L.** & dickey, l.m. (2017). Barriers, challenges, and decision-making in the letter writing process for gender transition. *Psychiatric Clinics, 40,* 65-78.
12. *Katz-Wise, S.L., **Budge, S. B.,** Orovecz, J.O. , Nguyen, B., & Thompson, K. (2017). Imagining the Future: Qualitative findings of future orientation from the Trans Youth Family Study. *Journal of Counseling Psychology, 64, 26-40.*
13. ° **Budge, S.L.** (2016). To err is human: An introduction to the special issue on clinical errors. *Psychotherapy*, *53*, 255-256.
14. *Sinnard, M. , Raines, C. , & **Budge, S.L.** (2016). The association between geographic location and anxiety and depression in transgender individuals: An exploratory study of an online sample. *Transgender Health, 1,* 181-186.
15. ***Budge, S.L.** & Pankey, T.L. (2016). Ethnic differences in gender dysphoria. *Current Psychiatry Reviews, 12,* 175-180.
16. *dickey, l.m., **Budge, S.L.,** Katz-Wise, S.L., & Garza, M.V. (2016). Health disparities in the transgender community: Exploring differences in insurance coverage. *Psychology of Sexual Orientation and Gender Diversity, 3,* 275-282.
17. *Barr, S.M. , **Budge, S.L.,** & Adelson, J.L. (2016) Transgender community belongingness as a mediator between strength of transgender identity and well-being. *Journal of Counseling Psychology, 63,* 87-97.
18. ***Budge, S.L.,** Thai, J.L., Tebbe, E., & Howard, K.H. (2016) The intersection of socioeconomic status, race, sexual orientation, transgender identity, and mental health outcomes. *The Counseling Psychologist, 44,* 1025-1049.
19. *Tebbe, E.A. & **Budge, S.L.** (2016) Research with transgender communities: Applying a process-oriented approach to methodological considerations and research recommendations. *The Counseling Psychologist, 44,* 996-1024.

20. *Moradi, B., Tebbe, E., Brewster, M., **Budge, S.L.,** Lenzen, A., Enge, E…Painter, J. (2016). A content analysis of trans people and issues: 2002-2012. *The Counseling Psychologist, 44,* 960-995.
21. *Tebbe, E.A., Moradi, B., & **Budge, S.L.** (2016). Enhancing scholarship focused on trans people and issues. *The Counseling Psychologist, 44,* 950-959.
22. ***Budge, S.L.** (2015*).* Psychotherapists as gatekeepers: An evidence-based case-study highlighting the role and process of letter-writing for transgender clients. *Psychotherapy, 52,* 287-297.
23. *Kopta, M., Owen, J.J., & **Budge, S.L.** (2015). Measuring psychotherapy outcomes with the Behavioral Health Measure-20: Efficient and comprehensive. *Psychotherapy, 52,* 442-448.
24. *Watkins, C.E., **Budge, S.L.,** & Callahan, J.L. (2015). Common and specific factors converging in psychotherapy supervision: A supervisory extrapolation of the Wampold/Budge psychotherapy relationship model. *Journal of Psychotherapy Integration, 25,* 214-235.
25. *Owen, J.J., Adelson, J.L., **Budge, S.L.,** Wampold, B.E., Kopta, M., Minami, T., & Miller, S.D., (2015). Trajectories of change in short-term psychotherapy. *Journal of Clinical Psychology, 71,* 817-827.
26. ***Budge, S.L.** (2015). The effectiveness of psychotherapeutic treatments for personality disorders: A review and critique of current research practices. *Canadian Psychology, 56,* 191-196.
27. *Owen, J.J., Adelson, J.L., **Budge, S.L.,** Reese, R.J., & Kopta, M.M. (2015). Good-Enough Level and Dose-Effect models: Variation among outcomes and therapists. *Psychotherapy Research, 26,* 22-30.
28. *Katz-Wise, S.L. & **Budge, S.L.** (2015). Cognitive and interpersonal identity processes related to mid-life gender transitioning in transgender women. *Counselling Psychology Quarterly, 28,* 150-174.
29. ***Budge, S.L.,** Orovecz, J., & Thai, J.L. (2015). Trans men's positive emotions: The interaction of gender identity and emotion labels. *The Counseling Psychologist, 43,* 404-434.
30. ***Budge, S. L.,** Keller, B.L., & Sherry, A. (2015) A qualitative investigation of lesbian, gay, bisexual, and queer women's experiences of sexual pressure. *Archives of Sexual Behavior, 44,* 813-824.
31. ***Budge, S.L.** (2014). Navigating the balance between positivity and minority stress for LGBTQ clients who are coming out. *Psychology of Sexual Orientation and Gender Diversity, 1,* 350-352.
32. ***Budge, S.L.,** Rossman, H.K., & Howard, K.H. (2014). Coping and psychological distress among genderqueer individuals: The moderating effect of social support. *Journal of LGBT Issues in Counseling, 8,* 95-117.
33. ***Budge, S.L.,** Moore, J.T., Del Re, A.C., Wampold, B.E., Baardseth, T.P., & Nienhuis, J.B. (2013). The effectiveness of evidence-based treatments for personality disorders when comparing treatment-as-usual and bona fide treatments. *Clinical Psychology Review, 33,* 1057-1066.
34. ***Budge, S.L.** (2013). Interpersonal psychotherapy with transgender clients. *Psychotherapy*, 50, 356-359.

35. *Katz-Wise, S.L., **Budge, S.L.,** & Hyde, J.S. (2013). Individuation or identification? Self-objectification and the mother–adolescent relationship. *Psychology of Women Quarterly, 37,* 366-380.
36. ***Budge, S.L.,** Adelson, J.L., & Howard, K.H. (2013). Anxiety and depression in transgender individuals: The roles of transition status, loss, social support, and coping. *Journal of Consulting and Clinical Psychology, 81,* 545-557.
37. ***Budge, S.L.**, Owen, J.J., Kopta, S.M., Minami, T., Hanson, M.R., & Hirsch, G (2013). Differences among trainees in client outcomes associated with the Phase Model of Change. *Psychotherapy, 50,* 150-157.
38. ***Budge, S. L.,** Katz-Wise, S. L., Tebbe, E., Howard, K.A.S., Schneider, C. L., & Rodriguez, A. (2013). Transgender emotional and coping processes: Use of facilitative and avoidant coping throughout the gender transition. *The Counseling Psychologist, 41,* 601-647.
39. *Valdez, C. R. & **Budge, S.L.** (2012). Addressing adolescent depression in schools: Effectiveness and acceptability of an in-service training for school staff in the United States. *International Journal of Educational Psychology, 1,* 228-25.
40. *Wampold, B.E., & **Budge, S.L.** (2012). The relationship—and its relationship to the common and specific factors of psychotherapy. *The Counseling Psychologist, 40,* 601-623.
41. *Wampold, B.E., **Budge, S.L.**, Laska, K. M., Del Re, A.C., Baardseth, T.P., Fluckiger, C., Minami, T., Kivlighan, M., & Gunn, W. (2011). Evidence-based treatments for depression and anxiety versus treatment-as-usual: A meta-analysis of direct comparisons. *Clinical Psychology Review, 31,* 1304-1315.
42. *Valdez, C. R., Dvorscek, M., **Budge, S.L.,** & Esmond, S.L. (2011). Provider perspectives of Latino patients: Determinants of care and implications of treatment. *The Counseling Psychologist, 39,* 497-526.
43. *Wampold, B.E., Benish, S.G., Imel, Z.E., Miller, S.D., Laska, K., Del Re, A.C., Baardseth, T.P., & **Budge, S.L.** (2010).What works in the treatment of PTSD? A response to Ehlers et al. *Clinical Psychology Review, 30,* 269-276.
44. ***Budge, S. L.,** Tebbe, E. N. & Howard, K. A. S. (2010). The work experiences of transgender individuals: Negotiating the transition and coping with barriers. *Journal of Counseling Psychology, 57,* 377-393.
45. *Howard, K. A. S., **Budge, S. L.,** Gutierrez, B., Lemke, N. T., & Owen, A. D. (2010) Future plans of urban youth: Influences, perceived barriers, and coping strategies. *Journal of Career Development, 37,* 655-676.
46. ° **Budge, S. L.,** Baardseth, T. P., Wampold, B. H., & Fluckiger, C. (2010). Researcher allegiance and supportive therapy: Pernicious affects on results of randomized clinical trials. *European Journal of Counselling and Psychotherapy, 12,* 23-39.
47. *Howard, K. A. S., **Budge, S. L.,** & McKay, K. M. (2010). Youth exposed to violence: The role of protective factors. *Journal of Community Psychology, 38,* 63-79.
48. ***Budge, S. L.** (2006) Peer mentoring in post-secondary education: Implications for research and practice. *Journal of College Reading and Learning, 37*, 71-85.

BOOK CHAPTERS

1. ° **Budge, S.L.** & Orovecz, J.J. (2017). Gender fluidity. In K. Nadal (Ed.) *The SAGE Encyclopedia of Psychology and Gender* (pp. 660-662). Thousand Oaks, CA: SAGE.
2. ° **Budge, S.L.** & Pankey, T. L. (2017). Interpersonal therapies and gender. In K. Nadal (Ed.) *The SAGE Encyclopedia of Psychology and Gender* (pp. 961-964). Thousand Oaks, CA: SAGE.
3. ° **Budge, S.L.** & salkas, s. (2017). Experiences of transgender people within the LGBT community. In K. Nadal (Ed.) *The SAGE Encyclopedia of Psychology and Gender* (pp. 1073-1075). Thousand Oaks, CA: SAGE.
4. ° **Budge, S.L.** & Thai, J.L. (2017). Coming out processes for transgender people. In K. Nadal (Ed.) *The SAGE Encyclopedia of Psychology and Gender* (pp. 357-360). Thousand Oaks, CA: SAGE.
5. ° **Budge, S.L.** & Sinnard, M. (2017). Trans. In K. Nadal (Ed.) *The SAGE Encyclopedia of Psychology and Gender* (pp. 1685-1685). Thousand Oaks, CA: SAGE.
6. ° Akinniyi, D. & **Budge, S.L.** (2017). Biological sex and mental health outcomes. In K. Nadal (Ed.) *The SAGE Encyclopedia of Psychology and Gender* (pp. 161-165). Thousand Oaks, CA: SAGE.
7. ° Lam, J. & **Budge, S.L.** (2017). Help-seeking behaviors and men. In K. Nadal (Ed.) *The SAGE Encyclopedia of Psychology and Gender* (pp. 832-834). Thousand Oaks, CA: SAGE.
8. ° Jones, T., Chin, M.Y., & **Budge, S.L.** (2017). Sororities. In K. Nadal (Ed.) *The SAGE Encyclopedia of Psychology and Gender* (pp. 1611). Thousand Oaks, CA: SAGE.
9. ° Sun, S. & **Budge, S.L.** Women's group therapy. (2017). In K. Nadal (Ed.) *The SAGE Encyclopedia of Psychology and Gender* (pp. 1829-1830). Thousand Oaks, CA: SAGE.
10. ° Sun, S., Minero, L., & **Budge, S.L.** (2017). Multiracial people and gender. In K. Nadal (Ed.) *The SAGE Encyclopedia of Psychology and Gender* (pp. 1208-1212). Thousand Oaks, CA: SAGE.
11. ° Alexander, D., Hunter, C., & **Budge, S.L.** (2017). Experiences of women in religious leadership. In K. Nadal (Ed.) *The SAGE Encyclopedia of Psychology and Gender* (pp. 1813-1815). Thousand Oaks, CA: SAGE.
12. ° **Budge, S.L.** (2017). Genderqueer. In A. Goldberg (Ed.) *The SAGE Encyclopedia of LGBTQ Studies* (pp. 460-463). Thousand Oaks, CA: SAGE.
13. ° **Budge, S.**L. & Snyder, K.E. (2016). Sex-related differences research. In A. Goldberg (Ed.) *The Wiley Blackwell Encyclopedia of Gender and Sexuality Studies* (pp. 2125-2129*)*. Thousand Oaks, CA: SAGE.
14. °**Budge, S. L**., & Wampold, B. E. (2015). The relationship: How it works. In O. C. G. Gelo, A. Pritz, & B. Rieken (Eds.), *Psychotherapy research: Foundations, process, and outcomes* (pp. 213-228). Dordrecht: Springer.

PUBLICATIONS IN REVISION AND UNDER REVIEW

1. **Budge, S.L**. & Moradi, B. (Under Review). *A meta-analytic approach to studying psychotherapy outcomes focused on transgender affirmative therapies and power dynamics.*
2. Moradi, M. & **Budge, S.L.** (Under Review). *A meta-analytic approach to studying psychotherapy outcomes for LGBTQ affirmative therapies.*

3. **Budge, S.L.** & Moradi, B. (Under Review). *Gender Identity*.
4. Moradi, B. & **Budge, S.L.** (Under Review). *Sexual Orientation*.
5. Rossman, K., Sinnard, M., & **Budge, S.L.** (Under Review). *A qualitative examination of consideration and practice of consensual non-monogamy among sexual and gender minority couples.*
6. **Budge, S.L.,** Katz-Wise, S.L., Conniff, J., Braden, T., Belcourt, W.S., Parks, R. L. (Under Review). *Coping processes for transgender youth.*
7. **Budge, S.L.,** Katz-Wise, S. L., & Owen, J.J. (Under Review) *Sexual minorities' sexual communication, internalized homophobia, and conformity to gender norms.*
8. Goldberg, A.E., Kuvalanka, K.A., **Budge, S.L.,** Benz, M. & Smith J. (Under Review). *Mental health and health care experiences of trans students in higher educational settings: a mixed methods study.*
9. Hambrick, M., Cintron, A., Apegoraro, L., & **Budge, S.L.** (Under review). *I Am Cait: An analysis of the top-down and bottom-up framing of Caitlyn Jenner's ESPY Awards speech.*
10. Thai, J.L., **Budge, S.L.,** & Adelson, J. L. (Under review) *The impact of family and identity on suicidality and substance abuse in trans Asian and Pacific Islander individuals.*
11. Walinsky, D. & **Budge, S.L.** (Under Review) *Gender binaries, workplace discrimination and satisfaction, and delayed gender transition.*

MANUSCRIPTS IN PROGRESS

1. **Budge, S.L.,** Sinnard, M.T., & Rossman, H.K. *Queering emotions: A content analysis of non-binary and genderfluid individuals' experiences of affect.*
2. **Budge, S.L.,** Rossman, H.K., & Sinnard, M.T. *A grounded theory analysis of the relationship between emotions and internal identity processes for non-binary and genderfluid individuals.*
3. Rossman, H.K., Sinnard, M.T., salkas, s., & **Budge, S.L.** Genderfluid and non-binary individuals' experiences of external identity processes and emotion labels.
4. **Budge, S.L.,** Orovecz, J.O., Barr, S.M., & Keller, B.L. *Affirmative emotional processes for*
   transgender women: A qualitative analysis.
5. **Budge, S.L.,** Stahl, A., Alexander, D., salkas, s., Orovecz, J.. *The identity formation of genderqueer individuals.*
6. **Budge, S**.L., Akinniyi, D., Alexander, D., Stahl, A., salkas, s., Orovecz, J. *Analyzing the understanding of multiple identities for genderqueer individuals.*
7. **Budge, S.L.** Barr, S.M., & Snyder, K. & *A dynamic systems approach to exploring the development of transgender identity.*
8. Rossman, H.K., Eleazer, J., Gervasi, C., **& Budge, S.L.** *A qualitative analysis of transgender individuals' perceptions of privilege.*
9. Hunter, C. & **Budge, S.L.** *The moderating effect of race related to discrimination for transgender individuals.*
10. Alexander, D. & **Budge, S.L.** *The impact of partner support on symptoms of anxiety for trans women, trans men, and genderqueer individuals.*

11. Eleazer, J. & **Budge, S.L.** *Transgender military service-members' experiences of identity and vocational integration.*
12. Solberg, V.S., **Budge, S.L.,** Phelps, A., Durham, J., Haakenson, K., & Timmons, J. *The perceived utility and value of Individualized Learning Plans: Parent, educator, and student perspectives.*
13. Solberg, V.S., **Budge, S.L.,** & Halverson, E. *Identifying the nature of career decision-making patterns and their impact on career, academic and social/emotional outcomes: A mixed methods approach.*

MINOR PUBLICATIONS AND TECHNICAL REPORTS

1. Solberg, V. S., Gresham, S. L., & **Budge, S. L.** (2009, December). *ECDM validation study-II*. Center on Education and Work (CEW), University of Wisconsin – Madison. Submitted to Guidance Branch, Singapore Ministry of Education.
2. Solberg, V. S., Gresham, S. G., **Budge, S. L.,** Phelps, A. L., Haakenson, K., & Durham, J. (2009, September). *NCWD/Youth research and demonstration project on Individualized Learning Plans.* Center on Education and Work (CEW), University of Wisconsin-Madison. Submitted to the National Collaborative on Workforce and Disability/Youth.
3. Solberg, V. S., Lindwall, J., **Budge, S. L**., Schneider, C. L., Deloya, J., Halley, K., & Hatfield, P. (2009, August). *Report on the Mental Health Concerns among the Students in the Madison Metropolitan School District*. Center on Education and Work (CEW), University of Wisconsin– Madison. Submitted to the Madison Metropolitan School District.
4. Solberg, V. S., **Budge, S. L**., Phelps, L. A. (2009, August). *Phase II Portal: Focus Group Discussion*. Center on Education and Work (CEW), University of Wisconsin – Madison. Submitted to Guidance Branch, Singapore Ministry of Education
5. Valdez, C. R., & **Budge, S. L.** (2008). *Program evaluation of "It's Time! Adults Addressing Youth and Teen Depression."* InHealth Wisconsin, Milwaukee, WI.
6. Lin, M. & **Budge, S.** (2007). Exploring the impact of race and class on the First Year in Counseling Psychology 115. *Our First Year Experience, 2*, 3-4.

RESEARCH SUPPORT

Fall Research Competition **6/2018 – 6/2019**
University of Wisconsin-Madison
$34,000 - **funded**
Research project determining the effectiveness of psychotherapy interventions focused on minority stressors for transgender clients.
Role: PI

National Institute of Health **1/2018 - current**
NICHD, R01, $500,000 - **submitted**
Study focused on promoting well-being among transgender and gender non-conforming youth and identifying salient contextual factors.
Role: Collaborator

UW Institute for Clinical Research (ICTR) **6/2017 – 6/2018**
Health Equity and Diversity (AHEAD) research pilot award
$10,000 - **funded**
Research project determining the effectiveness of psychotherapy interventions focused on minority stressors for transgender clients.
Role: PI

National Institute of Health **1/2017 – 1/2019**
Structured pubertal suppression readiness assessment for gender dysphoric youth.
NICHD, R21, $206,028
Role: Collaborator

Fall Research Competition **5/2017 - 9/2018**
University of Wisconsin-Madison
$60,000 - **funded**
Supplemental research project for the NIH grant (listed below) focusing on pubertal suppression for transgender youth.
Role: PI

National Institute of Health **11/2016**
NICHD, K23, $666,769 - **scored,** unfunded
Study focusing on the effects of pubertal suppression on affect and emotion regulation for transgender youth.
Role: PI

Wisconsin Partnership Program **6/2016 – 6/2018**
Community Opportunity Grant
$50,000 **- funded**
A grant that assists with opportunities focused on transgender health and equity in health care.
Role: Collaborator

UW Institute for Clinical Research (ICTR) **6/2016 – 6/2018**
Health Equity and Diversity (AHEAD) research pilot award
$10,000 - **funded**
Research project advancing the Wisconsin Survey of Trans Youth: An Assessment of Resources and Needs.
Role: Co-investigator

Patient Centered Outcome Research Initiative (PCORI) **5/2016**
Engagement Award
$250,000 - **scored**, unfunded
Creating a collective for integrating psychological health, education, and research for LGBTQ therapies (CIPHER LGBTQ)
Role: Co-PI

Faculty Research Development Grant **10/2012 - 10/2013**
College of Education and Human Development
University of Louisville
$2,200 - **funded**
Research project testing psychotherapy process and outcomes for transgender individuals.
Role: PI

Faculty Research Development Grant **9/2011- 9/2012**
College of Education and Human Development
University of Louisville
$2,200 - **funded**
Research project regarding positive experiences of transgender identity and inter-sectionality of identities with genderqueer individuals.
Role: PI

Charles J. Gelso Research Grant **6/2010 – 6/2012**
American Psychological Association (Division 29)
$2,000 - **funded**
Meta-analysis project focusing on personality disorders and treatment effectiveness.
Role: PI

INTERNATIONAL PRESENTATIONS
°Invited; Underlining denotes student;

1. **Budge, S.L.** & Katz-Wise, S.L. (2016, July). *Emotional expression of trans youth and their families: A cross-comparison of familial cultures for gender and emotions.* Paper presented at the International Congress of Psychology Conference, Yokohama, Japan.
2. Chin, M.Y., Minero, L., & **Budge, S.L.** (2016, July). *"This is me, and I am happy. I love it": Understanding Internal Coping Processes of Trans-identified Individuals using Grounded Theory.* Paper presented at the International Congress of Psychology Conference, Yokohama, Japan.
3. **Budge, S.L.,** Katz-Wise, S.L., Conniff, J., Belcourt, S., & Parks, R. (2016, July). *Developmental processes of coping for trans youth: Results from the Trans Youth and Family Study (TYFS).* Paper presented at the World Professional Association for Transgender Health Biannual Conference, Amsterdam, The Netherlands.
4. Sinnard, M., Raines, C., & **Budge, S.L.** (2016, July). *Effects of location and transition status on anxiety and depression in trans individuals.* Paper presented at the World Professional Association for Transgender Health Biannual Conference, Amsterdam, The Netherlands.
5. **Budge, S.L.** & salkas, s. (2016, July). *An overview of non-binary gender identities in the National Transgender Discrimination Survey*, Paper presented at the World Professional Association for Transgender Health Biannual Conference, Amsterdam, The Netherlands.
6. Orovecz, J., salkas, s., & **Budge, S.L.** (2016, July). *External identity processes for individuals with non-binary identities.* Paper presented at the World Professional Association for Transgender Health Biannual Conference, Amsterdam, The Netherlands.

7. Rossman, K., Sinnard, M., & **Budge, S.L.** (2016, July). *The externalization of affect for individuals with non-binary gender identities.* Paper presented at the World Professional Association for Transgender Health Biannual Conference, Amsterdam, The Netherlands.
8. Hase, C.N., Reiland, M.T., **Budge, S.L**. (2015, August). *"Omitting none:" Experience of people of color in a primarily white meditation community*. Poster presented at American Psychological Association. Toronto, ON.
9. Akinniyi, D.A. & **Budge, S.L.** (2015, August*). Genderqueer individuals' conceptualizations of multiple identities: A qualitative investigation using identity maps.* Paper presented at the Annual Meeting for the American Psychological Association, Toronto, Canada.
10. Sinnard, M. & **Budge, S.L.** (2015, August). *Effects of location and transition status on anxiety and depression in trans individuals.* Poster presented at the Annual Meeting for the American Psychological Association, Toronto, Canada.
11. Watkins, C.E., **Budge, S.L.,** & Wampold, B.E. (2015, August). *Extrapolating the Wampold/Budge psychotherapy relationship model to psychotherapy supervision.* Paper presented at the Annual Meeting for the American Psychological Association, Toronto, Canada.
12. **Budge, S.L.** (2014, February). *Developmental processes of positive emotions for trans individuals: The interplay of interpersonal emotions and transition appraisal.* Paper presented at the World Professional Association for Transgender Health Biannual Conference, Bangkok, Thailand.
13. **Budge, S.L.,** Adelson, J.L., & Howard, K.A.S. (2014, February). *Transgender and Genderqueer individuals' mental health concerns: A moderated mediation analysis of social support and coping.* Paper presented the World Professional Association for Transgender Health Biannual Conference, Bangkok, Thailand.

NATIONAL PRESENTATIONS

°Invited; Underlining denotes student;

1. **Budge, S.L.** (2018, August). *The feasibility of a clinical trial focusing on trans individuals' minority stress.* Paper to be presented at the Annual Meeting for the American Psychological Association, San Francisco, California.
2. **Budge, SL.,** Allen, B., Andert, B., Botsford, J., & Rehm, J. (2018, August). *Resources contributing to psychological well-being for trans youth: A CBPR Approach*. Paper to be presented at the Annual Meeting for the American Psychological Association, San Francisco, California.
3. Dillard, S., Sinnard, M.T., **Budge, S.L.**, & Katz-Wise, S.L. (2018, August). *Triadic analysis of concordance and discordance in families of trans youth.* Poster to be presented at the Annual Meeting for the American Psychological Association, San Francisco, California.
4. Mauk, E., Guo, E., Stock, C., Eck, M., & **Budge, S.L.** (2018, August). *Minority stress interventions in a psychotherapy pilot trial for transgender clients.* Paper to be presented at the Annual Meeting for the American Psychological Association, San Francisco, California.
5. Orzechowski, M., **Budge, S.L.,** Lavendar, A., Onsgard, K., Schamms, S., Liebowitz, S., & Katz-Wise, S.L. (2018, August). *Emotions of transgender youth.* Poster to be presented

at the Annual Meeting for the American Psychological Association, San Francisco, California.

6. Raines, C.R & **Budge, S.L.** (2018, August). *Measuring masculine sexual entitlement: Subscales of a new instrument.* Poster to be presented at the Annual Meeting for the American Psychological Association, San Francisco, California.
7. Sinnard, M.T, Orzechowski, M., **Budge, S.L.,** Belcourt, S., Conniff, J., Orovecz, J., Parks, R., Sun, S., & Sutton, J. (2018, August). *Depression and anxiety among transgender compared to cisgender Individuals: A meta-analysis.* Poster to be presented at the Annual Meeting for the American Psychological Association, San Francisco, California.
8. Sinnard, M.T., Lewis, K., & **Budge, S.L.** (2018, August). *The effectiveness of psychotherapy for transgender clients: A randomized controlled trial.* Paper to be presented at the Annual Meeting for the American Psychological Association, San Francisco, California.
9. Sun, S., Hoyt, W.T., & **Budge, S.L.** (2018, August). *Minority stress, HIV risk behaviors, and mental health among Chinese men who have sex with men (MSM): A qualitative analysis.* Poster to be presented at the Annual Meeting for the American Psychological Association, San Francisco, California.
10. Thomas, K.A., Andert, B., Ibarra, N., **Budge, S.L.,** & dickey, l. (2018, August). *Non-suicidal self-injury in transgender individuals.* Poster to be presented at the Annual Meeting for the American Psychological Association, San Francisco, California.
11. Dyer, R., **Budge, S.L.,** Rehm, J., Botsford, J., Andert, B., & Allen, B. (2018, August). *Rural-urban differences in perceived safety at school for Wisconsin trans youth.* Poster to be presented at the Annual Meeting for the American Psychological Association, San Francisco, California.
12. Raines, C.R & **Budge, S.L.** (2018, August). *Understanding the relationships between masculine sexual entitlement, masculinity, and violence.* Poster to be presented at the Annual Meeting for the American Psychological Association, San Francisco, California.
13. Rehm, J., Botsford, J**., Budge, S.L,** Andert, B., & Allen, B. (2017, September). *Initial results of needs assessment for trans and gender expansive youth in Wisconsin*. Poster presented at the International Joint Meeting of Pediatric Endocrinology, Washington, D.C.
14. Minero, L.M. & **Budge, S.L.** (2017, February). *Experiences of exclusion and discrimination among undocutrans (undocumented and transgender) individuals in the united states and implications for mental health professionals.* Paper presented at the meeting for the United States Professional Association for Transgender Health, Los Angeles, California.
15. **Budge, S.L.** (2017, February). *Evaluating the effectiveness of psychotherapy with trans clients: using the working alliance inventory.* Paper presented at the meeting for the United States Professional Association for Transgender Health, Los Angeles, California.
16. **Budge, S.L.** (2016, August). *Psychotherapy interventions, process, and outcome with transgender and gender non-conforming clients.* Chair of invited symposium for Division 29 at the Annual Meeting for the American Psychological Association, Denver, Colorado.
17. **Budge, S.L.** (2016, August). *The impact of minority stress interventions on psychotherapy outcomes with a trans client.* Paper presented at the Annual Meeting for the American Psychological Association, Denver, Colorado.

18. Minero, L.M., Chin, M.Y., & **Budge, S.L.** (2016, August). *Transgender clients' reports of characteristics of effective and trans-competent therapists.* Paper presented at the Annual Meeting for the American Psychological Association, Denver, Colorado.
19. **Budge, S.L.** (2016, August). *The state and future of psychotherapy research with transgender clients.* Paper presented at the Annual Meeting for the American Psychological Association, Denver, Colorado.
20. Minero, L.M., Chin, M.Y., & **Budge, S.L.** (2016, August). *Understanding external coping processes of trans-identified individuals using grounded theory.* Poster presented at the Annual Meeting for the American Psychological Association, Denver, Colorado.
21. Salkas, S. & **Budge, S.L.** (2016, August). *An overview of US population-based data on individuals with non-binary gender identities*. Paper presented at the Annual Meeting for the American Psychological Association, Denver, Colorado.
22. Alexander, D., Orovecz, J., Salkas, S., Stahl, A., & **Budge, S. L.** (2016, August). *Internal identity processes for individuals with non-binary identities*. Paper presented at the Annual Meeting for the American Psychological Association, Denver, Colorado.
23. Rossman, K., Sinnard, M., & **Budge, S.L.,** (2016, August). *The "queering" of emotions--using non-binary gender identity to label emotional processes.* Paper presented at the Annual Meeting for the American Psychological Association, Denver, Colorado.
24. Barr, S. M. & **Budge, S.L.** (2016, August). *Experiences of self esteem and well-being for individuals with non-binary gender identities*. Paper presented at the Annual Meeting for the American Psychological Association, Denver, Colorado.
25. Chase, A., Lam, J., & **Budge, S.L.** (2016, August). *Culture and masculine ideology: measuring masculinity among japanese american men*. Poster presented at the Annual Meeting for the American Psychological Association, Denver, Colorado.
26. Akinniyi, D. & **Budge, S.L.** (2016, August). *The student-athlete experience: Multiple minority statuses and discrimination*. Poster presented at the Annual Meeting for the American Psychological Association, Denver, Colorado.
27. **Budge, S.L**. (2016, August). *Identity processes, well-being, and emotional processes for individuals with non-binary identities.* Chair of symposium at the Annual Meeting for the American Psychological Association, Denver, Colorado.
28. Hase, C.N., Meadows, J.D., Budge, S.L. (2016, June). *Inclusion and exclusion in the white space: An investigation of the experiences of people of color in a primarily white american meditation community.* Poster presented at Mind & Life Summer Research Institute. Garrison, NY.
29. **Budge, S.L.** (2015, June). *The effectiveness of psychotherapeutic treatments for personality disorders: A review and critique of current research practices.* Paper presented at the Annual Meeting for the Society for Psychotherapy Research, Philadelphia, PA.
30. Kring, M. & **Budge, S.L.** (2015, June*). Re-evaluating outcomes in psychotherapy: Considerations beyond self-report.* Paper presented at the Annual Meeting for the Society for Psychotherapy Research, Philadelphia, PA.
31. Owen, J. J., Wampold, B.E., Miller, S.D., **Budge, S.L.**, & Minami, T. (2015, June). *Trajectories of change in short-term psychotherapy: Lessons from growth curve mixture modeling.* Paper presented at the Annual Meeting for the Society for Psychotherapy Research, Philadelphia, PA.

32. Katz-Wise, S.L. & **Budge, S.L.** (2015, April). *Imaging the future: qualitative findings of future orientation from trans youth and parents/caregivers in the Trans Youth Family Study.* Paper presented at the Annual Transgender Health Summit, Oakland, CA.
49. **Budge, S.L.** (2014, August). *The other side of the story: trans individuals' experiences of positivity and resilience.* Symposium chair for the Annual Meeting for the American Psychological Association, Washington, DC.
50. **Budge, S.L.** (2014, August). *Lessons learned from NIH-grant submission for LGBTQ research.* Invited panelist for the Annual Meeting for the American Psychological Association, Washington, DC.
33. **Budge, S.L.** & Katz-Wise, S.L. (2014, August). *Emotional and interpersonal experiences of trans youth and their caregivers.* Paper presented at the Annual Meeting for the American Psychological Association, Washington, DC.
34. Eleazer, J.L., Nguyen, Y., **Budge, S.L.** (2014, August). *"I'm afraid of my therapist": Military policy and access-to-care for transgender US service members.* Paper presented at the Annual Meeting for the American Psychological Association, Washington, DC.
35. Thai, J.L. & **Budge, S.L.** (2014, August). *Mental health outcomes for trans Asian American, Asian, and Pacific Islander populations.* Paper presented at the Annual Meeting for the American Psychological Association, Washington, DC.
36. Alexander, D. & **Budge, S.L.** (2014, August). *The impact of partner support on symptoms of anxiety for trans women, trans men, and genderqueer individuals.* Poster presented at the Annual Meeting for the American Psychological Association, Washington, DC.
37. Barr, S.M. & **Budge, S.L**. (2014, August). *Trans identity salience as a predictor for well-being and body control beliefs for trans individuals.* Poster presented at the Annual Meeting for the American Psychological Association, Washington, DC.
38. Keller, B.L., Barr, S.M., & **Budge, S.L.** (2014, August). *Trans women's emotional resilience: Reactions to the intersection of sexism and transphobia.* Paper presented at the Annual Meeting for the American Psychological Association, Washington, DC.
39. Rossman, H.K., Sinnard, M., **Budge, S.L.** (2014, August). *Adapting a three-tiered model of emotions to genderqueer individuals' identity processes.* Paper presented at the Annual Meeting for the American Psychological Association, Washington, DC.
40. Thai, J.L., Orovecz, J., **Budge, S.L.** (2014, August). *Trans men's experiences of positive emotions: An examination of gender identity and emotion labels.* Paper presented at the Annual Meeting for the American Psychological Association, Washington, DC.
41. Tebbe, E.N., Brewster, M., **Budge, S.L.** (2014, August). *A content analysis of transgender psychological literature.* Poster presented at the Annual Meeting for the American Psychological Association, Washington, DC.
42. Thai, J.L. & **Budge, S.L.** (2014, March). *Family relationships and outness for transgender Asian Pacific Islander individuals.* Paper presented at the Society of Counseling Psychology Conference, Atlanta, GA.
43. Hunter, C. & **Budge, S.L.** (2014, March). *The moderating effect of race related to discrimination for transgender individuals.* Paper presented at the Society of Counseling Psychology Conference, Atlanta, GA.
44. Alexander, D. & **Budge, S.L.** (2014, March). *The impact of partner support on symptoms of anxiety for trans women, trans men, and genderqueer individuals.* Paper presented at the Society of Counseling Psychology Conference, Atlanta, GA.

45. Barr, S.M. & **Budge, S.L.** (2014, March). *Validation of the Objectified Body Consciousness Scale for transgender individuals.* Paper presented at the Society of Counseling Psychology Conference, Atlanta, GA.
46. **Budge, S.L.** (2013, October). *Addressing grief and role transitions for transgender clients experiencing gender identity incongruence.* Paper presented at the Biennial North American Society for Psychotherapy Research Conference, Nashville, TN.
47. **Budge, S.L.,** Barr, S.M., Katz-Wise, S.L., Keller, B.L., & Manthos, M. (2013, June). *Incorporating positivity into psychotherapy with trans clients.* Workshop presented at the Annual Philadelphia Transgender Health Conference, Philadelphia, PA.
48. **Budge, S.L.** & Barr, S.M. (2013, April). *Emotional and identity processes of trans youth: A developmental approach.* Paper presented at the Biennial Society for Research on Child Development Conference, Seattle, WA.
49. **Budge, S.L.,** Thai, J., Rossman, H.K. *(*2012, August*) Intersecting identities and mental health outcomes for transsexual, cross-dressing, and genderqueer individuals.* Poster presented at the Annual Meeting for the American Psychological Association, Orlando, Florida.
50. **Budge, S.L.** & Keller, B.L. (2012, August). *"She felt pressured, I felt neglected": LGBQ individuals' experiences of sexual pressure in relationships.* Poster presented at the Annual Meeting for the American Psychological Association, Orlando, Florida.
51. **Budge, S.L.,** Moore, J., Neinhuis, J., Baardseth, T., & Wampold, B.E. (2012, June). *The relative efficacy of bona-fide psychological treatments for personality disorders: A meta-analysis of direct comparisons.* Paper presented at the Annual Meeting for the Society for Psychotherapy Research, Virginia Beach, Virginia.
52. **Budge, S.L.** & Katz-Wise, S.L. (2012, February). *Trans-affirmative therapy: Focusing on emotional and coping processes throughout gender transitioning.* Workshop presented at the Transgender Spectrum Symposium, Annual Meeting of the Gay and Lesbian Affirmative Psychotherapy Association, New York, New York.
53. **Budge, S.L.** & Katz-Wise, S.L. (2011, November). *Transgender emotional and coping processes: Facilitative and avoidant coping throughout the gender transition.* Paper presented at the Annual Meeting for the Society for the Scientific Study of Sexuality, Houston, Texas.
54. **Budge, S.L.** & Howard, K.H. (2011, August). *Gender socialization and genderqueer individuals: The impact of assigned sex on coping and mental health concerns.* Paper presented at the Annual Meeting for the American Psychological Association, Washington, D.C.
55. Tebbe, E.L., **Budge, S.L.,** & Fischer, A. (2011, March). *Transforming the research Goliath: Reflections on research with transgender communities.* Roundtable presented at the Bi-Annual Meeting of the Association for Women in Psychology, Philadelphia, Pennsylvania.
56. **Budge, S.L.** & Howard, K.A.S. (2010, August). *Coping, social support, and well-being in the transition process for transgender individuals.* Paper presented at the Annual Meeting for the American Psychological Association, San Diego, California.
57. Baardseth, T.P., **Budge, S.L.,** & Wampold, B.E. (2010, August). *Allegiance and psychotherapy research: The effectiveness of supportive therapy as a control.* Poster presented at the Annual Meeting for the American Psychological Association, San Diego, California.

58. Solberg, V.S., Gresham, S.L., **Budge, S.L**., & Phelps, A.L. (2010, August). *Impact of learning experiences on students with disabilities career development.* Poster presented at the Annual Meeting for the American Psychological Association, San Diego, California.
59. Katz-Wise, S.L., **Budge, S.L.,** & Hyde, J.S. (2010, August). *Individuation or identification? Objectified body consciousness.* Poster presented at the Annual Meeting for the American Psychological Association, San Diego, California.
60. Solberg, V.S., Gresham, S.L., **Budge, S.L**., & Phelps, A.L. (2010, August). *Impact of exposure to quality learning experiences on career development.* Paper presented at the Annual Meeting for the American Psychological Association, San Diego, California.
61. **Budge, S.L.** & Fluckiger, C. (2010, June). *Comparison of evidence-based-treatments versus treatment as usual: A meta-analysis.* Paper presented at the Annual Meeting for the Society for Psychotherapy Research, Asilomar, California.
62. **Budge, S.L**. & Howard, K.A.S. (2010, April). *Career decision-making in the transgender population: The role of barriers and discrimination.* Paper presented at the Annual Meeting for the American Educational Research Association, Denver, Colorado.
63. **Budge, S.L.**, Solberg, V.S., Phelps, L.A., Haakenson, K., & Durham, J. (2010, April). *Promising practices for implementing Individualized Learning Plans: Perspectives of teachers, parents, and students.* Paper presented at the Annual Meeting for the American Educational Research Association, Denver, Colorado.
64. Solberg, V.S., Gresham, S.L., Phelps, L.A., & **Budge, S.L.** (2010, April). *Identifying decision-making patterns and its impact on career development and workforce readiness.* Paper presented at the Annual Meeting for the American Educational Research Association, Denver, Colorado.
65. Katz-Wise, S.L., **Budge, S.L.,** & Hyde, J.S. (2010, March). *Objectified body consciousness and the mother-adolescent relationship.* Poster presented at the Biennial Meeting for the Society for Research on Adolescence, Philadelphia, Pennsylvania.
14. **Budge**, **S. L.**, Tebbe, E. N., Katz-Wise, S. L., Schneider, C. L., & Howard, K. A. (2009, August). *Workplace transitions: Work experiences and the impact of transgender identity.* Paper presented at the Annual Meeting of the American Psychological Association, Toronto, Ontario, Canada.
15. Katz-Wise, S. L., **Budge, S. L.**, & Schneider, C. L. (2009, August). *Navigating the gender binary: A qualitative study of transgender identity development.* Paper presented at the Annual Meeting of the American Psychological Association, Toronto, Ontario, Canada.
12. Nelson, M. L., Thompson, M. N., Huffman, K. L., & **Budge, S. L.** (2009, August). *Development and further validation of the social class identity dissonance scale.* Paper presented at the Annual Meeting of the American Psychological Association, Toronto, Ontario, Canada.
66. Dvorscek, M., **Budge, S. L.**, Bluemner, J. L., & Valdez, C. R. (2009, August). *Health care provider perspectives on Latino patients with depression.* Poster presented at the Annual Meeting of the American Psychological Association, Toronto, Ontario, Canada.
67. Neumaier, E. R., **Budge, S. L.**, Bohlig, A. J., Doolin, E. M., & Nelson, M. L. (2009, August). *I feel masculine but they think I'm feminine: Toward measuring experienced gender role.* Poster presented at the Annual Meeting of the American Psychological Association during the Division 17 Social Hour, Toronto, Ontario, Canada.

68. Doolin, E. M., Graham, S. R., Hoyt, W. T., **Budge, S. L.**, & Bohlig, A. J. (2009, January). *Out and about in the South: Defining lesbian communities.* Poster presented at the National Multicultural Conference and Summit, New Orleans, LA.
69. **Budge, S. L.**, Tebbe, E. N. & Howard, K. A. S. (2009, January) *Transgender individuals' work experiences: Perceived barriers, discrimination, and self-efficacy.* Paper presented at the Annual Meeting of the Career Conference, Madison, WI.
70. Howard, K. A. S., **Budge, S. L.**, Jones, J., & Higgins, K. (2009, January). *Future plans of urban youth: A qualitative analysis of influences, barriers, & coping strategies.* Paper presented at the Annual Meeting of the Career Conference, Madison, WI.
71. **Budge, S.,** Schneider, C., Rodriguez, A., Katz-Wise, S., Tebbe, E., & Valdez, C. (2008, August). *The emotional roller coaster: Transgender experiences of positive and negative emotions.* Poster presented at the Annual Meeting of the American Psychological Association, Boston, MA.
72. Nelson, M. L., Huffman, K. & **Budge, S. L.**, (2008, August). *Initial validation of the Social Class Identity Dissonance Scale.* Poster presented at the Annual Meeting of the American Psychological Association, Boston, MA.
73. **Budge, S. L.,** Schneider, C., Rodriguez, A., & Howard, K. A. S. (2008, January) *What about the "T"?: Career counseling with transgender populations.* Paper presented at the Annual Meeting of the Career Conference, Madison, WI.
74. Howard, K. A .S., McKay, K. M., & **Budge, S. L.** (2007, August) *Adolescents' use of SOC strategies: The interaction with low-income and high violence contexts.* Poster presented at the Annual Meeting of the American Psychological Association, San Francisco, CA.
75. **Budge, S. L.** & Sherry, A. (2007, August) *The influence of gender role on sexual compliance: A preliminary investigation of LGB relationships.* Poster presented at the Annual Meeting of the American Psychological Association, San Francisco, CA.
76. Howard, K. A. S., Solberg, V. S., & **Budge, S. L.** (2007, August). *Designing culturally responsive school counseling career development programming for youth.* Paper presented at the Annual Meeting of the American Psychological Association, San Francisco, CA.
77. Howard, K. A. S., Jones, J. E., **Budge, S.,** Gutierrez, B., Lemke, N., Owen, A., & Higgins, K. (2007, April). *Academic and career goals of high school youth: processes and challenges.* Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, IL.

REGIONAL PRESENTATIONS

°Invited; Underlining denotes student;

1. **°Budge, S.L.** (2017, September). *Transgender individuals and minority stress: The past, present, and future.* Research talk presented for the UW Department of Psychology Diversity series.
2. **°Budge, S.L.** and Karcher, O. (2017, May). *Supporting trans youth and their mental health needs, Part 2.* Paper presented at the Supporting Trans and Gender Expansive Youth conference, Madison, Wisconsin.

3. °**Budge, S.L.** (2016, October). *Supporting trans youth and their mental health needs.* Paper presented at the Supporting Trans and Gender Expansive Youth conference, Madison, Wisconsin.
4. **Budge, S.L.** (2013, November). *Incorporating an IPT approach with transgender clients.* Paper presented at the Annual Kentucky Psychological Association Conference, Lexington, Kentucky.
5. **Budge, S.L.** (2013, April). *Using interpersonal therapy with transgender clients.* Workshop provided at the Annual University of Florida Interdisciplinary Conference on LGBT Issues.
6. Barr, S. M. & **Budge, S. L.** (2013, April). *The role of identity integration in the emotional well-being of post-transition individuals.* Poster presentation at the Kentucky Psychological Association Student Research Conference, Louisville, Kentucky.
7. Orovecz, J., Thai, J.L., & **Budge, S.L.** (2013, April). *"I'm stoked about life": The emotional processes of trans men through a qualitative lens*. Poster presented at the Spring Research Conference, Lexington, Kentucky.
8. Rossman, K. & **Budge, S.L.** (2013, April). *Genderqueer individuals' mental health concerns: The relationship between social support and coping*. Paper presented at the Spring Research Conference, Lexington, Kentucky.
9. Barr, S. M. & **Budge, S. L.** (2013, April). *The role of identity integration in the emotional well-being of post-transition individuals.* Poster presented at the Spring Research Conference, Lexington, Kentucky.
10. Rossman, K. & **Budge, S.L.** (2013, June). *Just the fact that I commanded that respect - I got the privilege: Qualitative examination of privilege in the trans community.* Paper presented at the Spring Research Conference, Lexington, Kentucky.
11. Keller, B.L., Barr, S.M., & **Budge, S. L**. (2013, April). "*For every bad, there's 40 good things that happen": A qualitative approach to understanding the positive emotional experiences of trans women.* Poster presentation at the Spring Research Conference, Lexington, Kentucky.
12. Orovecz, J., Thai, J.L., & **Budge, S.L.** (2013, April). *"I'm stoked about life": The emotional processes of trans men through a qualitative lens.* Presented at the Spring Research Conference, Lexington, Kentucky.
13. Orovecz, J., Thai, J.L., & **Budge, S.L.** (2013, March). *"I'm me, and I'm proud to be me": A grounded theory analysis of trans men's emotional processes.* Presented at the Kentucky Psychological Association Foundation Spring Academic Conference, Louisville, Kentucky.
14. Eleazer, J. R. & **Budge, S. L.** (2013, March). *"It would be better for them to have a dead hero for a father than a freak:" Suicidality and trans military service.* Poster presented at the Kentucky Psychological Association Spring Academic Conference, Louisville, Kentucky.
15. Sinnard, M., Rossman, K., & **Budge, S. L.** (2013, March). *Positive emotional experiences of gender non-binary identified individuals.* Poster presentation at the Kentucky Psychological Association Student Research Conference, Louisville, Kentucky.
16. Barr, S.M., Stahl, A., Manthos, M., & **Budge, S.L.** (2012, November). *"It means there aren't rules and you don't have to ascribe to a specific binary": A qualitative examination of genderqueer identity.* Paper presented at the Chicago LGBTQ Health and Wellness Conference, Chicago, Illinois.

17. Thai, J.L., Orovecz, J., & **Budge, S.L.** (2012, November). *Trans men and positivity: Emotional processes related to identity.* Paper presented at the Chicago LGBTQ Health and Wellness Conference, Chicago, Illinois.
18. **Budge, S.L.,** Barr, S.M., Orovecz, J., & Rossman, H.K. (2012, November). *Clinical work with LGBT youth.* Workshop provided at the Annual Kentucky Psychological Association Conference, Louisville, Kentucky.
19. **Budge, S.L.,** Lee, S., & Monahan-Rial, V. (2011, February). *Bridging institutional gaps: Utilizing transgender-affirmative therapy with college students.* Workshop presented at the Annual Meeting for the Big 10 College Counseling Center Conference, Minneapolis, Minnesota.
20. Lee, J., **Budge, S.L.,** Wilson, J.L., & Roper, J.M. (2011, February). *The Korean Conundrum: Managing stigma in the recruitment of group counseling members.* Workshop presented at the Annual Meeting for the Big 10 College Counseling Center Conference, Minneapolis, Minnesota.
21. °**Budge, S.L.** & Katz-Wise, S.L. (2010, February). *Transition to adulthood: Developmental steps for transgender individuals.* Workshop presented at the Conference on Transgender and Gender Variant Youth, Madison, Wisconsin.
22. °**Budge, S.L.** (2009, October). *Individualized Learning Plans: Parent, student, and educator focus groups.* Paper presented at the Fall Institute for the National Collaborative on Workforce and Disability/Youth, Charleston, South Carolina.

KEYNOTE AND INVITED PRESENTATIONS

1. °**Budge, S.L.** & Mauk, E. (2017, May). *Health and well-being of LGBTQ students: Lessons learned and recommendations for educators*. Invited presentation at the CESA Conference, Madison, Wisconsin.
2. °**Budge, S.L.** (2016, March). *The construction of gender identity as "disordered": A critical examination of mental health using trans narratives.* Invited presentation at the Women's and Gender Studies Forum at the University of Florida, Gainesville, Florida.
3. °**Budge, S.L.** (2016, March). *Understanding, acknowledging, and responding to LGBTQ microaggressions in health care settings.* Keynote provided at the Florida Area Health Education Center, Gainesville, Florida.
4. °**Budge, S.L.** (2014, September). *Positivity in trans populations: Implications for vocational psychology.* Boston University, Boston, Massachusetts.
5. °**Budge, S.L.** (2013, April). *Future directions for research and therapy with trans and gender diverse individuals.* Keynote provided at the Annual University of Florida Interdisciplinary Conference on LGBT Issues.
6. °**Budge, S.L.** *(*2013, March*). The psychology of sexual orientation and gender identity: future directions and implications.* Keynote provided at the East Texas Psi Chi Student Research Conference, Tyler, Texas.

NATIONAL RESEARCH BRIEFINGS

1. °**Budge, S.L.,** & Solberg, V.S., (2010, March) *Career exploration and the use of career narrative data for high school students' career exploration processes: A United States sample.* Research briefing presented at the Department of Labor, Washington, D.C.

2. °**Budge, S.L.,** Solberg, V.S., & Phelps, A.L. (2010, March) *Individualized Learning Plans within a community-oriented approach: The usefulness of focus group data with parents, teachers, and students.* Research briefing presented at the Department of Labor, Washington, D.C.

INTERNATIONAL RESEARCH BRIEFINGS

1. °**Budge, S.L.,** & Solberg, V.S., (2010, February) *A three-tiered approach to analyze the career decision making processes using focus group data with Singaporean parents, students, and staff.* Research briefing presented at the Ministry of Education, Singapore.
2. °**Budge, S.L.,** & Solberg, V.S., (2010, February) *Use of narrative analysis for high school students' career exploration processes: A Singapore Sample.* Research briefing presented at the Ministry of Education, Singapore.

TEACHING EXPERIENCE

University of Wisconsin-Madison Courses (Fall 2014 - Fall 2017)

Fall 2017
CP 951: Research in Individual Interventions (graduate): enrollment = 12
CP 999: Independent Study (graduate): enrollment = 1
CP 990: Independent Research (graduate): enrollment = 2
CP 699: Independent Research (undergraduate): enrollment = 3

Summer 2017
CP 699: Independent Research (undergraduate): enrollment = 1

Spring 2017
CP 903: Advanced Practicum (graduate): enrollment = 8
CP 900: Foundational Practicum (graduate): enrollment = 5
CP 890: Advanced Assessment Techniques (graduate): enrollment = 10
CP 999: Independent Study (graduate): enrollment = 1
CP 990: Independent Research (graduate): enrollment = 1
CP 699: Independent Research (undergraduate): enrollment = 8

Fall 2016
CP 805: Helping Relationships & Techniques (graduate): enrollment = 15
CP 990: Independent Research (graduate): enrollment = 2
CP 699: Independent Research (undergraduate): enrollment = 8

Summer 2016
CP 699: Independent Research (undergraduate): enrollment = 1

Spring 2016
CP 903: Advanced Practicum (graduate): enrollment = 4

CP 900: Foundational Practicum (graduate): enrollment = 9
CP 810: Professional Development/Clinical Practice (graduate): enrollment = 8
CP 699: Independent Research (undergraduate): enrollment = 1
Counseling Psychology Training Clinic Supervision (*n* = 7)

Fall 2015
CP 805: Helping Relationships & Techniques (graduate): enrollment = 10
CP 999: Independent Study (graduate): enrollment = 10

Spring 2015
Master's Pre-Practicum (enrollment: 17)
Counseling Psychology Training Clinic Supervision (*n* = 12)
CP 990: Independent Research (graduate): enrollment = 8
CP 901: Counseling Psych Practicum (graduate): enrollment = 1
CP 699: Independent Research (undergraduate): enrollment = 1

Fall 2014
CP 805: Helping Relationships & Techniques (graduate): enrollment = 17
CP 999: Independent Study (graduate): enrollment = 5

Course or Curriculum Development at UW-Madison From 2014-current

Individual Interventions (new course)	**2017**
Advanced Assessment Techniques (new curriculum)	**2017**
LGBT Psychology (new curriculum)	**2016**
Advanced Doctoral Clinical Practicum (new course)	**2016**
Foundational Doctoral Clinical Practicum (new course)	**2016**
Master's Pre-Practicum (new course)	**2015**
Helping Relationships & Techniques (new course)	**2014**

Previous Teaching

University of Louisville Courses
ECPY 780: Advanced Practicum
ECPY 648: Intellectual Assessment
ECPY 663: Multicultural Issues
ECPY 629: Theories and Techniques of Counseling
ECPY 621: Differential Diagnosis
ECPY 793: Gender and Queer Issues In Psychology
ECPY 793: Advanced Multicultural Psychotherapy
ECPY 700: Supervised Research

Graduate-Student Teaching:
University of Wisconsin-Madison (2006-2009)
CP 804: Research Methods

CP 994: Personality Assessment
CP 650: Interviewing Skills
CP 115: First Year Experience

University of Texas at Austin (2005-2006)
PSY 301: Introduction to Psychology

Supervision of Clinical Work at UW-Madison

Provision of Supervision at the Counseling Psychology Training Clinic **8/2014 – 5/2016**

I was the on-site licensed psychologist and supervisor for one clinic night per week. Provided individual clinical supervision to 7 masters and doctoral students (1 hr. per week of individual clinical supervision for each student in addition to administration [feedback on notes and watching video-recordings of sessions]). Provided one hour of group supervision on the night I was on-site at the clinic.

Provision of Supervision to students in the Pre-Practicum course (CP 806). **1/2015 – 5/2015**

Provided individual supervision (above and beyond class duties, due to low staffing in the department) to masters and doctoral students for the CP 806 course in the Spring of 2015.

SERVICE ACTIVITIES

PUBLIC SERVICE (From 2014- current)

Wisconsin Transgender Health Coalition (WTHC) **5/2015-current**

I have been involved in the organization since its inception. I have mainly been involved in the "data and dissemination" team, where I provide my expertise as researcher helping community members establish their own research projects and write grants to support personnel within the coalition. As a part of this team, I have given presentations to community members about population-based data within Wisconsin that can influence access to more medical and mental health care. I have also assisted team members with creating surveys and recruiting individuals to be a part of a Wisconsin needs assessment of transgender youth. We meet once per month to focus on the larger data team and have smaller meetings throughout the month to focus on community outreach and training to disseminate research in a fashion that is most helpful for individuals who are not involved in academia.

Co-Coordinator and Co-Chair for the Transgender

and Gender Expansive Youth Conference **2/2016-current**

Attend meetings for an ongoing planning committee to coordinate semi-annual conferences about the concerns of transgender youth. Helped develop an agenda for the conferences, planned speakers, coordinated a budget, and decided on special topics for the conference. Introduce the keynote speaker at the conference and provide project management during the day of the conference. Provided three one-hour long sessions to educate teachers, school staff, mental health professionals, and community members.

Pro-Bono Psychotherapy **8/2015 -5/2016**

Provided 1.5 hours of pro-bono weekly group psychotherapy to transgender and gender expansive youth at the Counseling Psychology Training Clinic. Provided group therapy training to a doctoral student to conduct co-therapy with me as part of the group.

Community Presentations and Trainings

Group Health Cooperative Insurance	**12/2017**
Goodman Community Center and UW Health	**9/2017**
Marquette University	**8/2017**
Madison Metropolitan School District	**5/2017**
Wisconsin Department of Public Safety	**4/2017**
Psychiatric Services	**2/2017**
FORGE	**1/2017**
Wisconsin Department of Public Instruction	**12/2016**
Madison Metropolitan School District	**10/2016**
Marquette University	**5/2016**

PROFESSIONAL SERVICE

Associate Editor
Psychotherapy **1/2014 - current**

Guest Editor of Special Sections

Psychotherapy	**9/2016**
Journal of Counseling Psychology	**12/2017**
Psychology of Sexual Orientation and Gender Diversity	**12/2017**

Editorial Board

Archives of Sexual Behavior	**1/2014 – 12/2016**
Psychology of Sexual Orientation and Gender Diversity	**1/2016 – current**
International Journal of Transgenderism	**1/2016 - current**

Ad Hoc Reviewer: Journal of Consulting and Clinical Psychology, Clinical Psychology Review, Journal of Counseling Psychology, The Counseling Psychologist, Feminism and Psychology, Psychology of Religion and Spirituality, Psychology of Women Quarterly, Journal of GLBT Family Issues, BioMed Central Journal, The Cognitive Behavior Therapist, Psychotherapy Research, Routledge Publishers, Harvard University Press, Family Process

Leadership in Professional Organizations

Co-Chair of Science Committee **8/2011 - current**
Society for the Psychological Study of Lesbian, Gay, Bisexual, and Transgender Issues (Division 44)

Membership in Professional Organizations

American Psychological Association (APA)
- Society of Counseling Psychology (Division 17)
- Division of Psychotherapy (Division 29)
- Society for the Psychology of Women (Division 35)
- Society for the Psychological Study of Lesbian, Gay, Bisexual, and Transgender Issues (Division 44)
- Society of Clinical Child and Adolescent Psychology (Division 53)

World Professional Association for Transgender Health (WPATH)
Society for Psychotherapy Research (SPR)

UNIVERSITY SERVICE

University Committee

Faculty Senate (alternate) Attended 2 faculty senate meetings	**5/2016 – current**
GLBTQ Committee	**5/2017 - current**

School of Education Committee

Information Technology Policy Advisory Committee	**8/2014 – current**

Department Committee

Doctoral Training Committee	**8/2015 – current**
Doctoral Admissions Chair	**8/2017 - current**

Social Justice Committee (chair)	**8/2016 - current**
Salary and Promotion Committee	**8/2016 - current**
Masters Training Committee	**8/2014 – 8/2015**

Doctoral Dissertation Committees
Kinton Rossman (University of Louisville; Chair, Defended)
Danielle Alexander (University of Louisville; Chair)
Jayden Thai (University of Louisville; Proposed)
Jake Nienhuis (University of Louisville; Defended)
Kelley Quirk (University of Louisville; Defended)
Keldric Thomas (University of Louisville; Defended)
Johanna Strokoff (University of Louisville; Defended)
Elise Romines (University of Louisville; Defended)
Julia Benjamin (University of Wisconsin-Madison; Defended)
Craig Hase (University of Wisconsin-Madison; Defended)
Sarah McArdell Moore (University of Wisconsin-Madison, Defended)
Noah Yulish (University of Wisconsin-Madison, Defended)
Nick Frost (University of Wisconsin-Madison, Defended)
Lindsey Houghton (University of Wisconsin-Madison, Proposed)
Shufang Sun (University of Wisconsin-Madison, Defended)
Joe Orovecz (University of Wisconsin-Madison, In preparation)
Andrew Wislocki (University of Wisconsin-Madison, Proposed)
Dustin Brockberg (University of Wisconsin-Madison, Proposed)
Christo Raines (University of Wisconsin-Madison, Proposed)
Alyssa Ramirez Stege (University of Wisconsin-Madison, Proposed)

Undergraduate Thesis Committees

Morgan Sinnard (University of Louisville; Chair, defended)

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF WISCONSIN

ALINA BOYDEN and
SHANNON ANDREWS,

Plaintiffs,

v. Case No. 17-CV-264

STATE OF WISCONSIN DEPARTMENT
OF EMPLOYEE TRUST FUNDS, et al.,

Defendants.

EXPERT REPORT OF DR. LAWRENCE S. MAYER
SUBMITTED ON BEHALF OF THE STATE DEFENDANTS

Lawrence S. Mayer, MD, MS, PhD
4 Via Corsica
Dana Point, CA 92629
lsmmdphd@gmail.com

April 19th , 2018

While retained as a private consultant in this matter, I currently serve as a Visiting Fellow in Integrative Knowledge and Human Flourishing at Harvard University.

I have been asked to provide my opinion on the efficacy, safety, and optimality of hormonal and surgical interventions for the treatment of gender dysphoria.

QUALIFICATIONS

1. I am a research physician, epidemiologist and biostatistician and one of the few physicians with training in clinical epidemiology and a M.S. and Ph.D. in Mathematics and Statistics.
2. I have served as a tenured (and nontenured) professor at major universities for over four decades. My professorial (and research) appointments have been at Arizona State University, Johns Hopkins University, The Ohio State University, The Mayo Clinic, Princeton, Stanford, University of Michigan, University of Pennsylvania, and Virginia Tech. I am currently a Visiting Fellow at Harvard University where my research focuses on the integration of the quantitative methods of the social sciences with more classical biostatistical and epidemiological methods.
3. My full-time and part-time appointments have been in 23 disciplines including statistics, biostatistics, epidemiology, public health, social methodology,

psychiatry, mathematics, sociology, political science, economics and biomedical informatics. My primary focus has been on the intersection among biostatistics, medicine and public health.

4. I have reviewed as a biostatistician, epidemiologist, physician and social methodologist hundreds of manuscripts submitted for publication to many of the major medical, statistical and public health journals such as *The New England Journal of Medicine*, *The Journal of the American Statistical Association* and *The American Journal of Public Health*. I have served as an associate editor for *The Journal of the American Statistical Association* and *Social Methods and Research*. I am a founding member of the editorial board of the journal *Social Methodology* and the Sage series on Social Methodology.
5. I am a Fellow of the Royal Statistical Society
6. I attach a copy of my current Professional Vita, which lists my education, appointments, publications, research, and other professional experience.

SUMMARY OF OPINIONS

1. Sex is a biological trait and gender is a cultural construct.
2. Gender develops over time.
3. There is no evidence that gender is innate, immutable, or present at birth.
4. Gender dysphoria is the distress associated with incongruence between sex and gender.
5. Gender dysphoria is a serious medical condition that deserves treatment.

6. Medical and surgical treatments have not been demonstrated to be safe and effective for gender dysphoria.

OPINIONS

1. Since the publication of Sexuality and Gender, Findings from the Biological, Psychological, and Social Sciences in Fall of 2016, which I co-authored, there have been no new publications which have changed my understanding of gender. Mayer and McHugh (2016). Scientific and other sources that support my current understanding of gender are cited in that publication.
2. Scientific findings since the publication of Sexuality and Gender have reinforced my understanding of gender. See, for example, Mueller (2017).
3. Gender is almost uniformly defined as a cultural construct while sex is a biological trait. An excerpt from my Sexuality and Gender publication explains this idea in more detail:

> To clarify what is meant by "gender" and "sex," we begin with a widely used definition, here quoted from a pamphlet published by the American Psychological Association (APA):
>
> > Sex is assigned at birth, refers to one's biological status as either male or female, and is associated primarily with physical attributes such as chromosomes, hormone prevalence, and external and internal anatomy. Gender refers to the socially constructed roles, behaviors, activities, and attributes that a given society considers appropriate for boys and men or girls and women. These influence the ways that people act, interact, and feel about themselves.

> While aspects of biological sex are similar across different cultures, aspects of gender may differ. This definition points to the obvious fact that there are social norms for men and women, norms that vary across different cultures and that are not simply determined by biology. But it goes further in holding that gender is wholly "socially constructed" — that it is detached from biological sex. This idea has been an important part of a feminist movement to reform or eliminate traditional gender roles. In the classic feminist book The Second Sex (1949), Simone de Beauvoir wrote that "one is not born, but becomes a woman." This notion is an early version of the now familiar distinction between sex as a biological designation and gender as a cultural construct: though one is born, as the APA explains, with the "chromosomes, hormone prevalence, and external and internal anatomy" of a female, one is socially conditioned to take on the "roles, behaviors, activities, and attributes" of a woman.

Mayer and McHugh (2016) at 87. I go on to explain that:

> In biology, an organism is male or female if it is structured to perform one of the respective roles in reproduction. This definition does not require any arbitrary measurable or quantifiable physical characteristics or behaviors; it requires understanding the reproductive system and the reproduction process. Different animals have different reproductive systems, but sexual reproduction occurs when the sex cells from the male and female of the species come together to form newly fertilized embryos. It is these reproductive roles that provide the conceptual basis for the differentiation of animals into the biological categories of male and female. There is no other widely accepted biological classification for the sexes.

Mayer and McHugh (2016) at 90. I further explore this concept in my amicus brief for the *Gloucester County School Board v. G.G.* U.S. Supreme Court case, at page 7:

> Sex is thus innate and immutable. The genetic information directing development of male or female gonads and other primary sexual traits, which normally are encoded on chromosome pairs "XY" and "XX," are present immediately upon conception. As early as eight

> weeks' gestation, endogenously produced sex hormones cause prenatal brain imprinting that ultimately influences postnatal behaviors. *See* Francisco I. Reyes et al., Studies on Human Sexual Development, 37 J. of Clin. Endocrinology & Metabolism 74-78 (1973); Michael Lombardo, Fetal Testosterone Influences Sexually Dimorphic Gray Matter in the Human Brain, 32 J. of Neuroscience 674-80 (2012); Geneva Foundation for Medical Education and Research, "Human Sexual Differentiation" (2016), *available at* http://www.gfmer.ch/Book&'Reproductive_health/Human_sexual_differentiation.html. It is therefore not the reproductive system alone that carries one's sexual identity. Every cell in the body is marked with a sexual identity by its chromosomal constitution XX or XY.
>
> Thus, sex is not "assigned" at birth, as Respondent suggests; rather, it "declares itself anatomically in utero and is acknowledged at birth." Michelle A. 8 Cretella, Gender Dysphoria in Children and Suppression of Debate, 21 J. of Am. Physicians & Surgeons 50, 51 (2016). A baby's sex – male or female – is recognized and recorded at birth.

4. Definitions of sex which include gender as a part of sex do not contribute to our understanding of either sex or gender.

5. There is an emerging theory that gender identity is innate and immutable. Components of this theory are described in the report of Dr. Budge. It makes no sense.

6. For example, the following is a fundamental error in the Budge report:

> Sex refers to one's classification as male, female, or neither male or female. The term refers a person's chromosomes, hormones, reproductive organs, secondary sex characteristics, *and gender identity (i.e., internal sense of gender).*

Budge (2018) at 7 (emphasis added).

7. Beyond any doubt, sex is biological and, as such, cannot depend on cultural constructs.

8. Budge compounds her error by stating with emphasis:

> [G]ender identity is one of the primary factors when defining an individual's sex.

Budge (2018) at 7.

9. Not only is this definition of sex inconsistent with fundamental biology as taught in every Biology 101 course across the country, but to say that a cultural construct ought to be the "primary factor" in the definition of a biological concept is wholly inconsistent with basic scientific principles.

10. There is no evidence to support the idea that gender identity is a latent or innate trait present at birth. See, for example, Mayer, et al. Amicus Brief (2017) at 10 n.4.

11. The formation of gender identity is a developmental process. Budge's report suggests that gender identity is a process of discovery of a latent variable, present at birth, and revealed around the age of three, rather than developed over time. There is not a scintilla of scientific support for this idea.

12. Gender dysphoria is the distress associated with an individual's identification with a non-conforming gender. It is not the same as being transgendered.

13. Transgenderism is not a disease, disorder, or diagnosis. As such it cannot be treated. Many fought long and hard to remove the diagnosis of Gender Identity Disorder as a diagnosis for all transgendered people.

14. Transgenderism is neither necessary nor sufficient for a diagnosis of gender dysphoria.

15. There is evidence that transgender individuals may benefit from supportive measures but these measures cannot be viewed as "treatments" for being transgendered.

16. Gender dysphoria, unlike transgenderism, is a serious medical condition that deserves to be treated.

17. Treatment for gender dysphoria must be borne of medical necessity and address the medically relevant portion of this condition, which is *distress* associated with the conflict between an individual's gender and their sex.

18. Treatment interventions on behalf of gender dysphoric individuals must be held to the same scientific standards as other medical treatments. These interventions must be optimal, efficacious, and safe.

19. Any treatment which alters biological development must be used with extreme caution.

20. A variety of medical and surgical procedures have been proposed for treating gender dysphoria.

21. The evidence that these interventions are safe, effective, and optimal is minimal. The bases for this opinion with respect to both children and adults, along with the studies on which this opinion relies, can be found in both my Sexuality and Gender publication and my amicus brief. Mayer and McHugh (2016) at 106–13; Mayer, et al. Amicus Brief (2017) at 15–21. This opinion is supported by the

Centers for Medicare and Medicaid Services (Decision Memo for Gender Dysphoria and Gender Reassignment Surgery) which reviews many available studies and found "inconclusive" clinical evidence regarding gender reassignment surgery.

22. Optimality requires that the procedures employed in the treatment of a condition effectively address the underlying features of that condition. For transgendered patients, the idea that they require treatment for being transgendered is dated, offensive, and mistaken.

23. Optimality considerations for the treatment of gender dysphoria, the distress associated with have a non-conforming gender, should aim at reducing or eliminating this distress.

24. In body dysmorphic disorders, such as anorexia nervosa, we do not give patients interventions to alter their physical appearance. We treat the distress caused by the conflict between their perception of themselves and the reality of themselves. In other words, treatment of the distress associated with the disorder is what is medically appropriate and medically necessary.

25. If we disregard the principle of optimality, problems of equity arise: If a transgendered woman is entitled to feminization procedures to reduce her distress, surely a cis-gendered woman, similarly distressed, should be entitled to the same procedure.

26. Neither patient as presented above is entitled to the procedure as a medical necessity.

27. It is particularly difficult for me to imagine a world in which we might favor one category of person over another when considering the allocation of medical resources as a public good.

28. Suppose identical twins are both bothered by the masculinity of their face. However, the twins differ in their gender identity. If we accept treatment suggestions as proposed by Budge, one but not the other would be entitled to surgery. Why should one twin be treated but the other not, when neither twin presents a medical necessity for treatment?

29. Furthermore, since feminization or masculinization of transgender individuals is defined by concepts of femininity or masculinity which are cultural constructs, then the treatments for these individuals varies by culture.

30. Suppose in a particular society small hands is part of the archetypal female gender. Would a transgendered woman in that society be entitled to hand reduction surgery? What if she moves to a different culture?

31. Since gender affirming medical and surgical procedures depend on cultural values, the medical necessity of these interventions would vary depending upon the cultural traits of an individual, in a given place, at a given time.

32. Suppose a transgendered woman chooses, after a period of time, to adopt a male gender identity. Would she be entitled to surgery to re-masculinize her face?

33. According to Budge, transgender women are women from birth and are entitled to procedures that reduce the impact of biology on their development as a transgendered person.

34. According to the ideas presented in Budge's report not only does culture dominate biology, but biology is interpreted as being dependent upon culture. In essence, who you believe you are is more important than who you are.

CONCLUSION

Sex is a biological trait while gender is a cultural construct that develops over time and varies across cultures. There is no evidence that gender is innate, immutable, or present at birth. Some patients develop gender dysphoria, a serious condition that deserves treatment. There is little evidence that medical and surgical interventions reduce the incidence and prevalence of gender dysphoria. There is even less evidence that they would be cost effective compared to social and psychological interventions.

Lawrence S. Mayer, MD, MS, PhD

Date: 19 April 2018

References

Beek, Titia F., et al. "Gender Incongruence/Gender Dysphoria and Its Classification History."*International Review of Psychiatry*, vol. 28, no. 1, 2015, pp. 5–12., doi:10.3109/09540261.2015.1091293.

Bouman, Walter Pierre, et al. "Gender Dysphoria and Gender Incongruence: An Evolving Inter-Disciplinary Field." *International Review of Psychiatry*, vol. 28, no. 1, 2016, pp. 1–4., doi:10.3109/09540261.2016.1125740.

Brief of *Amici Curiae* Dr. Paul R. McHugh, M.D., Dr. Paul Hruz, M.D., PhD., and Dr. Lawrence S. Mayer, Ph. D. In Support of Petitioner, Jan. 10, 2017, *Gloucester County School Board v. G.G. ex rel Grimm*, No. 16-273 (U.S.).

Burke, Sarah M., et al. "Testosterone Effects on the Brain in Transgender Men." *Cerebral Cortex*, 2017, pp. 1–15., doi:10.1093/cercor/bhx054.

Colizzi, Marco, and Rosalia Costa. "The Effect of Cross-Sex Hormonal Treatment on Gender Dysphoria Individuals' Mental Health: a Systematic Review." *Neuropsychiatric Disease and Treatment*, Volume 12, 2016, pp. 1953–1966., doi:10.2147/ndt.s95310.

Davy, Zowie. "The DSM-5 and the Politics of Diagnosing Transpeople." *Archives of Sexual Behavior*, vol. 44, no. 5, 2015, pp. 1165–1176., doi:10.1007/s10508-015-0573-6.

Defreyne, Justine, et al. "Healthcare Costs and Quality of Life Outcomes Following Gender Affirming Surgery in Trans Men: a Review." *Expert Review of Pharmacoeconomics & Outcomes Research*, vol. 17, no. 6, 2017, pp. 543–556., doi:10.1080/14737167.2017.1388164.

Dhejne, Cecilia, et al. "Mental Health and Gender Dysphoria: A Review of the Literature."*International Review of Psychiatry*, vol. 28, no. 1, 2016, pp. 44–57., doi:10.3109/09540261.2015.1115753.

Expert Witness Report of Stephanie Budge, Ph.D., February 19, 2018, *Boyden, et al. v. Wisconsin Department of Employee Trust Funds, et al.*, No. 17-cv-264 (W.D. Wis.).

Flores, A.R., Herman, J.L. Gates, G.J., & Brown, T.N.T. (2016). *How Many Adults Identify as Transgender in the United States?* Los Angeles, CA: The Williams Institute.

Grift, Tim C. Van De, et al. "Surgical Satisfaction, Quality of Life, and Their Association After Gender-Affirming Surgery: A Follow-up Study." *Journal of Sex & Marital Therapy*, vol. 44, no. 2, 2017, pp. 138–148., doi:10.1080/0092623x.2017.1326190.

Hoekzema, Elseline, et al. "Regional Volumes and Spatial Volumetric Distribution of Gray Matter in the Gender Dysphoric Brain." *Psychoneuroendocrinology*, vol. 55, 2015, pp. 59–71., doi:10.1016/j.psyneuen.2015.01.016.

Jensen, Tamara, et al., Decision Memo For Gender Dysphoria and Gender Reassignment Surgery, August 30, 2016, Centers for Medicare and Medicaid Services, *available at* https://www.cms.gov/medicare-coverage-database/details/nca-decision-memo.aspx?NCAId=282&CoverageSelection=National&KeyWord=gender+reassignment+surgery&KeyWordLookUp=Title&KeyWordSearchType=And&bc=gAAAACAACAAAAA%3D%3D& (last visited April 19, 2018).

Joost M. L. G. Ã Campo, and Henk Nijman. "Gender Dysphoria and Psychiatric Symptoms."*The Journal of Nervous and Mental Disease*, vol. 204, no. 7, 2016, p. 558., doi:10.1097/nmd.0000000000000546.

Kraus, Cynthia. "Classifying Intersex in DSM-5: Critical Reflections on Gender Dysphoria."*Archives of Sexual Behavior*, vol. 44, no. 5, 2015, pp. 1147–1163., doi:10.1007/s10508-015-0550-0.

Kreukels, Baudewijntje P.C., and Antonio Guillamon. "Neuroimaging Studies in People with Gender Incongruence." *International Review of Psychiatry*, vol. 28, no. 1, 2016, pp. 120–128., doi:10.3109/09540261.2015.1113163.

Lawrence S. Mayer and Paul R. McHugh, "Sexuality and Gender: Findings from the Biological, Psychological, and Social Sciences," *The New Atlantis*, Number 50, Fall 2016.

Lawrence, Anne A., "Factors Associated With Satisfaction or Regret Following Male-to-Female Sex Reassignment Sugery." *Archives of Sexual Behavior*, vol. 32, 2003, pp. 299-315.

Mueller SC, De Cuypere G, T'Sjoen G., "Transgender Research in the 21st Century: A Selective Critical Review From a Neurocognitive Perspective," *Am J Psychiatry*. 2017 Dec 1;174(12):1155-1162. doi: 10.1176/appi.ajp.2017.17060626.

Newfield, Emily, et al. "Female-to-Male Transgender Quality of Life." *Quality of Life Research*, vol. 15, no. 9, 2006, pp. 1447–1457., doi:10.1007/s11136-006-0002-3.

Zucker, Kenneth J., et al. "Gender Dysphoria in Adults." *Annual Review of Clinical Psychology*, vol. 12, no. 1, 2016, pp. 217–247., doi:10.1146/annurev-clinpsy-021815-093034.

Appendix A: Testimony in Last Four Years

1. Court Appearances:

Elenza, Inc. v. Alcon Laboratories, Superior Court of the State of Delaware, No. N14-03-185 MMJ CCLD, May 8, 2017

2. Depositions:

Sowards v. Las Cruces Medical Center, Third Judicial District Court, County of Dona Ana, State of New Mexico, no. D-307-CV-2009-02563, July 15, 2014

Hilverding v. Steptodont, Inc. and Novocol Pharmaceutical of Canada, Inc., Court of Fulton County, State of Georgia, No. 13EV018074B, January 15, 2015

Hilverding v. Steptodont, Inc. and Novocol Pharmaceutical of Canada, Inc., State Court of Fulton County, State of Georgia, No. 13EV018074B, February 10, 2015 in

Prelas v. Mercedes Benz, USA, LLC, Circuit Court, Boone County, State of Missouri, O9BA-CV2409, April 17, 2015

Hilverding v. Septodont, et al., State Court of Fulton County, State of Georgia, Civil Action NO. 13EV018074B, August 31, 2015

Hyoung v. Target Corporation, Los Angeles County Superior Court, State of California, No. NC0580059, January, 6 2016

Environmental Research Center Aloe Vera of America, San Francisco County Superior Court, State of California, January 20, 2016

Elenza, Inc v. Alcon Laboratories, Superior Court of the State of Delaware, No. N14-03-185 MMJ CCLD, October 25, 2016

Ball v. Bukeirat, Circuit Court of Monongalia County, West Virginia, CA 14-C-37, November 4, 2016

Cheney v. Falcon Safety Products, Circuit Court of the 15th Judicial Court, Palm Beach County, FL, NO: 02013CA007140XXXXMBAN, December 27, 2017

Appendix B: Professional Vita

LAWRENCE S. MAYER, MD, MS, PhD
Professional Vita

February 2018

Primary interests: The biostatistical foundations, methods and interpretations used in the analysis of epidemiological and social science data. Development implementation and evaluation of statistical methods for assessing health effects of preventive interventions and environmental exposures including life-style variables. Analysis of statistical and epidemiological issues arising from applying evidence-based medicine in a clinical or policy environment. Analysis of the statistical issues arising from applying epidemiological models in the diagnosis, treatment, and prognosis of disease. Particularly interested in the intersections among social methodology, biostatistics and epidemiology.

Address:

4 Via Corsica
Dana Point, CA 92629
602-549-4885
410-336-2100

Previous Offices:

Johns Hopkins Medicine
Department of Psychiatry
5300 Alpha Commons Drive
Baltimore, MD 21224-2764
410-336-2100

Mayo Clinic
Samuel C. Johnson Research Building
13212 East Shea Boulevard
Scottsdale, AZ 85259
480-884-0221

Arizona State University
Department of Economics
Tempe, AZ 85258
480-965-6528

Current Position:

Visiting Fellow, Harvard University

Education:

Undergraduate: Arizona State University (1963-64) and Ohio State University: Psychology (Pre-med), BS, 1967, Phi Beta Kappa, *magna cum laude* with distinction in psychology. President's award for outstanding graduate.

Professional: Ohio State University College of Medicine (pre-clinical), dual enrollment, 1966-68; Guy's Hospital Medical School, London, MB (British MD), 1969; Junior House Officer, Associated Medical Schools, British Virgin Islands 1969-1970, MD qualified to practice as a Public Health Physician (psychiatric epidemiologist), British Health Service, 1970

Graduate: Ohio State University, Mathematics, MS, 1969; Mathematics (Statistics and Biostatistics); PhD, 1971

Honorary: MA in Arts and Letters, *honoris causa,* University of Pennsylvania, 1981

Previous Appointments:

Scholar in Residence, Department of Psychiatry, Johns Hopkins School of Medicine, 2016-2017

Professor of Statistics, Biostatistics, and Economics, Arizona State University, 1995-

(Affiliate) Professor, Mayo Clinic/ASU Program in Biomedical Informatics, 2008-2017

Professor of Psychiatry and Public Health (Part-time), School of Medicine and Bloomberg School of Public Health, Johns Hopkins University, 1989-2016

Detective (Fully Sworn), District (County) Attorney's Office, Maricopa County, Arizona 1998-2016 (retired) and State Resource Officer (Fully Sworn), State of Arizona, 1983-1998

Professor of Epidemiology, College of Public Health, University of Arizona, 2000-2016

Research Staff Member, Mayo Clinic, 2014-2016

Consultant in Psychiatric Epidemiology, Banner Alzheimer's Institute, Phoenix, 2003-2016

Chief, Epidemiology and Biostatistics Section, Integrated Fellowship in Cardiology, Phoenix, 1998-2016

Faculty Member, Medical Education, Banner Good Samaritan Medical Center, Phoenix, 1993-2016

Visiting Professor, Division of Neuropsychiatry, Department of Psychiatry, Johns Hopkins Medicine,
2003-2004

Visiting Professor, Department of Biostatistics, Johns Hopkins School of Public Health, 1996-1997, 1989-1990

Director of Research, Maricopa Integrated Health System, 2003-2006

System Director, Research and Director and Medical Director of the Banner Health Research Institute, Banner Health System, Phoenix, 2001-2003

Director, Wharton Analysis Center, Wharton School; Associate Professor of Statistics, Public and Urban Policy, and Epidemiology, University of Pennsylvania, 1979-1983

Visiting Professor, Department of Statistics, Stanford University, 1982-1983

Research Statistician and Lecturer with Rank of Associate Professor, Department of Statistics; Member, Center for Energy and Environmental Studies; Associate Master and Fellow, Princeton Inn College; Instructor, Woodrow Wilson School of Public Affairs; Princeton University, 1974-1979

Assistant Professor of Statistics (with secondary appointments in Political Science, Sociology, and Education) Virginia Polytechnic Institute and State University, 1971-1974

Assistant Professor, Department of Political Science, The Ohio State University, 1971

Teaching Assistant, Department of Mathematics, The Ohio State University, 1967-1968

Visiting Scholar, Department of Statistics, Stanford University, Summer Semesters, 1984-1988

Instructor, Summer Programs, Inter-University Consortium for Political and Social Research, Institute for Social Research, University of Michigan, 1971-1980

Other Major Appointments:

Clinical Professor, College of Medicine, University of Arizona, 1997-2006

Chair, Division of Research, Medical Professionals of Arizona, Phoenix, 2003-2006

Director, Good Samaritan Research Institute, Phoenix, 1999-2001

Consultant in Biostatistics and Clinical Epidemiology, Good Samaritan Medical

Center, Phoenix, 1993-2000

Thesis Advisor, Masters in Public Health, School of Public Health, University of Arizona, 1996-1998

Member, Committee on Statistics, Graduate College, Arizona State University, 1989-2004

Member, Program on Law and the Social Sciences, Arizona State University, 1983-2004

Member, Committee on Malpractice Reform, Arizona Supreme Court, 1989-1993

Erskine Fellow, Occupational Medicine, University of Canterbury, Christchurch, New Zealand, 1989-90

Scholarly Publications:

Hruz, PW, McHugh, PR, and Mayer, LS (2017) Growing Pains: Problems with Puberty Suppression in Treating Gender Dysphoria, The New Atlantis, Spring;(51): 1-24

Mayer, LS, and McHugh, PR (2016) Sexuality and Gender: Findings from the Biological, Psychological, and Social Sciences,The New Atlantis, Fall;(50): 7-143 (the entire issue – an invited issue)

Samus QM, Onyike CU, Johnston D, Mayer L, McNabney M, Baker AS, Brandt J, Rabins PV, Lyketsos CG, Rosenblatt A (2013) 12-month incidence, prevalence, persistence, and treatment of mental disorders among individuals recently admitted to assisted living facilities in Maryland. Int Psychogeriatr. 2013 May;25(5):721-731

Kozubal DE, Samus QM, Bakare AA, Trecker CC, Wong HW, Guo H, Cheng J, Allen PX, Mayer LS, Jamison KR, Kaplin AI Separate may not be equal: a preliminary investigation of clinical correlates of electronic psychiatric record accessibility in academic medical centers. Int J Med Inform. 2013 Apr;82(4):260-7.

Bicket M, Samus Q, McNabney M, Onyike C, Mayer L, Brandt J, Rabins P, Lyketsos C, Rosenblatt A (2010) The Physical Environment Influences Neuropsychiatric Symptoms and Other Outcomes in Assisted Living Residents Int J Geriatr Psychiatry. Oct;25(10):1044-54.

Ramsey CM, Leoutsakos JM, Mayer LS, Eaton WW, Lee HB (2010) History of manic and hypomanic episodes and risk of incident cardiovascular disease: 11.5 year follow-up from the Baltimore Epidemiologic Catchment Area Study. J Affective Disord. Sep;125(1-3):35-41.

Samus QM, Rosenblatt A, Steele C, Baker A, Harper M, Brandt J, Mayer, LS, Rabins PV, and Lyketsos CG (2009) The Impact of Neuropsychiatric Symptoms and Environmental

Characteristics on Quality of Life in Assisted Living Residents with Dementia. Journal of the American Geriatric Society (in press)

Samus QM, Mayer L, Onyike CU, Brandt J, Baker A, McNabney M, Rabins PV, Lyketsos CG, Rosenblatt A. (2009) Correlates Of Functional Dependence Among Recently Admitted Assisted Living Residents With And Without Dementia. J Am Med Dir Assoc. Jun;10(5):323-9.

Hayden KM, Zandi PP, West NA, Tschanz JT, Norton MC, Corcoran C, Breitner JC, Welsh-Bohmer KA; Cache County Study Group. Effects of family history and apolipoprotein E epsilon4 status on cognitive decline in the absence of Alzheimer dementia: the Cache County Study.Arch Neurol. 2009 Nov;66(11):1378-83.

Welsh-Bohmer KA, Ostbye T, Sanders L, Pieper CF, Hayden KM, Tschanz JT, …, Mayer L, … (2009) Neuropsychological performance in advanced age: influences of demographic factors and Apolipoprotein E: findings from the Cache County Memory Study. Clin Neuropsycho 2009 Jan;23(1):77-99. Epub 2008 Jun 10.

Samus QM, Mayer L, Baker A, McNabney M, Brandt J, Onyike CU, Rabins PV, Lyketsos CG, Rosenblatt A. (2008) Characteristics And Outcomes For Assisted Living Residents With Dementia: Comparing Dementia-Specific Care Units With Non-Dementia-Specific Care Units. Journal of the American Geriatric Society. July;56(7)1361-3

Rao V, Spiro J, Samus QM, Steele C, Baker A, Brandt J, Mayer L, Lyketsos CG, Rosenblatt A. (2008) Insomnia And Daytime Sleepiness In People With Dementia Residing In Assisted Living: Findings From The Maryland Assisted Living Study. Int J Geriatr Psychiatry. Feb(23)199-206

Rosenblatt A, Samus QM, Onyike CU, Baker AS, McNabney M, Mayer LS, Brandt J, Lyketsos CG. (2008) Acetylcholinesterase Inhibitors In Assisted Living: Patterns Of Use And
Association With Retention. Int J Geriatr Psychiatry Feb;23(2):178-84.

Tighe SK, Leoutsakos JM, C Carlson M, Onyike CU, Samus Q, Baker A, Brandt J, Rabins PV, Mayer L, Rosenblatt A, Lyketsos CG. (2008) The Association Between Activity Participation And Time To Discharge In The Assisted Living Setting Int J Geriatr Psychiatry Jun:23(6):586-91

Steinberg M, Shao H, Zandi P, Lyketsos CG, Welsh-Bohmer KA, Norton MC, Breitner JC, Steffens DC, Tschanz JT…Mayer, L.…(2008) Point and 5-year period prevalence of neuropsychiatric symptoms in dementia: the Cache County Study Int J Geriatr Psychiatry Feb;23(2):170-7.

Lyketsos CG, Samus QM, Baker A, McNabney M, Onyike CU, Mayer LS, Brandt J, Rabins P, Rosenblatt A. (2007) Effect Of Dementia And Treatment Of Dementia On Time

To Discharge From Assisted Living Facilities: The Maryland Assisted Living Study. J Am Geriatr Soc;55(7):1031-7

Mayer LS, Bay RC, Politis A, Steinberg M, Steele C, Baker AS, Rabins PV, Lyketsos CG. Comparison Of Three Rating Scales As Outcome Measures For Treatment Trials Of Depression In Alzheimer Disease: Findings From DIADS (2006) Int J Geriatr Psychiatry. Oct;21(10):930-6

Maust DT, Onyike CU, Sheppard JM, Mayer LS, Samus QM, Brandt J, Rabins PV, Lyketsos CG, Rosenblatt A. (2006) Predictors Of Caregiver Unawareness And Nontreatment Of Dementia Among Residents Of Assisted Living Facilities: The Maryland Assisted Living Study. Am J Geriatr Psychiatry. 2006 Aug;14(8):668-75

Khachaturian AS, Zandi PP, Lyketsos CG, Hayden KM, Skoog I, Norton MC, Tschanz JT, Mayer LS, Welsh-Bohmer KA, Breitner JC. (2006) Antihypertensive Medication Use And Incident Alzheimer Disease: The Cache County Study. Arch Neurol. 2006 May;63(5):686-92

Mayer LS, Bay RC, Politis A, Steinberg M, Steele C, Baker AS, Rabins PV, Lyketsos CG. (2006) Comparison Of Three Rating Scales As Outcome Measures For Treatment Trials Of Depression In Alzheimer Disease: Findings From DIADS Int J Geriatr Psychiatry. 21(10):930-6

Watson, Lea C., Lehmann, Susan, Mayer, Lawrence, Samus, Quincy, Baker, Alva, Brandt, Jason, Steele, Cynthia, Rabins, Peter, Rosenblatt, Adam, Lyketsos, Constantine (2006) Depression in Assisted Living Is Common and Related to Physical Burden Am. J. Geriatr. Psychiatry.14: 876-883

Samus, Quincy M., Rosenblatt, Adam, Onyike, Chiadi, Steele, Cynthia, Baker, Alva, Harper, Michael, Brandt, Jason, Mayer, Lawrence, Rabins, Peter V., Lyketsos, Constantine G. (2006) Correlates of Caregiver-Rated Quality of Life in Assisted Living: The Maryland Assisted Living Study
J Gerontol B Psychol Sci Soc Sci 2006 61: P311-314

Maust, Donovan T., Onyike, Chiadi U., Sheppard, Jeannie-Marie E., Mayer, Lawrence S., Samus, Quincy M., Brandt, Jason, Rabins, Peter V., Lyketsos, Constantine G., Rosenblatt, Adam (2006)
Predictors of Caregiver Unawareness and Nontreatment of Dementia Among Residents of Assisted Living Facilities: The Maryland Assisted Living Study Am. J. Geriatr. Psychiatry.14: 668-675

Burdick DJ, Rosenblatt A, Samus QM, Steele C, Baker A, Harper M, Mayer L, Brandt J, Rabins P, Lyketsos CG. (2005) Predictors of functional impairment in residents of

assisted-living facilities: the Maryland Assisted Living study. J Gerontol A Biol Sci Med Sci. Feb;60(2):258-64

Rao V, Spiro JR, Samus QM, Rosenblatt A, Steele C, Baker A, Harper M, Brandt J, Mayer L, Rabins PV, Lyketsos CG. (2005) Sleep disturbances in the elderly residing in assisted living: findings from the Maryland Assisted Living Study Int J Geriatr Psychiatry. 2005 Oct;20(10):956-66

Samus QM, Rosenblatt A, Steele C, Baker A, Harper M, Brandt J, Mayer L, Rabins PV, Lyketsos CG. (2005) The association of neuropsychiatric symptoms and environment with quality of life in assisted living residents with dementia Gerontologist. 45 Spec No 1(1):19-26

Politis, AM, Vozzella S, Mayer LS, Onyike CU, Baker A, and Lyketsos, CG (2004) A randomized, controlled, clinical trial of activity therapy for apathy in patients with dementia residing in long-term care, Intl Jour Geriatric Psychiatry, November, 2004, 19(11), 2069-2079

Khachaturian AS, Corcoran, CD, Mayer LS, Zandi PP, and Breitner JC (2004) Apolipoprotein E Epsilon4 Count Affects Age At Onset Of Alzheimer's Disease, But Not Lifetime Susceptibility: The Cache County Study (2004) Archives of General Psychiatry, May, 61(5), 518-24

Politis AM, Mayer LS, Passa M, Maillis A, and Lyketsos, CG (2004) Validity and Reliability of the Newly Translated Hellenic Neuropsychiatry Inventory (H-NPI) Applied to Greek Outpatients with Alzheimer's Disease: A study of Disturbing Behaviors Among Referrals to a Memory Clinic (2004) Int Jour Geriatric Psychiatry (2004) March, 2004, 19(3), 203-8

Zandi, P. Carlson, C., Plassman, B., Welsh-Bolmer, K., Mayer, L., Steffens, D., and Breitner,
J. (2002) Hormone Replacement Therapy and the Incidence of Alzheimer Disease in Older Women: The Cache County Study, Journal of the American Medical Association, 288 (17), November, 2123-2129

Zandi, P., Anthony, J. Hayden, K. Mehta, D., Mayer, L., and Breitner, J. (2002) Reduced Incidence Of AD With NSAIDS But Not H2 Receptor Antagonists, Neurology, 59:880-886

Miech, R., Breitner, J.C.S., Zandi, P.P., Khachaturian, A.S., Anthony, J. and Mayer, L. (2002) Incidence of AD May Decline in the Early 90's for Men, Later for Women: The Cache County Study, Neurology, 58 (2), 209-218

Merrill, R., Merrill, A., and Mayer, L. (2000) "Factors Associated with No Surgery or Radiation Therapy for Invasive Cervical Cancer in Black and White Women", Ethnicity and Disease, 10(2), 248-256

Rebok, G., Hawkins, W., Kellam, S., and Mayer, L. (1997) The Role of Concentration Problems on the Course of Aggressive and Shy Behavior in an Epidemiologically-Based Preventive Trials, Child Development, 23, 465-486

Rebok, G. W., Hawkins, W. E., Krener, P., Mayer, L.S., and Kellam, S.G. (1996) "The Effect of Concentration Problems on the Malleability of Children's Aggressive and Shy Behavior, Journal of the American Academy of Child and Adolescent Psychiatry, 35, 193-203

Kellam, S., Mayer, L., Rebok, G. and Hawkins, W. (1996) "The Effects of Improving Achievement on Aggressive Behavior and of Improving Aggressive Behavior on Achievement Through Two Preventive Interventions: An Investigation of Causal Paths", in Dohrenwend (ed.) Adversity, Stress and Psychopathology , American Psychiatric Press, American Psychiatric Association, [a refereed journal published as a monograph series]

Kellam, S., Rebok G., Mayer, L., Ialongo, N. and Kalodner, C. (1994) "Depressive Symptoms Over First Grade and Their Response to a Developmental Epidemiologically Based Preventive Trial Aimed at Improving Achievement" , Development and Psychopathology, 6, 463-481

Kellam, S.G., Rebok, G.W., Wilson, R. and Mayer, L.S.(1994) "The Social Field of the Classroom: Context for the Developmental Epidemiological Study of Aggressive Behavior", in Adolescence in Context: The Interplay of Family, School, Peers, and Work in Adjustment, Silbereisen, R. K. and Todt, E. (eds), New York: Springer-Verlag, 390-408

Kellam, S., Rebok G., Ialongo, N., and Mayer, L. (1994) "The Course and Malleability of Aggressive Behavior from Early First Grade Into Middle School: Results of a Developmental Epidemiological Based Preventive Trial", The Journal of Child Psychology and Psychiatry, 35(2), 259-281

Mayer, L. S. (1994) "On Cross-Lagged Panel Studies with Serially Correlated Errors," Frontiers in Econometrics, G. Maddala (ed), Springer-Verlag, 336-345

Dolan, L. J., Kellam, S. G., Brown, C. H., Werthamer-Larson, L., Rebok, G. W., Mayer, L. S., Laudolff, J. and Turkkan, J. S.(1993) "The Short-term Impact of Two Classroom-based Preventive Interventions on Aggressive and Shy Behaviors and Poor Achievement", Journal of Applied Developmental Psychology, 14, 317-345

Kellam, S. G., Werthamer-Larson, L., Dolan, L. J., Brown, C. H., Mayer, L. S., Rebok, G. R., Anthony, J. C., Laudolff, J. and Edelsohn, G.(1991) "Developmental Epidemiologically Based Preventive Trials: Baseline Modelling of Early Target Behaviors and Depressive Symptoms", American Journal of Community Psychology, 19, 563-584

Rebok, G.R., Kellam, S. G., Dolan, L. J., Werthamer-Larsson, L., Edwards, E. J., and

Mayer, L. S., and Brown, G.H. (1991) "Preventing Early Risk Behavior: Process Issues and Problem Areas in Prevention Research", The Community Psychologist, 24, 18-21

Mayer, L.S. and Carroll, S.S. (1991) "Modeling the Contemporaneous Relationship in a Continuous Variable Panel Model", Communications in Statistics, 17, 463-477

Mayer, L.S. and Carroll, S.S. (1988) "Measures of Dependence for Cross-Lagged Panel Models," Sociological Methods and Research, 17(1) August, 248-260

Mayer, L.S. and Carroll, S.S. (1987) "Testing for Homogeneity in Cross-Lagged Panel Studies, Communications in Statistics, 16(9), 2487-2510

Mayer, L.S. and Carroll, S.S. (1987) "Testing for Lagged, Cotemporal, and Total Dependence in Cross-Lagged Panel Analysis, Sociological Methods and Research, 16(2), 187-217

Mayer, L.S. (1986) "Statistical Inferences for Cross-Lagged Panel Models Without the Assumption of Normal Errors," Social Science Research, 15, 28-42

Mayer, L.S. and Carroll, S.S. (1986) "Detecting Serial Correlation in the Error Structure of a Cross-Lagged Panel Model," Communications in Statistics, 15, 347-366

Carroll, S.S. and Mayer, L.S. (1986) "Analysis of the Cross-Effects in a Cross-Lagged Panel Study," Communication in Statistics, 15, 3361-3395

Mayer, L.S. (1986) "On Cross-Lagged Panel Studies with Serially Correlated Errors," Journal of Business and Economic Statistics, 4, 347-357

Mayer, L.S. (1981). "A Comment on 'Estimating Volumes of Remaining Fossil Fuel Resources'," Journal of the American Statistical Association, 76, 551-554

Mayer, L.S. and Horowitz, C.E. (1979). "The Effect of Price on the Residential Demand for Electricity: A Statistical Study," Energy, 4, 87-99

Mayer, L.S. (1978). "Estimating the Effects of the Onset of the Energy Crisis on Residential Energy Demand," Resource and Energy, 1, 57-92

Mayer, L.S. and Benjamin, Y. (1978). "Modeling Residential Demand for Natural Gas as a Function of the Coldness of the Month," Energy and Buildings, 1, 301-312

Mayer, L.S., Hoyer, R.W., and Bernd, J.L. (1977). "Some Problems in the Validation of Mathematical and Stochastic Models of Political Phenomena: The Case of the Supreme Court," American Journal of Political Science, 21, 381-403

Mayer, L.S. and Younger, M.S. (1976). "Estimation of Standardized Regression Coefficients," Journal of the American Statistical Association, 71, 154-157

Mayer, L.S. and Robinson, J.A. (1977). "Measures of Association for Multiple Regression Models with Ordinal Predictor Variables," Sociological Methodology, 1978, Jossey-Bass, 141-162

Jensen, D.R. and Mayer, L.S. (1977). "Some Variational Results and Their Applications to Problems in Multiple Inference," Annals of Statistics, 5, 922-931

Horowitz, C.E. and Mayer, L.S. (1977). "The Relationship Between the Price and Demand for Natural Gas: A Partially Controlled Study," Energy Research, 1, 193-222

Hoyer, R.W. and Mayer, L.S. (1976). "On Electoral Equilibria in a Spatial Analysis Based on the Theory of Games," Journal of Politics, 38, 116-171

Hoyer, R.W. and Mayer, L.S. (1975). "On Social Preference Orderings Under Majority Rule," Econometrica, 43, 803-806

Mayer, L.S., and Good, I.J. (1975). "Is Minimax Regret Applicable to Voting Decisions? American Political Science Review, 69, 916-917

Good, I.J. and Mayer, L.S. (1975). "Estimating the Efficacy of a Vote," Behavioral Science, 20, January, 25-33

Mayer, L.S. and Younger, M.S. (1975). "Multiple Indicators and the Relationship Between Abstract Variables," Sociological Methodology, 1975, 191-211

Jensen, D.R. and Mayer, L.S. (1975). "Normal-Theory Approximations to Tests for Linear Hypotheses," Annals of Statistics, 3, 429-444

Jensen, D.R., Mayer, L.S. and Myers, R.H. (1975). "Optimal Designs and Large-Sample Tests for Linear Hypotheses," Biometrika, 62, 71-78

Hoyer, R.W. and Mayer, L.S. (1974). "Comparing Strategies in a Spatial Model of Electoral Competition," American Journal of Political Science, 18, 501-523

Bush, W. and Mayer, L.S. (1974). "Some Implications of Anarchy for the Distribution of Property," Journal of Economic Theory, 4, 401-411

Mayer, L.S., Singh, J. and Willke, T.A. (1974). "Utilizing Initial Estimates in Estimating the Coefficients in a Linear Model," Journal of the American Statistical Association, 69, 219-222

Mayer, L.S. and Younger, M.S. (1974). "Procedures for Estimating Standardized Regression Coefficients from Sample Data," Sociological Methods and Research, 1, 431-453

Mayer, L.S. and Good, I.J. (1974). "On Ordinal Prediction Problems," Social Forces, 52 (4), 543-549

Mayer, L.S. (1974). "On the Use of Non-Random Exogenous Variables in Path Analysis," American Sociological Review, 39, 891-893

Klemmack, D.L., Leggette, T.A. and Mayer, L.S. (1973). "Non-Random Exogenous Variables in Path Analysis," American Sociological Review, 38 (December), 778-784

Mayer, L.S. and Hendrickson, A. (1973). "A Method for Constructing an Optimal Regression Design After an Initial Set of Input Values Has Been Selected," Communications in Statistics, 2(5), 465-477

Mayer, L.S. and Willke, T.A. (1973). "On Biased Estimation in Linear Models," Technometrics, 15, 497-508

Mayer, L.S. (1973). "Estimating a Correlation Coefficient When One Variable is Not Directly Observed," Journal of the American Statistical Association, 68, 420-421

Burgess, P.M. and Mayer, L.S. (1973). "Simulation and Society, A Review Essay," Journal of Regional Science, 12, 303-311

Good, I.J. and Mayer, L.S. (1973). "On Surfaces of Constant Societal Loss in a Model of Social Choice," Journal of Mathematical Sociology, 2, 209-219

Mayer, L.S. (1972). "Using Monotone Regression to Estimate a Correlation Coefficient," Sociological Methodology, (Herbert Costner, ed.), Jossey-Bass: San Francisco, 200-212

Mayer, L.S. (1972). "An Analysis of Measures of Crosscutting and Fragmentation," Comparative Politics, 4, 405-415

Mayer, L.S. (1971). "Comment on 'The Assignment of Numbers to Rank Order Categories'," American Sociological Review, 35, 916-917

Mayer, L.S. (1971). "A Note on Treating Ordinal Data as Interval Data," American Sociological Review, 36, 519-520

Mayer, L.S. (1971). "A Note on An Axiomatic Model of Voting Bodies," American Political Science Review, 65, 764-65

Mayer. L.S. (1971). "A Method of Cluster Analysis When There Exists Multiple Indicators of a Theoretic Concept," Biometrics, 27, 143-155

Mayer, L.S. (1971). "A Comment on 'A Theorem on Voting'," American Political Science Review, 65, 779-780

Research Monographs:

Energy Consumption Measurement: Data Needs for Public Policy, (1977) Committee on Measurement of Energy Consumption, Washington: National Academy of Science

Mayer, L.S. (1976). An Analysis of Alternative Voter Registration Systems, Modules in Applied Mathematics, Washington: Mathematical Association of America

Chapters in Research Monographs:

Mayer, L. S. (1994) "On Cross-Lagged Panel Studies with Serially Correlated Errors," Frontiers in Econometrics, G. Maddala (ed), 154-165

Mayer, L.S. (1980). "The Effects of Price on Energy Demand: Econometrics Versus Exploratory Data Analysis," in Evaluation of Econometric Models (J. Kmenta and J. Ramsey, eds.), Academic Press, 15-45

Mayer, L.S. and Benjamin, Y. (1980). "Modelling Residential Demand for Natural Gas as a Function of the Coldness of the Month," in Saving Energy in the Home, (R. Socolow, ed.) New York: Ballinger

Bush, W. and Mayer, L.S. (1976). "On the Economics of Human Fertility," in Essays on Unorthodox Economic Strategies: Anarchy, Politics and Population, (A.T. Denzau and R.J. Mackay, eds.), University Publications, 163-181

Mayer, L.S. (1974). "Optimal Voting Behavior in a Two-Party Primary", in Applications of Mathematics in Political Science, Vol. VIII, (J. Herndon and J. Bernd, eds.), Charlottesville: University of Virginia Press, 4-14

Published Book Reviews

On the Verge: The Legal Fight of Travellers in England for their Rights (many authors), Romani Studies, 2001, 144-146

Firms and Markets (C. Tucker and R. Fuller, eds.), Perspective, Winter, 1988, 41

Social Science and Social Policy (R. Shotland and M. Mark, eds.), Perspective, April, 1986, 60

Principles of Epidemiology (Kleinbaum, Kupper and Morgenstern) Journal of the American Statistical Association, July/August 1984, 108

U.S. Interests and Global Natural Resources (Castle and Price, eds.), Perspective, September, 1984, 725-726

Proximity and Preference: Problems in the Multidimensional Analysis of Large Data

Sets (R. Golledge and J. Raynor, eds.), Journal of the American Statistical Association, September, 1983, 78, 734

Statistical Applications in the Spatial Sciences (N. Wrigley, ed.), Journal of the American Statistical Association, June, 1983, 78, 509-510

Power, Voting, and Voting Power (Manfred J. Holler, ed.), Perspective, February, 1983

Exploratory Data Analysis (J. Tukey), Evaluation and Program Planning , 1981, 4, 195-196

On the Social Use of Information (A. Wissel), Perspective, June, 1977, Vol. 6, No. 5

Simulation Model Building: A Statistical Approach to Modeling in the Social Sciences With The Simulation Method (U. Norlen), Perspective, March 1977, Vol. 6, No. 2

Research Methods in the Social Sciences (D. Nachimas and C. Nachimas), Perspective, November 1976, Vol. 5, No. 9

Registering Voters by Mail: The Maryland and New Jersey Experience (R. Smolka), Perspective, October 1975, Vol. 4, No. 8

Other Professional Activities:

Guest Lecture, Statistics and Epidemiology in Court, University of Maryland Law School, March, 2012

Editorial Board Member, Journal of Cardiology Research, 2003-

Member, Development Board, Copper Ridge Institute, Sykesville, MD, 1998-2000

Member, Expert Panel, Sexually Transmitted Disease and Teens, W. T. Grant Foundation, 2000-2001

Advisor, Sexually Transmitted Diseases & the Internet, American Social Health Association, 2000-2001

Invited Member, Panel on Mental Health Problems of Asylum Seekers, University of Greenwich, July 2000

Invited participant, Expert Panel on Mortality Associated with Alternative Fuels, Department of Energy, Carmel, May, 2000

Chief, Epidemiology and Biostatistics Branch, Phoenix Integrated Residency in Cardiology, 1999-

Clinical Professor, Prevention Center, College of Medicine, University of Arizona, 1999-

Member, Faculty of the Psychiatry Residency Program, Good Samaritan, 1998 –

Member of the Board of Directors, Palms Clinic, Phoenix, 1998-

Invited Participant, US Environmental Protection Agency Expert Panel on Cryptosporidium, October, 1998

Member, Evaluation Panel, Graduate Programs, University of Greenwich, London, August, 1998

Expert Witness, Appropriations Hearing on NIH Budget, US Senate, October, 1997-

Member, Expert Review Committee on Grant Applications and Awards, Health Care and Promotion Fund, Hong Kong, 1996-1998

Member, Clinical Committee, Health Services Advisory Group, Arizona, [the arm of the Medicare system that advises Medicare on reimbursements], 1994-1996

Alternate Member, Institutional Review Board, Samaritan Health Systems 1994-2001

Invited Attendee, Workshop on Psychosocial Research, American Psychiatric Association, Massachusetts General Hospital, Boston, October, 1996

Invited Attendee, Risk Estimation Conference, Environmental Protection Agency, Durham, North Carolina, September, 1996

Invited Attendee, Society for Prevention Research, Annual Conference, Puerto Rico, May, 1996

Proposal Evaluation Site Visit, Raptor Research Center, Boise State University, March 1996

Workshop Attendee, The Epidemiology of Avian Mortality, California Energy Commission, Sacramento, California, January, 1996

Invited Attendee, Prevention Science and Methodology Conference, Baltimore, MD, October, 1995

Invited Attendee, Avian Windpower Planning Meeting, Palm Springs, September, 1995

Invited Attendee, US Department of Energy Course on Risk Assessment, Boulder, July 1995

Invited Attendee, Mini-conference on Measuring Health Outcomes, Phoenix, March

1995

Invited Attendee, Private Conference on Wind Energy Research, California Energy Commission, Grand Island, California, December, 1994

Invited Participant, Workshop on Prevention Methodology, University of South Florida, Baltimore, December, 1994

Invited Participant, National Conference on Prevention Research, Washington, DC, December, 1994

Invited Consultant, California Energy Commission, Flagstaff, Arizona, November, 1994

Invited Participant, Workshop on the Science of Prevention, NIMH, Baltimore, December, 1994

Invited Participant, Meeting on Renewable Energy, California Energy Commission, Flagstaff, Arizona, November, 1994

Invited Participant, Workshop on Prevention Methodology, Oregon Social Learning Center, Eugene Oregon, August, 1994

Invited Technical Advisor, National Planning Meeting on Wind Power and Avian Mortality, Lakewood, CO, July, 1994

Invited Participant, Workshop on Biostatistical Methods in Preventive Mental Health Research, College of Public Health, University of South Florida, Tampa, March, 1994

Invited Participant, Biomedical Effects of Renewable Energy, Invited Conference, US Department of Energy, Washington, DC February, 1994

Member, Special Study Section, National Institute of Health, 1993-

Invited Participant, Avian Mortality Taskforce Meeting, October, Pleasonton, CA, December, 1993

Invited Participant, Conference on Avian Mortality and Wind Energy, Pacific Gas and Electric, Livermore, CA, October, 1993

Invited Participant, Prevention Center Directors Meeting, National Institute of Mental Health, Tysons Corner, September, 1993

Invited Participant, National Conference on Prevention Research, McLean, Virginia, April, 1993.

Invited Participant, Prevention Center Directors Meeting, National Institute of Mental

Health, Rockville, September, 1992

Invited Participant, Prevention Center Directors Meeting, National Institute of Mental Health, Rockville, September, 1991

Invited Participant, Conference on the Future of Prevention Research, National Institute of Mental Health, Washington, DC, July, 1991

Invited Participant, Workshop on Development of Delinquency, National Academy of Science, Woods Hole Study Center, July, 1991

Invited Participant, Workshop on Preventive Research, National Institute of Mental Health, October, 1990

Invited Lecturer, Exploratory Data Analysis, The Bootstrap and Panel Models in Occupational Medicine, lecture series, College of Business Administration, University of Canterbury, Christchurch, New Zealand, September - October, 1989

Invited Host, Mini-conference on The Epidemiology of Bladder Cancer, August, 1988, Lenox, Massachusetts

Expert Witness, Department of Public Health, Commonwealth of Massachusetts, July, 1988

Expert Witness, Department of Labor and Industry, Commonwealth of Massachusetts, July, 1988

Invited Participant, Workshop in Multidimensional Analysis, Information Theory and Asymptotic Methods, Stanford University, July 1983

Assisted in Preparation and Coordination, Conference on Science and Technology in the Soviet Union, Stanford University, July, 1983

Session Organizer, International Conference on Energy Use Management, Berlin, October, 1981

Member, Committee on Industrial Use of Solar Energy, Solar Energy Research Institute, Golden, Colorado, 1979-1981

Press Conference on Wharton's Support to Litigation Project Award, April, 1981, Philadelphia

Invited Participant, Workshop on Model Validation, Department of Economics, New York University, April, 1980.

Expert Witness, Hearings on Energy Tax Exemptions, Energy Committee, Pennsylvania State Assembly, April, 1980

Lecturer, Workshop in Environmental Policy, Florida Atlantic University, March, 1980

Interviewed on Feasibility of Philadelphia's Refinery Tax Proposal, WUSL Radio, Philadelphia, November, 1980

Member, Committee on Health Manpower Training, Department of Health, New Jersey, 1976-79.

Interviewed on Model Validation, WPEN Radio, Philadelphia, November, 1979.

Interviewed on Value of Energy Forecasts, Philadelphia Inquirer, October, 1979.

Invited Panelist, Panel on Energy Models in Energy Policy-making, Program in Science Technology and Public Policy, George Washington University, Washington, D.C., October, 1979

Organizer, Workshop on Resource Estimation, Department of Energy Statistical Symposium, Gatlinburg, Tennessee, October, 1979

Session Chairperson, Special Topics Meetings on Regression, Institute of Mathematical Statistics, October, 1979

Invited Participant, Workshop on the Measurement and Interpretation of Model Confidence, National Bureau of Standards, U.S. Department of Commerce, Washington, D.C., October, 1979

Invited Participant, Workshop on Measuring Model Confidence, National Bureau of Standards, Gaithersburg, MD, October 1979

Expert Witness, Hearings on State Health Benefits, Ohio State Assembly, February, 1979

Member, Committee on Model Evaluation, General Accounting Office, United States Congress, 1977-1978.

Participant, Workshop on Assessment of Energy Models, Massachusetts Institute of Technology, October, 1978.

Organizer, Session on Multivariate Statistics, Annual Meeting, Institute of Mathematical Statistics, August, 1978

Lecturer, Program on Environmental Management, Florida Atlantic University, April, 1978

Expert Witness, Hearings on Local Energy Policies, Subcommittee on Energy and Power, Committee on Interstate and Foreign Commerce, U.S. House of Representatives, May, 1978

Invited Panelist, Policy Workshop on Energy Policy, Swarthmore College, March, 1978

Chairperson, Committee on Membership, Institute of Mathematical Statistics, 1974-78

Invited Participant, Workshop on Energy Information, Stanford University, December 1977

Invited Participant, Conference on Criteria for Evaluation of Econometric Models, University of Michigan, June 1977

Expert Witness, Hearings on Health Impacts of Energy Conservation, Commerce Committee, US House Representatives, April, 1977

Conference Chair, Conference on the Analysis of Large Data Sets, Institute of Mathematical Statistics and American Statistical Association, Dallas, February 1977

Panelist, Seminars on Models and Energy Policy, Program in Public Policy, George Washington University, February, 1977

Invited Participant, Workshop on Stochastic Models of Social Structure Carnegie-Mellon University, MSSB Workshop, Pittsburgh, December, 1977

Interviewed on Energy Policy, West Virginia Public Television Network, October, 1976

Member, Committee on Measurement of Energy Consumption, National Academy of Sciences, 1975-76

Interviewed on Energy Policy, West Virginia Public Television Network, October, 1976

Participant, Workshop on Model Building, Mathematical Association of America, Cornell University, August, 1976

Organizer and Chair, Session on Voting Models, Annual Meeting of the Public Choice Society, Roanoke, VA, April, 1976

Instructor, Short Course on Advances in Data Analysis, Princeton University, April, 1976

Member, Organizing Committee, Annual Convention, Institute of Mathematical Statistics, 1975-76

Member, Site Review Committee, University of Texas, San Antonio, National Science Foundation, 1975

Participant, Workshop on Validation of Econometric Models, National Science Foundation, Vail, Colorado, June, 1975

Participant, Workshop on Decentralization Theory, National Science Foundation, Princeton University, March, 1975

Member of the Council, Polymetrics Section, International Studies Association, 1973-75

Member, Committee on Education of Gifted Children, Department of Education, Virginia, 1973-74

Member, Committee on Health Training, State Council of Higher Education, Virginia, 1973-74

Instructor, Workshop on Survey Research, University of Cologne, Cologne, West Germany, 1973

Lecturer, Institute on Model Building, National Science Foundation, Blacksburg, Virginia, August, 1973

Clinical Assistant [Clinical Rotations], Associated Medical Schools, British Virgin Islands, 1969-1970

Summer Fellow, College of Medicine, University of Michigan, Summer, 1970

Major Consulting Appointments (Other than Public and Non-profit):

Play an active advisory role to several CEO's, corporate medical directors, courts, boards, and non-profits on specific health issues, which are confidential, private, proprietary or privileged. I would be glad to discuss these activities in an executive session. They are not appropriate for open documentation.

Major Consulting Appointments (Public and Non-profit):

Consultant in Research Compliance, Maricopa Integrated Medical System, 2002-2003

Consultant, California Energy Commission, 1994-2002

Consultant, National Renewable Energy Laboratory, 1992-1996

Consultant, Department of Mental Hygiene, Johns Hopkins Medical Institutions, June-August, 1990 -1993

Consultant, Program on Delinquency, Child and Maternal Health, Harvard School of Public Health, 1991.

Consultant, Committee on the Courts, Arizona Supreme Court, 1988-1989.

Consultant, Bonneville Power Authority, 1986-1988.

Consultant, Special Counsel, Department of Energy, 1979-82.

Consultant, National Governors Association, 1979-81

Consultant, Environmental Monitoring Project, Environmental Protection Agency, 1979

Consultant, Energy Office, State of New York, 1976-78

Consultant, Department of Health, City of New York, 1976-78

Consultant, Center for the Study of Emergency Health Services, University of Pennsylvania, 1977

Consultant, Chancellor, The University of Missouri, 1976

Consultant, National Commission on Water Quality, 1974-76

Consultant, Trout Unlimited, 1976

Consultant, Policy Analysis Division, Department of Housing and Urban Development, 1974

Consultant, Department of Political Science, Ohio State University, 1974

Consultant, Committee on State Employee Benefits, Assembly of the State of Ohio, 1973

Consultant, Department of Preventive Medicine, Ohio State University, 1972-73

Editorial Service:

Abstract Review Board, Annual Meeting, Society for General Internal Medicine, 1995

Member, Editorial Board, Sociological Methodology, Publication of the American Sociological Association, 1979-1983

Associate Editor, Series on Social Methodology, Sage Publications, 1974-81

Member, Editorial Board, Journal of Politics, 1974-81

Associate Editor, Journal of the American Statistical Association, 1977-79

Abstracter, Executive Sciences Incorporated, 1974-79

Abstracter, Mathematical Reviews, 1974-76

Proposal reviewer for a variety of public agencies. In 1991-93 reviewed proposals for NIH, NIMH, NSF, DOE, EPA and others

Manuscript reviewer for several publishers including John Wiley and Sons and Wadsworth

Honors and Awards:

Listed in the International Who's Who in Medicine, 1997-

Listed in Who's Who in Medicine, 1994-

Honorary Member, Phi Beta Phi, Honorary Society, inducted 1991

Distinguished Research Professor, Arizona State University, 1987-88

Fellow, Royal Statistical Society, elected November, 1984.

Listed in Who's Who in the West, 1983-

Listed in Who's Who in Medical Research, 1982-

Listed in Personalities in America, 1981-

Listed in Distinguished Educators, 1982-

Member, Phi Beta Kappa, inducted 1967

Member, Alpha Iota Delta (Decision Science Honorary Society), elected 1986

Distinguished Alumni Award, Ohio State University, 1971

Awardee, Graduate Scholarship, National Science Foundation, 1967

Recipient, President's Scholarship Award, Ohio State University, 1968

Recipient, President's Scholarship Award, Ohio State University, 1967

Research Grants and Contracts:

Co-Principal Investigator, Alzheimer's Disease and Anti-Inflammatory Prevention: Is Elevated Serum Cholesterol Predictive of Developing AD?, D. Larry Sparks, PI, Institute for the Study of Aging, funded, March 2001, 360,000

Biostatistical Problems in Research Methodology, Samaritan Health Services, Principal Investigator: L.S. Mayer, 1996-2003, approximate award 450,000

Statistical Problems in Developing Intermediate Outcome Models of the Role of Apolipoprotein E in Alzheimer's Disease, Office of Research, Arizona State University, 1994-95, approximate award 20,000.

Biostatistical Problems in Research Methodology, Samaritan Health Services, Principal Investigator: L.S. Mayer, 1995-96, approximate award 26,000

Co-Principal Investigator, Prevention Research Training Grant, awarded by the Prevention Branch, National Institute of Mental Health, to the Prevention Center, Department of Mental Hygiene, Johns Hopkins School of Hygiene and Public Health. Principal Investigator: S. G. Kellam, 1994-1999, approximate award 500,000

Co-Principal Investigator, Epidemiological Prevention Center for Early Risk Behavior, awarded by the Prevention Branch, National Institute of Mental Health, to the Prevention Center, Department of Mental Hygiene, Johns Hopkins School of Hygiene and Public Health. Principal Investigator: S. G. Kellam, 1990-1995, approximate award, 5,000,000

Biostatistical Problems in Research Methodology, Samaritan Health Services, Principal Investigator: L.S. Mayer, 1994-95, approximate award 26,000

Biostatistical Problems in Research Methodology, Samaritan Health Services, Principal Investigator: L.S. Mayer, 1993-94, approximate award 25,000

Wharton Support to Litigation Project, awarded by the Office of the Special Counsel, Department of Energy to the Wharton Analysis Center, Wharton School, University of Pennsylvania. Principal Investigator: L.S. Mayer, 1981-83, approximate award: 2,200,000

Wharton Energy Allocation Project, awarded by the Department of Energy to the Wharton Analysis Center, Wharton School, University of Pennsylvania, Principal Investigator: L.S. Mayer, 1981-83, approximate award: 100,000

Wharton Energy Data Analysis Project, awarded by Oak Ridge National Laboratory to the Wharton Analysis Center, Wharton School, University of Pennsylvania, Principal Investigator: L.S. Mayer, 1980-81, approximate award: 450,000

Wharton Petroleum Data Analysis Project, awarded by CEXEC, Inc. to the Wharton Analysis Center, Wharton School, University of Pennsylvania, Principal Investigator:

L.S. Mayer, 1980-81, approximate award: 100,000

Wharton Model Evaluation Project, awarded by the Energy Information Administration, Department of Energy to the Wharton Analysis Center, Wharton School, University of Pennsylvania, Principal Investigator: L.S. Mayer, 1979-81, approximate award: 900,000

Wharton Energy Assessment Project, awarded by Oak Ridge National Laboratory to the Wharton Analysis Center, Wharton School, University of Pennsylvania, Principal Investigator: L.S. Mayer, 1980-81, approximate award: 100,000

Princeton Resource Estimation and Validation Project, awarded by the Energy Information Administration, Department of Energy, to the Departments of Statistics and Geology, Princeton University, Principal Investigators: K. Deffeyes, G. Watson, and L. Mayer, 1978-79, approximate award: 450,000

Analysis of Residential Energy Demand, awarded by the Office of Conservation, Department of Energy to the Center for Energy and Environmental Studies, Princeton University, Principal Investigators: R. Socolow, D. Harrje, L. Mayer and F. Sinden, 1977-78, approximate award: 300,000

Analysis of Statistical Issues Arising from Energy Studies, awarded by the National Science Foundation to the Center for Energy and Environmental Studies, Princeton University, Principal Investigator: L.S. Mayer, 1977-78, approximate award: 50,000

Analysis of Residential Energy Demand, awarded by the Energy Research and Development Administration to the Center for Energy and Environmental Studies, Princeton University, Principal Investigators: R. Socolow, D. Harrje and L. Mayer, 1976-77, approximate award: 300,000

Assessing the Value of Econometric Energy Models, awarded by the Department of Commerce to the Center for Energy and Environmental Studies, Princeton University, Principal Investigator: L.S. Mayer, 1976-77, approximate award: 25,000

Energy Husbandry in Residential Housing, awarded by the National Science Foundation to the Center for Environmental Studies, Princeton University, Principal Investigators: R. Socolow, D. Harrje and L. Mayer, 1975-76, approximate award: 300,000

On Comparing Factor Matrices, awarded by the National Institute of Mental Health to the Department of Statistics, Princeton University, Principal Investigator: L.S. Mayer, 1974 - 1975, approximate award: 15,000

Measuring the Relationship Between Abstract Variables, awarded by the National Institute of Mental Health to the Department of Statistics, Virginia Polytechnic Institute and State University, Principal Investigator: L.S. Mayer, 1972-74,

approximate award: 15,000

Component Analysis of Variance, awarded by the National Institute of Mental Health to the Behavioral Sciences Laboratory, Ohio State University and the Department of Statistics, Virginia Polytechnic Institute and State University, Principal Investigator: L.S. Mayer, 1971-72, approximate award: 15,000

Papers Presented at Professional Meetings:

Depression in Assisted Living is Common and Related To Physical Burden, Gerontology Society Annual Meeting, Washington DC, November 2004

"Methodological Issues In Modeling The Incidence Of Alzheimer's Disease As A Function Of Age", World Congress of Epidemiology, Toronto, June, 2001

"Biostatistical Problems in Forecasting the Prevalence of Alzheimer's Disease" World Psychiatric Congress, Baltimore, March, 2001

"Using Latent Growth Models and Exploratory Methods to Assess the Relationship Between Responses in a Bivariate Prevention Model (with M. Reiser) Society for Prevention Research, Annual Meeting, Washington DC, May 1997

"Standard Metrics and Methods for Conducting Avian Wind Energy Interaction Studies (with R. Anderson) American Wind Energy Association Conference, Austin Texas, June, 1997

"A Randomized Clinical Trial of a Group Empowerment Program for Somatizing Patients: Six Months Follow-up Results", (with J. C. Peirce, A. Miller and J. Westley), invited lecture, Society for General Internal Medicine, Washington, DC, May 1997

"Measuring Effectiveness: Lessons from Heparinizing Patients with Deep Vein Thrombosis and Pulmonary Embolism" (with J. C. Peirce and R. A. Raschke), invited lecture, Society for General Internal Medicine, Washington, DC, May 1997

"Latent Growth Models of the Impact of Intervention on a Bivariate Longitudinal Response", invited lecture, Society for Research on Child Development, Washington, DC, March, 1997

"Developmental Epidemiology and its Implications for Prevention Research" invited lecture (with Sheppard Kellam), Life History Society Annual Meeting, London, December, 1996

"Standard Methods for Conducting Avian Mortality Studies", with R. L. Anderson, European Wind Energy Conference, Rome, October, 1996

"Using Multilevel Models to Tease Out Variability in Individual Behavior", invited lecture,

Association for Clinical Psychosocial Research, American Psychiatric Association, Boston, October, 1996

“Statistical Issues Arising from Application of the Proximal-Distal Model in Prevention Research, Society for Prevention Research, San Juan, Puerto Rico, June, 1996.

“Recent Advances in Prevention Methodology: Multilevel Models”, invited lecture, Prevention Methodology Conference, Tempe, Arizona, May 1996

"Advances in the Methods of Prevention Research", invited lecture, National Forum on Prevention, McLean, VA, May, 1996

"Multilevel Models in Prevention Science", invited presentation, Prevention Science Methodology Group meeting, College of Public Health, University of South Florida, Tampa, March, 1996

"Prevented Fractions and Attributable Risk in Proximal Distal Prevention Models", invited lecture, College of Public Health, University of South Florida, Tampa, February, 1996

"Prevented Fractions and Attributable Risks in Preventive Trials", invited paper, Prevention Science and Methodology Conference, Baltimore, MD, October, 1995

"The Use of Epidemiological Measures to Estimate the Effects of Adverse Factors and Preventive Interventions", Workshop on Avian Mortality, Palm Springs, September, 1995

"The Use of Epidemiological Measures to Estimate the Effects of Adverse Factors and Preventive Interventions", invited presentation, Workshop on Avian Mortality and Avian Windpower Planning Meeting, Department of Energy, Palm Springs, September, 1995

"Methodological Advances in Prevention Research", with S. Kellam and J. Anthony, invited symposium, Prevention Research Society, Scottsdale Arizona, June 1995

"Multilevel Modeling and the Development of Aggressive Behavior", invited paper, World Psychiatric Association, New York, May, 1995

"Attributable Risk and Preventive Fractions in Prevention Research", invited lecture, Workshop on the Science of Prevention, NIMH, Baltimore, December, 1994

"Reduction of Aggressive Behavior Among First Graders and Its Consequences for Later Antisocial Behavior and Drug Use", with S. Kellam, H. Chilcoat, J. Anthony, G. Rebok, and N. Ialongo, invited lecture, Society for Prevention Research, Washington, June, 1994

"The Impact of Failure on Boys and Girls: Preventive Intervention Studies on Achievement and Depression" with S. Kellam, G. Rebok, and N. Ialongo, Society for Life History, Durham, November, 1993

"The Course and Malleability of Aggressive Behavior", with S. Kellam, G. Rebok, and N. Ialongo, invited lecture, American Society of Criminology, Annual Meeting, Phoenix, October, 1993

"Mediated Effects in Structural Equation Models", invited paper, American Statistical Association Annual Meeting, August, 1992

"The Course and Malleability of Aggressive Behavior in Young Children", invited presentation, with S. Kellam, et. al., National Academy of Science Institute of Medicine, Committee on Prevention of Mental Disorders, June, 1992

"Developmental Epidemiology and the course of Aggressive Behavior", Life Course Development Society, Philadelphia, April, 1992

"Modeling the Cotemporal Effects in a Cross-Lagged Panel Model", ASA Annual Meeting, New Orleans, August, 1988

"Estimating Multivariate Continuous Variable Panel Models", ASA Annual Meeting, San Francisco, August, 1987

"Inferences in Cross-Lagged Panel Models," invited paper, AIDS Convention, Phoenix, March, 1986

"Recent Advances in Cross-Lagged Panel Analysis," invited lecture, Southwest Social Science Convention, San Antonio, March, 1986

Hypothesis Testing with Continuous Variable Panel Data," Annual Meeting, Biometrics Society (WNAR), San Luis Obispo, June, 1985

"Multivariate Cross-Lagged Panel Models: Does IQ Cause Achievement?" invited lecture, Regional Meeting, Institute of Mathematical Statistics, Humboldt State University, Arcata, CA, June, 1983

"Analysis of the U.S. Short-Term Integrated (Energy) Forecasting System," invited lecture, International Energy Conference, Berlin, October 1981

"Assessing Energy Models: A Policy Process Approach," invited lecture, Workshop on Energy Model Validation, National Bureau of Standards, January 1979

"Energy Use and Potential for Conservation," (with David Harrje et al.), invited lecture, International Conference on Energy Use Management, Tucson, October 1977

"Large Data Sets and the Meta-Theorems of Exploratory Data Analysis," invited lecture, American Statistical Association, Special Topic Meeting, Dallas, 1977

"The Internalization of Cosmopolitan-Local Orientations Among College Students," (with W. Snizek), invited lecture, Southern Sociological Association, Washington, D.C., April 1975

"Equivalent Estimation and a Special Group Structure," (with T. Woteki), invited lecture, Regional Meeting, Institute of Mathematical Statistics, Minneapolis, March 1975

"The Use and Abuses of Probability in Voting Theory Models," invited lecture, Annual Meeting, Public Choice Society, New Haven, April 1974

"Some Problems with the Theory of Coalitions as Applied to the Judiciary," invited paper, Annual Meeting, American Political Science Association Convention, Chicago, August 1974

"On Principal Components and Clusters," invited lecture, Annual Meeting, International Classification Society, Atlanta, Georgia, April, 1973

"On Biased Estimation in Linear Models," invited lecture, Annual Meeting, American Statistical Association, New York, December, 1973

"Invariant Estimation with Applications to Linear Models," (with M.S. Younger), Institute of Mathematical Statistics, Blacksburg, Virginia, Academy of Science, May, 1972

"On Biased Estimation in Linear Models," invited lecture, Virginia Academy of Science, Lexington, Virginia, May, 1972

"Methods of Cluster Analysis Which Utilize Principle Components," invited lecture, International Classification Society Convention, Chicago, Illinois, April 1972

"A Method of Cluster Analysis," invited lecture, Annual Meeting, Biometrics Society, Fort Collins, Colorado, August, 1971

"Measures of Association," invited lecture, International Studies Association, San Juan, Puerto Rico, March, 1971

"Utilizing Initial Estimates in Estimating the Coefficients in a General Linear Model," Annual Meeting, Institute of Mathematical Statistics, Laramie, Wyoming, August 1970

Speeches, Presentations, Lectures and Colloquia:

“Validating Biomarkers in Psychiatry”, Department of Psychiatry, University of Athens,

Athens, Greece, October, 2006

"Fitting Failure Models to the Incidence of Alzheimer's Disease: Methodological Problems", invited lecture, Johns Hopkins School of Public Health, Noon conference series on Mental Heath, January, 2001

"Psychiatric Epidemiology", Residency Program in Psychiatry, Samaritan Health System, September, 2000

"Critical Appraisal in Internal Medicine", invited speaker, Good Samaritan Internal Medicine Program. April, 2000

"Psychiatric Epidemiology", Residency Program in Psychiatry, Samaritan Health System, September, 1999

"Tradeoffs Between Latent Growth Models and Epidemiological Models of Preventive Interventions, invited colloquium, Department of Mental Hygiene, Johns Hopkins School of Hygiene and Public Health, October, 1998

"Psychiatric Epidemiology", Residency Program in Psychiatry, Samaritan Health System, September, 1998

"Advances in Psychiatric Epidemiology", Clinical Epidemiology Section, Royal Medical Society (Edinburgh), August, 1998

"Latent Growth Models and Attributable Risks", luncheon speaker, Fellowship in Drug Epidemiology, Johns Hopkins University, April 1998

"Attributable Risk Measure in Mediational Impact Models: Somatizing Behavior", invited colloquium, Department of Mental Hygiene, Johns Hopkins School of Hygiene and Public Health, March, 1998

"Statistical Issues in Using Attributable Risk Measures in Intermediate Outcome Models", Department of Statistics, The University of Lancaster, Lancaster, England, June, 1997

"Statistical Problems that Arise in Applying Intermediate outcome Models in Prevention Research", invited lecture, Department of Statistics, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, May, 1997

"The Epidemiology of Thyroid Disease", invited lecture, Grand Rounds in Endocrinology, Samaritan Health Services, April, 1997

"Attributable Risk and Preventive Fractions in Prevention Research", invited lecture, Workshop on the Science of Prevention, NIMH, Baltimore, December, 1994

"Advances in Prevention Methodology", invited lecture, Prevention Research Center, Johns Hopkins University, September, 1994

"Multi-level Modeling in Prevention Research", invited colloquium, Prevention Research Center, Arizona State University, April, 1994

"Multi-level Modeling of Health Data; The Effects of Intervention on Aggressive Behavior", invited lecture, Program in Developmental Biology, University of North Carolina, April, 1994

"Mediation in Intermediate Variable Models", Department of Epidemiology and Biostatistics, College of Public Health, University of South Florida, March, 1994

"Assessing the Impact of Interventions on Proximal and Distal Outcomes" NIMH Prevention Research Center Directors Meeting, October 1993 with Reiser, M. and Warsi, G

"Epidemiology and Social Methodology: Complementarity in Prevention Research", invited presentation, with S. Kellam, et. al., NIMH Prevention Research Conference, Tysons Corners, VA, April, 1993

"Statistical Issues in Prevention Research", invited lecture, Directors' Meeting, Prevention Research Center Directors Meeting, National Institute of Mental Health, Rockville, Maryland, October, 1992

"The Course and Malleability of Aggressive Behavior in Young Children", invited presentation, with S. Kellam, et. al., National Academy of Science Institute of Medicine, Committee on Prevention of Mental Disorders, June, 1992

"Causal Models in Prevention Research: Mediation Moderation and Confounding", invited seminar, Carl A. Taube Memorial Colloquium Series in Psychiatry and Mental Health, Johns Hopkins University, May, 1992

"Breast Implants, Risk Surveillance and Health Statistics", invited lecture, MBA Special Colloquium Series, Arizona State University, March, 1992

"Proximal/Distal Effects on Two Developmental Epidemiologically-Based Preventive Interventions", invited seminar, Colloquium Series in Mental Health, Johns Hopkins School of Hygiene and Public Health, February, 1992

"Analyzing Subgroups and Contextual Effects" [with Sheppard Kellam], invited presentation, Directors' Meeting, Prevention Research Center Directors Meeting, National Institute of Mental Health, Rockville, Maryland, September, 1991

"Proximal/Distal Effects on Two Developmental Epidemiologically-Based Preventive Interventions" [with Sheppard Kellam, et. al.], invited seminar, Carl A. Taube Memorial

Colloquium Series in Mental Health, Johns Hopkins School of Hygiene and Public Health, September 1991

"The Epidemiology of Preventive Care in the Workplace", invited lecture, Phoenix Chapter, Association of Corporate Fitness Directors, Phoenix, May 1991.

"Statistics, Medicine and the Law", Invited Lecture, East Mesa Doctors Club, November 1990

"Statistical Models in the Analysis of Panel Data", invited lecture, Department of Biostatistics, Johns Hopkins School of Hygiene and Public Health, April, 1990

"Applications of Statistics to Occupational Health Problems", invited lecture, Department of Statistics, MacQuarie University, Australia, October, 1989

"Panel Models and Policy Analysis", invited lecture, Lincoln College, Christchurch, New Zealand, September 1989

"Panel Analysis and Occupational Health Analysis", invited lecture, University of Otago, New Zealand", September 1989

"Current Trends in Data Analysis, invited lecture, MBA colloquium, University of Canterbury, Christchurch, New Zealand, September 1989

"Managing the Health of Workers and the Health of the Firm", invited banquet speech, Conference on Analysis of Occupational Health Risks, Phoenix, August 1987

"Panel Models, Covariance Structures and the Exclusion of Liberals from 'Death-Sentence' Juries", invited colloquium, Department of Statistics, Stanford University, August, 1986

"A Statistician Looks at Panel Analysis or a Perfidious Peek at Pundits and Pookas," invited lecture, Arizona Chapter, American Statistical Association, March, 1984.

"A Statistician Looks at Panel Analysis", invited lecture, College of Business, University of Tennessee, June, 1983

"The Use of Panel Models in Non-experimental Research", invited lecture, College of Medicine, University of California, San Francisco, June, 1983

"Competing Approaches to Analysis of Panel Data", invited lecture, Econometrics Seminar, Stanford University, May 1983

"Science Analysis in Politics and the Politics of Science Analysis", invited lecture, Butler University, Indianapolis, March, 1983

"Statistical Problems in Panel Models", invited lecture, College of Education, Stanford University, March, 1983

"A Statistician Looks at Panel Analysis or a Perfidious Peek at Pundits and Pookas", invited lecture, Department of Computer and Information Sciences, University of California, Santa Cruz, February, 1983

"A Statistician Looks at Panel Analysis or a Perfidious Peek at Pundits and Pookas", invited lecture, Department of Computer and Information Sciences, University of Santa Clara, February, 1983

"Statistical Problems in Panel Analysis", invited lecture, Department of Mathematics, University of California, Santa Barbara, February, 1983

"A Statistician Looks at Panel Analysis", invited lecture, Department of Statistics, University of Arizona, February, 1983

"A Crossed Lagged Penal Analysis of Cross-Lagged Panel Analysis", invited colloquium, Department of Statistics, Stanford University, January, 1983

"Some Exciting Problems in Energy Modeling", invited lecture, Department of Mathematics, Arizona State University, August, 1982

"Statistical Problems in Short-term Energy Forecasting", invited lecture, Energy Information Administration, Washington, D.C., February, 1982

"Problems in Forecasting Energy Supplies", Decision Sciences Seminar, Wharton School, September, 1981

"Energy Policy: Myth and Reality", invited lecture, Philadelphia Business Seminar, April, 1981

"Energy Management: Building Image and Minimizing Liabilities", invited lecture, Wharton Executive Development Seminar, April, 1981

"Evaluating Energy Models", invited lecture, Delaware Chapter, American Statistical Association, University of Delaware, May, 1980

"Evaluating Models of Resource Depletion", invited lecture, Department of Economics, New York University, April, 1980.

"Exploratory Methods and the Art of Data Analysis", Dinner speech, Philadelphia Chapter, American Statistical Association, October, 1979

"Models of Domestic Oil Resources: Science Products and Political Agents", invited lecture, Thayer School of Engineering, Dartmouth College, March, 1979

"Models of Sequential Voting", invited lecture, Department of Political Science, Dartmouth College, March, 1979

"Estimating Oil Reserves: The Methods, Models and Policy Issues", invited lecture, School of Public and Urban Policy, University of Pennsylvania, December, 1978

"Estimating the Domestic Crude Oil Resource Base: Examining the King's Approach", invited lecture, Department of Statistics, University of Pennsylvania, November, 1978

"Picking a Multivariate Test Function, The Eenie-Meany Principle", invited lecture, Montreal Joint Statistics Colloquium, Montreal, November, 1977

"Econometric Energy Models: The Emperor's Quantitative Suit", invited lecture, Department of Commerce, October, 1977

"Exploratory Data Analysis as an Alternative to the Econometric Analysis of Social Problems," invited lecture, Department of Psychology, College of William and Mary, April, 1977

"Analyzing Energy Policy: The Competing Roles of the Economist, Engineer and Mathematician", invited lecture, Department of Mathematics, University of South Carolina, April, 1977

"Analyzing Political Data: What Can Statistics Tell Us?," invited lecture, School of International Studies, University of Denver, May, 1976

"Schur-Convexity and the Equivalence of Multivariate Tests", invited seminar, Department of Statistics, Rutgers University, October, 1975

"On Communal Indifference Curves," (with I.J. Good), invited seminar, Mathematical Economics Seminar, Virginia Polytechnic Institute and State University, October, 1975

"The Statistical Analysis of Energy Problems: Who Should We Believe?", invited lecture, Office of Energy Analysis, Department of Commerce, October, 1975

"Energy Research and Residential Housing", invited lecture, The Federal Energy Administration, September, 1975

"Consumer Reaction to the Energy Crisis: The Long Underwear Effect", invited address, West Virginia University, February, 1975

"Mathematical Models and other Forms of Hocus-Pocus", invited lecture, Department of Political Science, West Virginia University, February, 1975

"Factor Analysis: The Short Bed Problem", invited lecture, Department of Statistics

and Operations Research, University of Pennsylvania, March, 1975

"LSD and Political Science: Distinguishing Uppers and Downers", invited address, Western New England College, November, 1974

"Probability, Statistics and the Theory of Democracy", invited lecture, Department of Statistics, University of Connecticut, October, 1974

"Statistical Policy Analysis: Assessing the Unobservable", invited lecture, Department of Statistics, Princeton University, January, 1974

"On Procedures for Comparing Factor Matrices", invited lecture, Department of Statistics, University of Connecticut, January, 1974.

"A Mathematician's Doubts About Econometric Solutions to Political Problems", invited lecture, Department of Political Science, Ohio State University, May, 1973

"Estimating the Relationship Between Unobserved Variables, or Can We Sell the Second Canonical Correlation to the Social Scientists?", invited lecture, Department of Statistics, Ohio State University, May, 1973

"Generalized Spatial Models of Voting Theory", invited lecture, Center for Public Choice, Virginia Polytechnic Institute and State University, February, 1973

"Estimating the Relationship Between Ordinal Variables", invited lecture, Department of Statistics, Harvard University, 1973.

"Some Statistical Problems in Spatial Models", invited colloquium, Department of Statistics, Carnegie-Mellon University, Pittsburgh, October, 1972.

"Sex, the Generation Gap, and Fermat's Last Theorem", invited speech, Tidewater Council of Teachers of Mathematics, Norfolk, Virginia, September, 1972

"Mathematics: Is it Irrelevant by Necessity or Design?", invited lecture, Department of Mathematics, Emory and Henry College, Emory, Virginia, April, 1972

"Is There Reason for a Mathematician to help a Social Scientist?", invited to deliver annual Phi Mu Epsilon Lecture, Blacksburg, Virginia, 1972

"Probability Without Calculus and Statistics Without Mathematics", invited lecture, Virginia Mathematics Teachers Annual Convention, Roanoke, Virginia, November, 1972

"If Educators Educate Educators, Who Educates the Educated?", banquet address, State Mathematics Teachers Convention, Norfolk, Virginia, 1971

"Two-Stage Estimation in linear Models", invited lecture, Department of Statistics, Pennsylvania State University, January, 1971

"Problems in Cluster Analysis", invited lecture, Department of Applied Statistics, University of Minnesota, January 1971

Papers in Proceedings:

Mayer, L. S. and Reiser M.(1992) "Mediation and Confounding in Panel Models of Prevention Research" Proceedings of the Social Statistics Section, American Statistical Association

Mayer, L. S. and Carroll, S. S.(1988) "Modeling the Cotemporal Effect in a Cross-Lagged Panel Model," Proceedings of the Business and Economics Section, American Statistical Association

Carroll, S. S. and Mayer, L. S. (1987) "Testing for Serial Correlation in Cross-Lagged Panel Studies," Proceedings of the Business and Economics Section, American Statistical Association

Carroll, S. S. and Mayer, L. S. (1986) "Evaluation of the Cross Effects Parameters in a Cross-Lagged Panel Model," Proceedings of the Business and Economic Section, American Statistical Association

Mayer, L. S. (1985) "Hypothesis Testing in Cross-Lagged Panel Models," Proceedings of the Social Statistics Section, American Statistical Association

Mayer, L. S. and Carroll, S. S. (1985) "Testing for Serial Correlation in Cross-Lagged Panel Studies," Proceedings of the Business and Economics Section, American Statistical Association

Mayer, L.S. et. al. (1982). "Analysis of the U.S. Short-Term Integrated (Energy) Forecasting System," Proceedings of the International Conference on Energy Use Management, New York: Pergamon Press, 971-982

Harrje, D. and Mayer, L.S. (1978). "Energy Use and the Potential for Conservation," Proceedings of the International Conference on Energy Use Management,, Volume II, R. Fazzolare and C. Smith (eds.), New York: Pergamon Press, 749- 771

Mayer, L.S. (1978). "The Use of Semi-Controlled Experiments in the Analysis of Residential Energy Demand," Proceedings of the 1978 Department of Energy Symposium, Washington: Government Printing Office

Mayer, L.S. (1978). "The Value of the Econometric Approach to Forecasting Our Energy Future," Proceedings of the International Conference on Energy Use Management,, Volume III, R. Fazzolare and C. Smith (eds.), New York: Pergamon Press, 1073-1082

Mayer, L.S. (1978). "Difficulty in Developing Local Energy Policy," expert testimony, Hearings on Local Energy Policy, Washington: U.S. Congress

Mayer, L.S. (1977). "Exploratory Data Analysis and Classical Statistics: Their Abilities to Shed Light on Energy Issues," Proceedings of the 1977 Department of Energy Symposium, 27-32, Washington: Government Printing Office

Published Abstracts:

"Equivariant Estimation and A Special Group Structure", (with T. Woteki), Bulletin of the Institute of Mathematical Statistics, 1975

"A Fortran Program for Linear Log Odds Analysis", (with P.J. Pichotta), Behavior Research Methods and Instrumentation, 1974, 6, p. 521

"Invariant Estimation in the Social Sciences", (with M. S. Younger), Bulletin of the Institute of Mathematical Statistics, 1973

"On Principal Components and Clusters", Bulletin of the International Classification Society, 1973

"Methods of Cluster Analysis Which Utilize Principal Components", Bulletin of the International Classification Society, 1972

"Utilizing Initial Estimates in Estimating the Coefficients in General Linear Model", Annals of Mathematical Statistics, October 1970

Society Membership:

Society for Epidemiological Research, Society for Environmental Epidemiology, Royal Statistical Society, Society for Medical Decision Making, American Statistical Association, Biometrics Society, Institute for Mathematical Statistics, Psychometric Society, Econometric Society, American Association for the Advancement of Science, American Political Science Association, American Sociological Association, and Council for Applied for Social Research.

Courses Taught at Arizona State University and Banner Good Samaritan Medical Center

Epidemiology, Epidemiology Methodology, Clinical Epidemiology, Panel Analysis, Biostatistics, Multiple Regression, Time Series Modeling, Applied Forecasting Methods, Stochastic Processes, Exploratory Data Analysis, Seminar in Multivariate Analysis, Advanced Topics in Statistical Inference, Advanced Topics in Linear Models, Advanced Research Methods.

Courses taught at other Universities:

Undergraduate:

Biostatistics, Data Analysis, Nonparametric Methods, Regression Analysis, Mathematical Statistics, Mathematical Modeling, Design of Experiments, Statistics for the Social Sciences, Educational Statistics, Statistics and Public Policy, Computers and Society, Forecasting.

Graduate:

Biostatistics, Clinical Epidemiology, Statistical Forecasting, Exploratory Data Analysis, Epidemiological Methods, Econometrics, Applied Multivariate Statistics, Advanced Multivariate Statistics, Stochastic Processes, Advanced Probability, Linear Models, Advanced Inference, Time Series, Sampling Theory, Quantitative Methods of Policy Analysis, Philosophy of Science, Advances in Social Methodology.

Professional:

Statistics and Public Policy (Woodrow Wilson School, Princeton University); Advanced Study in Energy Analysis (Wharton MBA Program, University of Pennsylvania); Advanced Study in Statistics and Law (Law School, University of Pennsylvania): Medical Statistics (College of Medicine, Ohio State University)

Notable University Committees:

Member, Graduate Committee on Ph.D. program in Health Services Administration and Policy, Arizona State University (ASU) 1991-1992

Member, Executive Board, Program on Law and the Social Sciences, ASU, 1983-1989

Faculty Senate (elected), ASU, 1987-89

University Services Committee, ASU, 1988-89

Council on Research and Creative Activities, ASU, 1986-1988

Sunset Review Committee, Meteorite Center, ASU, 1987

Sunset Review Committee, Energy Research Center, ASU, 1987

Chair, Sunset Review Committee, Center for Advanced Research in Transportation, ASU, 1987

Women Studies Research Awards Committee, ASU, 1984-1989

Board, Ph.D. Program in Justice Studies, ASU, 1987-1989

Biomedical Research Committee, ASU< 1986-1988

Notable Previous University Committee Assignments:

Member, Health Professions Advisory Board, University of Pennsylvania, 1980-83

Member, Environmental Task Force Committee, Office of the Provost, University of Pennsylvania, 1979-82

Member, Committee on Undergraduate Student Life, Princeton University, 1976

Member, Council of Masters, Princeton University, 1976-79

Fellow, Princeton Inn College, Princeton University, 1975-76

Member, Chair Search Committee, Department of Statistics, Virginia Polytechnic Institute and State University, 1972-74

Appendix C: Compensation

$400.00 per hour.

APPENDIX D

The New Atlantis
A Journal of Technology & Society

Preface

This report was written for the general public and for mental health professionals in order to draw attention to—and offer some scientific insight about—the mental health issues faced by LGBT populations.

It arose from a request from Paul R. McHugh, M.D., the former chief of psychiatry at Johns Hopkins Hospital and one of the leading psychiatrists in the world. Dr. McHugh requested that I review a monograph he and colleagues had drafted on subjects related to sexual orientation and identity; my original assignment was to guarantee the accuracy of statistical inferences and to review additional sources. In the months that followed, I closely read over five hundred scientific articles on these topics and perused hundreds more. I was alarmed to learn that the LGBT community bears a disproportionate rate of mental health problems compared to the population as a whole.

As my interest grew, I explored research across a variety of scientific fields, including epidemiology, genetics, endocrinology, psychiatry, neuroscience, embryology, and pediatrics. I also reviewed many of the academic empirical studies done in the social sciences including psychology, sociology, political science, economics, and gender studies.

I agreed to take over as lead author, rewriting, reorganizing, and expanding the text. I support every sentence in this report, without reservation and without prejudice regarding any political or philosophical debates. This report is about science and medicine, nothing more and nothing less.

Readers wondering about this report's synthesis of research from so many different fields may wish to know a little about its lead author. I am a full-time academic involved in all aspects of teaching, research, and professional service. I am a biostatistician and epidemiologist who focuses on the design, analysis, and interpretation of experimental and observational data in public health and medicine, particularly when the data are complex in terms of underlying scientific issues. I am a research physician, having trained in medicine and psychiatry in the U.K. and received the British equivalent (M.B.) to the American M.D. I have never practiced medicine (including psychiatry) in the United States or abroad. I have testified in dozens of federal and state legal proceedings and regulatory hearings, in

most cases reviewing scientific literature to clarify the issues under examination. I strongly support equality and oppose discrimination for the LGBT community, and I have testified on their behalf as a statistical expert.

I have been a full-time tenured professor for over four decades. I have held professorial appointments at eight universities, including Princeton, the University of Pennsylvania, Stanford, Arizona State University, Johns Hopkins University Bloomberg School of Public Health and School of Medicine, Ohio State, Virginia Tech, and the University of Michigan. I have also held research faculty appointments at several other institutions, including the Mayo Clinic.

My full-time and part-time appointments have been in twenty-three disciplines, including statistics, biostatistics, epidemiology, public health, social methodology, psychiatry, mathematics, sociology, political science, economics, and biomedical informatics. But my research interests have varied far less than my academic appointments: the focus of my career has been to learn how statistics and models are employed across disciplines, with the goal of improving the use of models and data analytics in assessing issues of interest in the policy, regulatory, or legal realms.

I have been published in many top-tier peer-reviewed journals (including *The Annals of Statistics*, *Biometrics*, and *American Journal of Political Science*) and have reviewed hundreds of manuscripts submitted for publication to many of the major medical, statistical, and epidemiological journals (including *The New England Journal of Medicine*, *Journal of the American Statistical Association*, and *American Journal of Public Health*).

I am currently a scholar in residence in the Department of Psychiatry at Johns Hopkins School of Medicine and a professor of statistics and biostatistics at Arizona State University. Up until July 1, 2016, I also held part-time faculty appointments at the Johns Hopkins Bloomberg School of Public Health and School of Medicine, and at the Mayo Clinic.

An undertaking as ambitious as this report would not be possible without the counsel and advice of many gifted scholars and editors. I am grateful for the generous help of Laura E. Harrington, M.D., M.S., a psychiatrist with extensive training in internal medicine and neuroimmunology, whose clinical practice focuses on women in life transition, including affirmative treatment and therapy for the LGBT community. She contributed to the entire report, particularly lending her expertise to the sections on endocrinology and brain research. I am indebted also to Bentley J. Hanish, B.S., a young geneticist who expects to graduate medical school in 2021 with an M.D./Ph.D. in psychiatric epidemiology.

He contributed to the entire report, particularly to those sections that concern genetics.

I gratefully acknowledge the support of Johns Hopkins University Bloomberg School of Public Health and School of Medicine, Arizona State University, and the Mayo Clinic.

In the course of writing this report, I consulted a number of individuals who asked that I not thank them by name. Some feared an angry response from the more militant elements of the LGBT community; others feared an angry response from the more strident elements of religiously conservative communities. Most bothersome, however, is that some feared reprisals from their own universities for engaging such controversial topics, regardless of the report's content—a sad statement about academic freedom.

I dedicate my work on this report, first, to the LGBT community, which bears a disproportionate rate of mental health problems compared to the population as a whole. We must find ways to relieve their suffering.

I dedicate it also to scholars doing impartial research on topics of public controversy. May they never lose their way in political hurricanes.

And above all, I dedicate it to children struggling with their sexuality and gender. Children are a special case when addressing gender issues. In the course of their development, many children explore the idea of being of the opposite sex. Some children may have improved psychological well-being if they are encouraged and supported in their cross-gender identification, particularly if the identification is strong and persistent over time. But nearly all children ultimately identify with their biological sex. The notion that a two-year-old, having expressed thoughts or behaviors identified with the opposite sex, can be labeled for life as transgender has absolutely no support in science. Indeed, it is iniquitous to believe that all children who have gender-atypical thoughts or behavior at some point in their development, particularly before puberty, should be encouraged to become transgender.

As citizens, scholars, and clinicians concerned with the problems facing LGBT people, we should not be dogmatically committed to any particular views about the nature of sexuality or gender identity; rather, we should be guided first and foremost by the needs of struggling patients, and we should seek with open minds for ways to help them lead meaningful, dignified lives.

Lawrence S. Mayer, M.B., M.S., Ph.D.

The New Atlantis
A Journal of Technology & Society

Executive Summary

This report presents a careful summary and an up-to-date explanation of research—from the biological, psychological, and social sciences—related to sexual orientation and gender identity. It is offered in the hope that such an exposition can contribute to our capacity as physicians, scientists, and citizens to address health issues faced by LGBT populations within our society.

Some key findings:

Part One: Sexual Orientation

- The understanding of sexual orientation as an innate, biologically fixed property of human beings—the idea that people are "born that way"—is not supported by scientific evidence.

- While there is evidence that biological factors such as genes and hormones are associated with sexual behaviors and attractions, there are no compelling causal biological explanations for human sexual orientation. While minor differences in the brain structures and brain activity between homosexual and heterosexual individuals have been identified by researchers, such neurobiological findings do not demonstrate whether these differences are innate or are the result of environmental and psychological factors.

- Longitudinal studies of adolescents suggest that sexual orientation may be quite fluid over the life course for some people, with one study estimating that as many as 80% of male adolescents who report same-sex attractions no longer do so as adults (although the extent to which this figure reflects actual changes in same-sex attractions and not just artifacts of the survey process has been contested by some researchers).

- Compared to heterosexuals, non-heterosexuals are about two to three times as likely to have experienced childhood sexual abuse.

Part Two: Sexuality, Mental Health Outcomes, and Social Stress

- Compared to the general population, non-heterosexual subpopulations are at an elevated risk for a variety of adverse health and mental health outcomes.

- Members of the non-heterosexual population are estimated to have about 1.5 times higher risk of experiencing anxiety disorders than members of the heterosexual population, as well as roughly double the risk of depression, 1.5 times the risk of substance abuse, and nearly 2.5 times the risk of suicide.

- Members of the transgender population are also at higher risk of a variety of mental health problems compared to members of the non-transgender population. Especially alarmingly, the rate of lifetime suicide attempts across all ages of transgender individuals is estimated at 41%, compared to under 5% in the overall U.S. population.

- There is evidence, albeit limited, that social stressors such as discrimination and stigma contribute to the elevated risk of poor mental health outcomes for non-heterosexual and transgender populations. More high-quality longitudinal studies are necessary for the "social stress model" to be a useful tool for understanding public health concerns.

Part Three: Gender Identity

- The hypothesis that gender identity is an innate, fixed property of human beings that is independent of biological sex—that a person might be "a man trapped in a woman's body" or "a woman trapped in a man's body"—is not supported by scientific evidence.

- According to a recent estimate, about 0.6% of U.S. adults identify as a gender that does not correspond to their biological sex.

- Studies comparing the brain structures of transgender and non-transgender individuals have demonstrated weak correlations between brain structure and cross-gender identification. These correlations do not provide any evidence for a neurobiological basis for cross-gender identification.

- Compared to the general population, adults who have undergone sex-reassignment surgery continue to have a higher risk of experiencing poor mental health outcomes. One study found that, compared to controls, sex-reassigned individuals were about 5 times more likely to attempt suicide and about 19 times more likely to die by suicide.

- Children are a special case when addressing transgender issues. Only a minority of children who experience cross-gender identification will continue to do so into adolescence or adulthood.

- There is little scientific evidence for the therapeutic value of interventions that delay puberty or modify the secondary sex characteristics of adolescents, although some children may have improved psychological well-being if they are encouraged and supported in their cross-gender identification. There is no evidence that all children who express gender-atypical thoughts or behavior should be encouraged to become transgender.

The New Atlantis
A Journal of Technology & Society

Sexuality and Gender

Findings from the Biological, Psychological, and Social Sciences

Lawrence S. Mayer, M.B., M.S., Ph.D. and Paul R. McHugh, M.D.

Introduction

Few topics are as complex and controversial as human sexual orientation and gender identity. These matters touch upon our most intimate thoughts and feelings, and help to define us as both individuals and social beings. Discussions of the ethical questions raised by sexual orientation and gender identity can become heated and personal, and the associated policy issues sometimes provoke intense controversies. The disputants, journalists, and lawmakers in these debates often invoke the authority of science, and in our news and social media and our broader popular culture we hear claims about what "science says" on these matters.

This report offers a careful summary and an up-to-date explanation of many of the most rigorous findings produced by the biological, psychological, and social sciences related to sexual orientation and gender identity. We examine a vast body of scientific literature from several disciplines. We try to acknowledge the limitations of the research and to avoid premature conclusions that would result in over-interpretation of scientific findings. Since the relevant literature is rife with inconsistent and ambiguous definitions, we not only examine the empirical evidence but also delve into underlying conceptual problems. This report does not, however, discuss matters of morality or policy; our focus is on the scientific evidence—what it shows and what it does not show.

We begin in Part One by critically examining whether concepts such as heterosexuality, homosexuality, and bisexuality represent distinct, fixed, and biologically determined properties of human beings. As part of this discussion, we look at the popular "born that way" hypothesis, which

posits that human sexual orientation is biologically innate; we examine the evidence for this claim across several subspecialties of the biological sciences. We explore the developmental origins of sexual attractions, the degree to which such attractions may change over time, and the complexities inherent in the incorporation of these attractions into one's sexual identity. Drawing on evidence from twin studies and other types of research, we explore genetic, environmental, and hormonal factors. We also explore some of the scientific evidence relating brain science to sexual orientation.

In Part Two we examine research on health outcomes as they relate to sexual orientation and gender identity. There is a consistently observed higher risk of poor physical and mental health outcomes for lesbian, gay, bisexual, and transgender subpopulations compared to the general population. These outcomes include depression, anxiety, substance abuse, and most alarmingly, suicide. For example, among the transgender subpopulation in the United States, the rate of attempted suicide is estimated to be as high as 41%, ten times higher than in the general population. As physicians, academics, and scientists, we believe all of the subsequent discussions in this report must be cast in the light of this public health issue.

We also examine some ideas proposed to explain these differential health outcomes, including the "social stress model." This hypothesis—which holds that stressors like stigma and prejudice account for much of the additional suffering observed in these subpopulations—does not seem to offer a complete explanation for the disparities in the outcomes.

Much as Part One investigates the conjecture that sexual orientation is fixed with a causal biological basis, a portion of Part Three examines similar issues with respect to gender identity. Biological sex (the binary categories of male and female) is a fixed aspect of human nature, even though some individuals affected by disorders of sex development may exhibit ambiguous sex characteristics. By contrast, gender identity is a social and psychological concept that is not well defined, and there is little scientific evidence that it is an innate, fixed biological property.

Part Three also examines sex-reassignment procedures and the evidence for their effectiveness at alleviating the poor mental health outcomes experienced by many people who identify as transgender. Compared to the general population, postoperative transgender individuals continue to be at high risk of poor mental health outcomes.

An area of particular concern involves medical interventions for gender-nonconforming youth. They are increasingly receiving therapies that affirm their felt genders, and even hormone treatments or surgical

modifications at young ages. But the majority of children who identify as a gender that does not conform to their biological sex will no longer do so by the time they reach adulthood. We are disturbed and alarmed by the severity and irreversibility of some interventions being publicly discussed and employed for children.

Sexual orientation and gender identity resist explanation by simple theories. There is a large gap between the certainty with which beliefs are held about these matters and what a sober assessment of the science reveals. In the face of this complexity and uncertainty, we need to be humble about what we know and do not know. We readily acknowledge that this report is neither an exhaustive analysis of the subjects it addresses nor the last word on them. Science is by no means the only avenue for understanding these astoundingly complex, multifaceted topics; there are other sources of wisdom and knowledge—including art, religion, philosophy, and lived human experience. And much of our scientific knowledge in this area remains unsettled. However, we offer this overview of the scientific literature in the hope that it can provide a shared framework for intelligent, enlightened discourse in political, professional, and scientific exchanges—and may add to our capacity as concerned citizens to alleviate suffering and promote human health and flourishing.

The New Atlantis
A Journal of Technology & Society

Part One

Sexual Orientation

While some people are under the impression that sexual orientation is an innate, fixed, and biological trait of human beings—that, whether heterosexual, homosexual, or bisexual, we are "born that way"—there is insufficient scientific evidence to support that claim. In fact, the concept of sexual orientation itself is highly ambiguous; it can refer to a set of behaviors, to feelings of attraction, or to a sense of identity. Epidemiological studies show a rather modest association between genetic factors and sexual attractions or behaviors, but do not provide significant evidence pointing to particular genes. There is also evidence for other hypothesized biological causes of homosexual behaviors, attractions, or identity—such as the influence of hormones on prenatal development—but that evidence, too, is limited. Studies of the brains of homosexuals and heterosexuals have found some differences, but have not demonstrated that these differences are inborn rather than the result of environmental factors that influenced both psychological and neurobiological traits. One environmental factor that appears to be correlated with non-heterosexuality is childhood sexual abuse victimization, which may also contribute to the higher rates of poor mental health outcomes among non-heterosexual subpopulations, compared to the general population. Overall, the evidence suggests some measure of fluidity in patterns of sexual attraction and behavior—contrary to the "born that way" notion that oversimplifies the vast complexity of human sexuality.

The popular discussion of sexual orientation is characterized by two conflicting ideas about why some individuals are lesbian, gay, or bisexual. While some claim that sexual orientation is a choice, others say that sexual orientation is a fixed feature of one's nature, that one is "born that way." We hope to show here that, though sexual orientation is not a choice, neither is there scientific evidence for the view that sexual orientation is a fixed and innate biological property.

A prominent recent example of a person describing sexual orientation as a choice is Cynthia Nixon, a star of the popular television series *Sex and the City*, who in a January 2012 *New York Times* interview explained, "For me it's a choice, and you don't get to define my gayness for me," and commented that she was "very annoyed" about the issue of whether or not gay people are born that way. "Why can't it be a choice? Why is that any less legitimate?"[1] Similarly, Brandon Ambrosino wrote in *The New Republic* in

2014 that "It's time for the LGBT community to stop fearing the word 'choice,' and to reclaim the dignity of sexual autonomy."[2]

By contrast, proponents of the "born that way" hypothesis—expressed for instance in Lady Gaga's 2011 song "Born This Way"—posit that there is a causal biological basis for sexual orientation and often try to bolster their claims with scientific findings. Citing three scientific studies[3] and an article from *Science* magazine,[4] Mark Joseph Stern, writing for *Slate* in 2014, claims that "homosexuality, at least in men, is clearly, undoubtedly, inarguably an inborn trait."[5] However, as neuroscientist Simon LeVay, whose work in 1991 showed brain differences in homosexual men compared to heterosexual men, explained some years after his study, "It's important to stress what I didn't find. I did not prove that homosexuality is genetic, or find a genetic cause for being gay. I didn't show that gay men are 'born that way,' the most common mistake people make in interpreting my work. Nor did I locate a gay center in the brain."[6]

Many recent books contain popular treatments of science that make claims about the innateness of sexual orientation. These books often exaggerate—or at least oversimplify—complex scientific findings. For example, in a 2005 book, psychologist and science writer Leonard Sax responds to a worried mother's question as to whether her teenage son will outgrow his homosexual attractions: "Biologically, the difference between a gay man and a straight man is something like the difference between a left-handed person and a right-handed person. Being left-handed isn't just a phase. A left-handed person won't someday magically turn into a right-handed person.... Some children are destined at birth to be left-handed, and some boys are destined at birth to grow up to be gay."[7]

As we argue in this part of the report, however, there is little scientific evidence to support the claim that sexual attraction is simply fixed by innate and deterministic factors such as genes. Popular understandings of scientific findings often presume deterministic causality when the findings do not warrant that presumption.

Another important limitation for research and for interpretation of scientific studies on this topic is that some central concepts—including "sexual orientation" itself—are often ambiguous, making reliable measurements difficult both within individual studies and when comparing results across studies. So before turning to the scientific evidence concerning the development of sexual orientation and sexual desire, we will examine at some length several of the most troublesome conceptual ambiguities in the study of human sexuality in order to arrive at a fuller picture of the relevant concepts.

Problems with Defining Key Concepts

A 2014 *New York Times Magazine* piece titled "The Scientific Quest to Prove Bisexuality Exists"[8] provides an illustration of the themes explored in this Part—sexual desire, attraction, orientation, and identity—and of the difficulties with defining and studying these concepts. Specifically, the article shows how a scientific approach to studying human sexuality can conflict with culturally prevalent views of sexual orientation, or with the self-understanding that many people have of their own sexual desires and identities. Such conflicts raise important questions about whether sexual orientation and related concepts are as coherent and well-defined as is often assumed by researchers and the public alike.

The author of the article, Benoit Denizet-Lewis, an openly gay man, describes the work of scientists and others trying to demonstrate the existence of a stable bisexual orientation. He visited researchers at Cornell University and participated in tests used to measure sexual arousal, tests that include observing the way pupils dilate in response to sexually explicit imagery. To his surprise, he found that, according to this scientific measure, he was aroused when watching pornographic films of women masturbating:

> Might I actually be bisexual? Have I been so wedded to my gay identity—one I adopted in college and announced with great fanfare to family and friends—that I haven't allowed myself to experience another part of myself? In some ways, even asking those questions is anathema to many gays and lesbians. That kind of publicly shared uncertainty is catnip to the Christian Right and to the scientifically dubious, psychologically damaging ex-gay movement it helped spawn. As out gay men and lesbians, after all, we're supposed to be sure—we're supposed to be "born this way."[9]

Despite the apparently scientific (though admittedly limited) evidence of his bisexual-typical patterns of arousal, Denizet-Lewis rejected the idea that he was actually bisexual, because "It doesn't feel true as a sexual orientation, nor does it feel right as my identity."[10]

Denizet-Lewis's concerns here illustrate a number of the quandaries raised by the scientific study of human sexuality. The objective measures the researchers used seemed to be at odds with the more intuitive, subjective understanding of what it is to be sexually aroused; our own understanding of what we are sexually aroused by is tied up with the entirety of our lived experience of sexuality. Furthermore, Denizet-Lewis's insistence

that he is gay, not bisexual, and his concern that uncertainty about his identity could have social and political implications, points to the fact that sexual orientation and identity are understood not only in scientific and personal terms, but in social, moral, and political terms as well.

But how do categories of sexual orientation—with labels such as "bisexual" or "gay" or "straight"—help scientists study the complex phenomenon of human sexuality? When we examine the concept of sexual orientation, it becomes apparent, as this part will show, that it is too vague and poorly defined to be very useful in science, and that in its place we need more clearly defined concepts. We strive in this report to use clear terms; when discussing scientific studies that rely on the concept of "sexual orientation," we try as much as possible to specify how the scientists defined the term, or related terms.

One of the central difficulties in examining and researching sexual orientation is that the underlying concepts of "sexual desire," "sexual attraction," and "sexual arousal" can be ambiguous, and it is even less clear what it means that a person identifies as having a sexual orientation grounded in some pattern of desires, attractions, or states of arousal.

The word "desire" all by itself might be used to cover an aspect of volition more naturally expressed by "want": I want to go out for dinner, or to take a road trip with my friends next summer, or to finish this project. When "desire" is used in this sense, the objects of desire are fairly determinate *goals*—some may be perfectly achievable, such as moving to a new city or finding a new job; others may be more ambitious and out of reach, like the dream of becoming a world-famous movie star. Often, however, the language of desire is meant to include things that are less clear: indefinite *longings* for a life that is, in some unspecified sense, different or better; an inchoate sense of something being missing or lacking in oneself or one's world; or, in psychoanalytic literature, unconscious dynamic forces that shape one's cognitive, emotional, and social behaviors, but that are separate from one's ordinary, conscious sense of self.

This more full-blooded notion of desire is, itself, ambiguous. It might refer to a hoped-for state of affairs like finding a sense of meaning, fulfillment, and satisfaction with one's life, a desire that, while not completely clear in its implications, is presumably not entirely out of reach, although such longings may also be forms of fantasizing about a radically altered or perhaps even unattainable state of affairs. If I want to take a road trip with my friends, the steps are clear: call up my friends, pick a date, map out a route, and so on. However, if I have an inchoate longing for change, a hope for sustainable intimacy, love, and belonging, or an unconscious conflict

that is disrupting my ability to move forward in the life I have tried to build for myself, I face a different sort of challenge. There is not necessarily a set of well-defined or conscious goals, much less established ways of achieving them. This is not to say that the satisfaction of these longings is impossible, but doing so often involves not only choosing concrete actions to achieve particular goals but the more complex shaping of one's own life through acting in and making sense of the world and one's place in it.

So the first thing to note when considering both popular discussions and scientific studies of sexuality is that the use of the term "desire" could refer to distinct aspects of human life and experience.

Just as the meanings that might be intended by the term "desire" are many, so also is each of these meanings varied, making clear delineations a challenge. For example, a commonsense understanding might suggest that the term "sexual desire" means wanting to engage in specific sexual acts with particular individuals (or categories of individuals). Psychiatrist Steven Levine articulated this common view in his definition of sexual desire as "the sum of the forces that incline us toward and away from sexual behavior."[11] But it is not obvious how one might study this "sum" in a rigorous way. Nor is it obvious why all the diverse factors that can potentially influence sexual behavior, such as material poverty—in the case of prostitution, for instance—alcohol consumption, and intimate affection, should all be grouped together as aspects of sexual desire. As Levine himself points out, "In anyone's hands, sexual desire can be a slippery concept."[12]

Consider a few of the ways that the term "sexual desire" has been employed in scientific contexts—designating one or more of the following distinct phenomena:

1. States of physical arousal that may or may not be linked to a specific physical activity and may or may not be objects of conscious awareness.

2. Conscious erotic interest in response to finding others attractive (in perception, memory, or fantasy), which may or may not involve any of the bodily processes associated with measurable states of physical arousal.

3. Strong interest in finding a companion or establishing a durable relationship.

4. The romantic aspirations and feelings associated with infatuation or falling in love with a specific individual.

5. Inclination towards attachment to specific individuals.

6. The general motivation to seek intimacy with a member of some specific group.

7. An aesthetic measure that latches onto perceived beauty in others.[13]

In a given social science study, the concepts mentioned above will often each have its own particular operational definition for the purposes of research. But they cannot all mean the *same* thing. Strong interest in finding a companion, for example, is clearly distinguishable from physical arousal. Looking at this list of experiential and psychological phenomena, one can easily envision what confusions might arise from using the term "sexual desire" without sufficient care.

The philosopher Alexander Pruss provides a helpful summary of some of the difficulties involved in characterizing the related concept of sexual attraction:

> What does it mean to be "sexually attracted" to someone? Does it mean to have a tendency to be aroused in their presence? But surely it is possible to find someone sexually attractive without being aroused. Does it mean to form the belief that someone is sexually attractive to one? Surely not, since a belief about who is sexually attractive to one might be wrong—for instance, one might confuse admiration of form with sexual attraction. Does it mean to have a noninstrumental desire for a sexual or romantic relationship with the person? Probably not: we can imagine a person who has no sexual attraction to anybody, but who has a noninstrumental desire for a romantic relationship because of a belief, based on the testimony of others, that romantic relationships have noninstrumental value. These and similar questions suggest that there is a cluster of related concepts under the head of "sexual attraction," and any precise definition is likely to be an undesirable shoehorning. But if the concept of sexual attraction is a cluster of concepts, neither are there simply univocal concepts of heterosexuality, homosexuality, and bisexuality.[14]

The ambiguity of the term "sexual desire" (and similar terms) should give us pause to consider the diverse aspects of human experience that are often associated with it. The problem is neither irresolvable nor unique to this subject matter. Other social science concepts—aggression and addiction, for example—may likewise be difficult to define and to

operationalize and for this reason admit of various usages.* Nevertheless, the ambiguity presents a significant challenge for both research design and interpretation, requiring that we take care in attending to the meanings, contexts, and findings specific to each study. It is also important to bracket any subjective associations with or uses of these terms that do not conform to well-defined scientific classifications and techniques.

It would be a mistake, at any rate, to ignore the varied uses of this and related terms or to try to reduce the many and distinct experiences to which they might refer to a single concept or experience. As we shall see, doing so could in some cases adversely affect the evaluation and treatment of patients.

The Context of Sexual Desire

We can further clarify the complex phenomenon of sexual desire if we examine what relationship it has to other aspects of our lives. To do so, we borrow some conceptual tools from a philosophical tradition known as phenomenology, which conceives of human experience as deriving its meaning from the whole context in which it appears.

The testimony of experience suggests that one's experience of sexual desire and sexual attraction is not voluntary, at least not in any immediate way. The whole set of inclinations that we generally associate with the experience of sexual desire—whether the impulse to engage in particular acts or to enjoy certain relationships—does not appear to be the sole product of any deliberate choice. Our sexual appetites (like other natural appetites) are experienced as given, even if their expression is shaped in subtle ways by many factors, which might very well include volition. Indeed, far from appearing as a product of our will, sexual desire—however we define it—is often experienced as a powerful force, akin to hunger, that many struggle (especially in adolescence) to bring under direction and control. Furthermore, sexual desire can impact one's attention involuntarily or color one's day-to-day perceptions, experiences, and encounters. What seems to be to some extent in our control is how we choose to live with this appetite, how we integrate it into the rest of our lives.

But the question remains: What *is* sexual desire? What is this part of our lives that we consider to be given, prior even to our capacity to

* "Operationalizing" refers to the way social scientists make a variable measurable. Homosexuality may be operationalized as the answers that survey respondents give to questions about their sexual orientation. Or it could be operationalized as answers to questions about their desires, attractions, and behavior. Operationalizing variables in ways that will reliably measure the trait or behavior being studied is a difficult but important part of any social science research.

deliberate and make rational choices about it? We know that some sort of sexual appetite is present in non-human animals, as is evident in the mammalian estrous cycle; in most mammalian species sexual arousal and receptivity are linked to the phase of the ovulation cycle during which the female is reproductively receptive.[15] One of the relatively unique features of *Homo sapiens*, shared with only a few other primates, is that sexual desire is not exclusively linked to the woman's ovulatory cycle.[16] Some biologists have argued that this means that sexual desire in humans has evolved to facilitate the formation of sustaining relationships between parents, in addition to the more basic biological purpose of reproduction. Whatever the explanation for the origins and biological functions of human sexuality, the lived experience of sexual desires is laden with significance that goes beyond the biological purposes that sexual desires and behaviors serve. This significance is not just a subjective add-on to the more basic physiological and functional realities, but something that pervades our lived experience of sexuality.

As philosophers who study the structure of conscious experience have observed, our way of experiencing the world is shaped by our "embodiment, bodily skills, cultural context, language and other social practices."[17] Long before most of us experience anything like what we typically associate with sexual desire, we are already enmeshed in a cultural and social context involving other persons, feelings, emotions, opportunities, deprivations, and so on. Perhaps sexuality, like other human phenomena that gradually become part of our psychological constitution, has roots in these early meaning-making experiences. If meaning-making is integral to human experience in general, it is likely to play a key role in sexual experience in particular. And given that volition is operative in these other aspects of our lives, it stands to reason that volition will be operative in our experience of sexuality too, if only as one of many other factors.

This is not to suggest that sexuality—including sexual desire, attraction, and identity—is the result of any deliberate, rational decision calculus. Even if volition plays an important role in sexuality, volition itself is quite complex: many, perhaps most, of our volitional choices do not seem to come in the form of discrete, conscious, or deliberate decisions; "volitional" does not necessarily mean "deliberate." The life of a desiring, volitional agent involves many tacit patterns of behavior owing to habits, past experiences, memories, and subtle ways of adopting and abandoning different stances on one's life.

If something like this way of understanding the life of a desiring, volitional agent is true, then we do not deliberately "choose" the objects of our

sexual desires any more than we choose the objects of our other desires. It might be more accurate to say that we gradually guide and give ourselves over to them over the course of our growth and development. This process of forming and reforming ourselves as human beings is similar to what Abraham Maslow calls self-actualization.[18] Why should sexuality be an exception to this process? In the picture we are offering, internal factors, such as our genetic make-up, and external environmental factors, such as past experiences, are only ingredients, however important, in the complex human experience of sexual desire.

Sexual Orientation

Just as the concept of "sexual desire" is complex and difficult to define, there are currently no agreed-upon definitions of "sexual orientation," "homosexuality," or "heterosexuality" for purposes of empirical research. Should homosexuality, for example, be characterized by reference to desires to engage in particular acts with individuals of the same sex, or to a patterned history of having engaged in such acts, or to particular features of one's private wishes or fantasies, or to a consistent impulse to seek intimacy with members of the same sex, or to a social identity imposed by oneself or others, or to something else entirely?

As early as 1896, in a book on homosexuality, the French thinker Marc-André Raffalovich argued that there were more than ten different types of affective inclination or behavior captured by the term "homosexuality" (or what he called "unisexuality").[19] Raffalovich knew his subject matter up close: he chronicled the trial, imprisonment, and resulting social disgrace of the writer Oscar Wilde, who had been prosecuted for "gross indecency" with other men. Raffalovich himself maintained a prolonged and intimate relationship with John Gray, a man of letters thought to be the inspiration for Wilde's classic *The Picture of Dorian Gray*.[20] We might also consider the vast psychoanalytic literature from the early twentieth century on the topic of sexual desire, in which the experiences of individual subjects and their clinical cases are catalogued in great detail. These historical examples bring into relief the complexity that researchers still face today when attempting to arrive at clean categorizations of the richly varied affective and behavioral phenomena associated with sexual desire, in both same-sex and opposite-sex attractions.

We may contrast such inherent complexity with a different phenomenon that can be delineated unambiguously, such as pregnancy. With very few exceptions, a woman is or is not pregnant, which makes classification

of research subjects for the purposes of study relatively easy: compare pregnant women with other, non-pregnant women. But how can researchers compare, say, "gay" men to "straight" men in a single study, or across a range of studies, without mutually exclusive and exhaustive definitions of the terms "gay" and "straight"?

To increase precision, some researchers categorize concepts associated with human sexuality along a continuum or scale according to variations in pervasiveness, prominence, or intensity. Some scales focus on both intensity and the objects of sexual desire. Among the most familiar and widely used is the Kinsey scale, developed in the 1940s to classify sexual desires and orientations using purportedly measurable criteria. People are asked to choose one of the following options:

0 - Exclusively heterosexual
1 - Predominantly heterosexual, only incidentally homosexual
2 - Predominantly heterosexual, but more than incidentally homosexual
3 - Equally heterosexual and homosexual
4 - Predominantly homosexual, but more than incidentally heterosexual
5 - Predominantly homosexual, only incidentally heterosexual
6 - Exclusively homosexual[21]

But there are considerable limitations to this approach. In principle, measurements of this sort are valuable for social science research. They can be used, for example, in empirical tests such as the classic "t-test," which helps researchers measure statistically meaningful differences between data sets. Many measurements in social science, however, are "ordinal," meaning that variables are rank-ordered along a single, one-dimensional continuum but are not intrinsically significant beyond that. In the case of the Kinsey scale, this situation is even worse, because it measures the self-identification of individuals, while leaving unclear whether the values they report all refer to the same aspect of sexuality—different people may understand the terms "heterosexual" and "homosexual" to refer to feelings of attraction, or to arousal, or to fantasies, or to behavior, or to any combination of these. The ambiguity of the terms severely limits the use of the Kinsey scale as an ordinal measurement that gives a rank order to variables along a single, one-dimensional continuum. So it is not clear that this scale helps researchers to make even rudimentary classifications among the relevant groups using qualitative criteria, much less to rank-order variables or conduct controlled experiments.

Perhaps, given the inherent complexity of the subject matter, attempts to devise "objective" scales of this sort are misguided. In a critique of such approaches to social science, philosopher and neuropsychologist Daniel N. Robinson points out that "statements that lend themselves to different interpretation do not become 'objective' merely by putting a numeral in front of them."[22] It may be that self-reported identifications with culturally fraught and inherently complex labels simply cannot provide an objective basis for quantitative measurements in individuals or across groups.

Another obstacle for research in this area may be the popular, but not well-supported, belief that romantic desires are sublimations of sexual desires. This idea, traceable to Freud's theory of unconscious drives, has been challenged by research on "attachment theory," developed by John Bowlby in the 1950s.[23] Very roughly, attachment theory holds that later affective experiences that are often grouped under the general rubric "romantic" are explained in part by early childhood attachment behaviors (associated with maternal figures or caregivers)—not by unconscious, sexual drives. Romantic desires, following this line of thought, might not be as strongly correlated with sexual desires as is commonly thought. All of this is to suggest that simple delineations of the concepts relating to human sexuality cannot be taken at face value and that ongoing empirical research sometimes changes or complicates the meanings of the concepts.

If we look at recent research, we find that scientists often use at least one of three categories when attempting to classify people as "homosexual" or "heterosexual": sexual *behavior*; sexual *fantasies* (or related emotional or affective experiences); and *self-identification* (as "gay," "lesbian," "bisexual," "asexual," and so forth).[24] Some add a fourth: inclusion in a community defined by sexual orientation. Consider, for example, the American Psychological Association's definition of sexual orientation in a 2008 document designed to educate the public:

> Sexual orientation refers to an enduring pattern of emotional, romantic and/or sexual *attractions* to men, women or both sexes. Sexual orientation also refers to a person's sense of *identity* based on those attractions, related *behaviors*, and membership in a *community* of others who share those attractions. Research over several decades has demonstrated that sexual orientation ranges along a *continuum*, from exclusive attraction to the other sex to exclusive attraction to the same sex.[25] [Emphases added.]

One difficulty with grouping these categories together under the same general rubric of "sexual orientation" is that research suggests they often

do not coincide in real life. Sociologist Edward O. Laumann and colleagues summarize this point clearly in a 1994 book:

> While there is a core group (about 2.4 percent of the total men and about 1.3 percent of the total women) in our survey who *define themselves* as homosexual or bisexual, have same-gender *partners*, and express homosexual *desires*, there are also sizable groups who do not consider themselves to be either homosexual or bisexual but have had adult homosexual experiences or express some degree of desire.... [T]his preliminary analysis provides unambiguous evidence that no single number can be used to provide an accurate and valid characterization of the incidence and prevalence of homosexuality in the population at large. In sum, homosexuality is fundamentally a multidimensional phenomenon that has manifold meanings and interpretations, depending on context and purpose.[26] [Emphases added.]

More recently, in a 2002 study, psychologists Lisa M. Diamond and Ritch C. Savin-Williams make a similar point:

> The more carefully researchers map these constellations—differentiating, for example, between *gender identity* and *sexual identity*, *desire* and *behavior*, *sexual* versus *affectionate* feelings, early-appearing versus late-appearing *attractions* and *fantasies*, or social *identifications* and sexual *profiles*—the more complicated the picture becomes because few individuals report uniform inter-correlations among these domains.[27] [Emphases added.]

Some researchers acknowledge the difficulties with grouping these various components under a single rubric. For example, researchers John C. Gonsiorek and James D. Weinrich write in a 1991 book: "It can be safely assumed that there is no necessary relationship between a person's sexual behavior and self-identity unless both are individually assessed."[28] Likewise, in a 1999 review of research on the development of sexual orientation in women, social psychologist Letitia Anne Peplau argues: "There is ample documentation that same-sex attractions and behaviors are not inevitably or inherently linked to one's identity."[29]

In sum, the complexities surrounding the concept of "sexual orientation" present considerable challenges for empirical research on the subject. While the general public may be under the impression that there are widely accepted scientific definitions of terms such as "sexual orientation," in fact, there are not. Diamond's assessment of the situation in 2003 is still true today, that "there is currently no scientific or popular consensus on

the exact constellation of experiences that definitively 'qualify' an individual as lesbian, gay, or bisexual."[30]

It is owing to such complexities that some researchers, for instance Laumann, proceed by characterizing sexual orientation as a "multidimensional phenomenon." But one might just as well wonder whether, in trying to shoehorn this "multidimensional phenomenon" into a single category, we are not reifying a concept that corresponds to something far too plastic and diffuse in reality to be of much value in scientific research. While labels such as "heterosexual" and "homosexual" are often taken to designate stable psychological or even biological traits, perhaps they do not. It may be that individuals' affective, sexual, and behavioral experiences do not conform well to such categorical labels because these labels do not, in fact, refer to natural (psychological or biological) kinds. At the very least, we should recognize that we do not yet possess a clear and well-established framework for research on these topics. Rather than attempting to research sexual desire, attraction, identity, and behavior under the general rubric of "sexual orientation," we might do better to examine empirically each domain separately and in its own specificity.

To that end, this part of our report considers research on sexual desire and sexual attraction, focusing on the empirical findings related to etiology and development, and highlighting the underlying complexities. We will continue to employ ambiguous terms like "sexual orientation" where they are used by the authors we discuss, but we will try to be attentive to the context of their use and the ambiguities attaching to them.

Challenging the "Born that Way" Hypothesis

Keeping in mind these reflections on the problems of definitions, we turn to the question of how sexual desires originate and develop. Consider the different patterns of attraction between individuals who report experiencing predominant sexual or romantic attraction toward members of the same sex and those who report experiencing predominant sexual or romantic attraction toward members of the opposite sex. What are the causes of these two patterns of attraction? Are such attractions or preferences innate traits, perhaps determined by our genes or prenatal hormones; are they acquired by experiential, environmental, or volitional factors; or do they develop out of some combination of both kinds of causes? What role, if any, does human agency play in the genesis of patterns of attraction? What role, if any, do cultural or social influences play?

Research suggests that while genetic or innate factors may influence the emergence of same-sex attractions, these biological factors cannot provide a complete explanation, and environmental and experiential factors may also play an important role.

The most commonly accepted view in popular discourse we mentioned above—the "born that way" notion that homosexuality and heterosexuality are biologically innate or the product of very early developmental factors—has led many non-specialists to think that homosexuality or heterosexuality is in any given person unchangeable and determined entirely apart from choices, behaviors, life experiences, and social contexts. However, as the following discussion of the relevant scientific literature shows, this is not a view that is well-supported by research.

Studies of Twins

One powerful research design for assessing whether biological or psychological traits have a genetic basis is the study of identical twins. If the probability is high that both members in a pair of identical twins, who share the same genome, exhibit a trait when one of them does—this is known as the concordance rate—then one can infer that genetic factors are likely to be involved in the trait. If, however, the concordance rate for identical twins is no higher than the concordance rate of the same trait in fraternal twins, who share (on average) only half their genes, this indicates that the shared environment may be a more important factor than shared genes.

One of the pioneers of behavioral genetics and one of the first researchers to use twins to study the effect of genes on traits, including sexual orientation, was psychiatrist Franz Josef Kallmann. In a landmark paper published in 1952, he reported that for all the pairs of identical twins he studied, if one of the twins was gay then both were gay, yielding an astonishing 100% concordance rate for homosexuality in identical twins.[31] Were this result replicated and the study designed better, it would have given early support to the "born that way" hypothesis. But the study was heavily criticized. For example, philosopher and law professor Edward Stein notes that Kallmann did not present any evidence that the twins in his study were in fact genetically identical, and his sample was drawn from psychiatric patients, prisoners, and others through what Kallmann described as "direct contacts with the clandestine homosexual world," leading Stein to argue that Kallmann's sample "in no way constituted a reasonable cross-section of the homosexual population."[32]

(Samples such as Kallmann's are known as convenience samples, which involve selecting subjects from populations that are conveniently accessible to the researcher.)

Nevertheless, well-designed twin studies examining the genetics of homosexuality indicate that genetic factors likely play some role in determining sexual orientation. For example, in 2000, psychologist J. Michael Bailey and colleagues conducted a major study of sexual orientation using twins in the Australian National Health and Medical Research Council Twin Registry, a large probability sample, which was therefore more likely to be representative of the general population than Kallmann's.[33] The study employed the Kinsey scale to operationalize sexual orientation and estimated concordance rates for being homosexual of 20% for men and 24% for women in identical (maternal, monozygotic) twins, compared to 0% for men and 10% for women in non-identical (fraternal, dizygotic) twins.[34] The difference in the estimated concordance rates was statistically significant for men but not for women. On the basis of these findings, the researchers estimated that the heritability of homosexuality for men was 0.45 with a wide 95% confidence interval of 0.00–0.71; for women, it was 0.08 with a similarly wide confidence interval of 0.00–0.67. These estimates suggest that for males 45% of the differences between certain sexual orientations (homosexual versus heterosexuals as measured by the Kinsey scale) could be attributed to differences in genes.

The large confidence intervals in the study by Bailey and colleagues mean that we must be careful in assessing the substantive significance of these findings. The authors interpret their findings to suggest that "any major gene for strictly defined homosexuality has either low penetrance or low frequency,"[35] but their data did show (marginal) statistical significance. While the concordance estimates seem somewhat high in the models used, the confidence intervals are so wide that it is difficult to judge the reliability, including the replicability, of these estimates.

It is worth clarifying here what "heritability" means in these studies, since the technical meaning in population genetics is narrower and more precise than the everyday meaning of the word. Heritability is a measure of how much variation in a particular trait within a population can be attributed to variation in genes in that population. It is not, however, a measure of how much a trait is genetically determined.

Traits that are almost entirely genetically determined can have very low heritability values, while traits that have almost no genetic basis can be found to be highly heritable. For instance, the number of fingers human beings have is almost completely genetically determined. But there is little

variation in the number of fingers humans have, and most of the variation we do see is due to non-genetic factors such as accidents, which would lead to low heritability estimates for the trait. Conversely, cultural traits can sometimes be found to be highly heritable. For instance, whether a given individual in mid-twentieth century America wore earrings would have been found to be highly heritable, because it was highly associated with being male or female, which is in turn associated with possessing XX or XY sex chromosomes, making variability in earring-wearing behavior highly associated with genetic differences, despite the fact that wearing earrings is a cultural rather than biological phenomenon. Today, heritability estimates for earring-wearing behavior would be lower than they were in mid-twentieth century America, not because of any changes in the American gene pool, but because of the increased acceptance of men wearing earrings.[36]

So, a heritability estimate of 0.45 does not mean that 45% of sexuality is determined by genes. Rather, it means that 45% of the variation between individuals in the population studied can be attributed in some way to genetic factors, as opposed to environmental factors.

In 2010, psychiatric epidemiologist Niklas Långström and colleagues conducted a large, sophisticated twin study of sexual orientation, analyzing data from 3,826 identical and fraternal same-sex twin pairs (2,320 identical and 1,506 fraternal pairs).[37] The researchers operationalized homosexuality in terms of lifetime same-sex sexual partners. The sample's concordance rates were somewhat lower than those found in the study by Bailey and colleagues. For having had at least one same-sex partner, the concordance for men was 18% in identical twins and 11% in fraternal twins; for women, 22% and 17%, respectively. For total number of sexual partners, concordance rates for men were 5% in identical twins and 0% in fraternal twins; for women, 11% and 7%, respectively.

For men, these rates suggest an estimated heritability rate of 0.39 for having had at least one lifetime same-sex partner (with a 95% confidence interval of 0.00–0.59), and 0.34 for total number of same-sex partners (with a 95% confidence interval of 0.00–0.53). Environmental factors experienced by one twin but not the other explained 61% and 66% of the variance, respectively, while environmental factors shared by the twins failed to explain any of the variance. For women, the heritability rate for having had at least one lifetime same-sex partner was 0.19 (95% confidence interval of 0.00–0.49); for total number of same-sex partners, it was 0.18 (95% confidence interval of 0.11–0.45). Unique environmental factors accounted for 64% and 66% of the variance, respectively, while

shared environmental factors accounted for 17% and 16%, respectively. These values indicate that, while the genetic component of homosexual behavior is far from negligible, non-shared environmental factors play a critical, perhaps preponderant, role. The authors conclude that sexual orientation arises from both heritable and environmental influences unique to the individual, stating that "the present results support the notion that the individual-specific environment does indeed influence sexual preference."[38]

Another large and nationally representative study of twins published by sociologists Peter S. Bearman and Hannah Brückner in 2002 used data from the National Longitudinal Study of Adolescent to Adult Health (commonly abbreviated as "Add Health") of adolescents in grades 7–12.[39] They attempted to estimate the relative influence of social factors, genetic factors, and prenatal hormonal factors on the development of same-sex attractions. Overall, 8.7% of the 18,841 adolescents in their study reported same-sex attractions, 3.1% reported a same-sex romantic relationship, and 1.5% reported same-sex sexual behavior. The authors first analyzed the "social influence hypothesis," according to which opposite-sex twins receive less gendered socialization from their families than same-sex twins or opposite-sex siblings, and found that this hypothesis was well-supported in the case of males. While female opposite-sex twins in the study were the least likely of all the groups to report same-sex attractions (5.3%), male opposite-sex twins were the likeliest to report same-sex attractions (16.8%)—more than twice as likely as males with a full, non-twin sister (16.8% vs. 7.3%). The authors concluded there was "substantial indirect evidence in support of a socialization model at the individual level."[40]

The authors also examined the "intrauterine hormone transfer hypothesis," according to which prenatal hormone transfers between opposite-sex twin fetuses influences the sexual orientation of the twins. (Note that this is different from the more general hypothesis that prenatal hormones influence the development of sexual orientation.) In the study, the proportion of male opposite-sex twins reporting same-sex attraction was about twice as high for those without older brothers (18.7%) as for those with older brothers (8.8%). The authors argued that this finding was strong evidence against the hormone-transfer hypothesis, since the presence of older brothers should not decrease the likelihood of same-sex attraction if that attraction has a basis in prenatal hormonal transfers. However, that conclusion seems premature: the observations are consistent with the possibility of *both* hormonal factors *and* the presence of an older brother having an effect (especially if the latter influences the former). This study

also found no correlation between experiencing same-sex attraction and having multiple older brothers, which had been reported in some earlier studies.[41]

Finally, Bearman and Brückner did not find evidence of significant genetic influence on sexual attraction. Significant influence would require that identical twins have significantly higher concordance rates for same-sex attraction than fraternal twins or non-twin siblings. But in the study, the rates were statistically similar: identical twins were 6.7% concordant, dizygotic pairs 7.2% concordant, and full siblings 5.5% concordant. The authors concluded that "it is more likely that any genetic influence, if present, can only be expressed in specific and circumscribed social structures."[42] Based on their data, they suggested the one observed social structure that might enable this genetic expression is the more limited "gender socialization associated with firstborn OS [opposite-sex] twin pairs."[43] Thus, they inferred that their results "support the hypothesis that less gendered socialization in early childhood and preadolescence shapes subsequent same-sex romantic preferences."[44] While the findings here are suggestive, further research is needed to confirm this hypothesis. The authors also argued that the higher concordance rates for same-sex attraction reported in previous studies may be unreliable due to methodological problems such as non-representative samples and small sample sizes. (It should be noted, however, that these remarks were published prior to the study by Långström and colleagues discussed above, which uses a study design that does not appear to have these limitations.)

To reconcile the somewhat mixed data on heritability, we could hypothesize that attraction to the same sex may have a stronger heritable component as people age—that is, when researchers attempt to measure sexual orientation later in life (as in the 2010 study by Långström and colleagues) than when measured earlier in life. Heritability estimates can change depending on the age at which a trait is measured because changes in the environmental factors that might influence variation in the trait may vary for individuals at different ages, and because genetically influenced traits may become more fixed at a later stage in an individual's development (height, for instance, becomes fixed in early adulthood). This hypothesis is also suggested by findings, discussed below, that same-sex attraction may be more fluid in adolescence than in later stages of adulthood.

In contrast to the studies just summarized, psychiatrist Kenneth S. Kendler and colleagues conducted a large twin study using a probability sample of 794 twin pairs and 1,380 non-twin siblings.[45] Based on concordance rates for sexual orientation (defined in this study as self-iden-

tification based on attraction), the authors state that their results "suggest that genetic factors may provide an important influence on sexual orientation."[46] The study does not, however, appear to be sufficiently powerful to draw strong conclusions about the degree of genetic influence on sexuality: only 19 of 324 identical twin pairs had any non-heterosexual member, with 6 of the 19 pairs concordant; 15 of 240 same-sex fraternal twin pairs had any non-heterosexual member, with 2 of the 15 pairs concordant. Because only 8 twin pairs were concordant for non-heterosexuality, the study's ability to draw substantively significant comparisons between identical and fraternal twins (or between twins and non-twin siblings) is limited.

Overall, these studies suggest that (depending on how homosexuality is defined) in anywhere from 6% to 32% of cases, both members of an identical twin pair would be homosexual if at least one member is. Since some twin studies found higher concordance rates in identical twins than in fraternal twins or non-twin siblings, there may be genetic influences on sexual desire and behavioral preferences. One needs to bear in mind that identical twins typically have even more similar environments—early attachment experiences, peer relationships, and the like—than fraternal twins or non-twin siblings. Because of their similar appearances and temperaments, for example, identical twins may be more likely than fraternal twins or other siblings to be treated similarly. So some of the higher concordance rates may be attributable to environmental factors rather than genetic factors. In any case, if genes do play a role in predisposing people toward certain sexual desires or behaviors, these studies make clear that genetic influences cannot be the whole story.

Summarizing the studies of twins, we can say that there is no reliable scientific evidence that sexual orientation is determined by a person's genes. But there is evidence that genes play a role in influencing sexual orientation. So the question "Are gay people born that way?" requires clarification. There is virtually no evidence that anyone, gay or straight, is "born that way" if that means their sexual orientation was genetically determined. But there is some evidence from the twin studies that certain genetic profiles probably increase the likelihood the person later identifies as gay or engages in same-sex sexual behavior.

Future twin studies on the heritability of sexual orientation should include analyses of larger samples or meta-analyses or other systematic reviews to overcome the limited sample size and statistical power of some of the existing studies, and analyses of heritability rates across different dimensions of sexuality (such as attraction, behavior, and identity) to

overcome the imprecisions of the ambiguous concept of sexual orientation and the limits of studies that look at only one of these dimensions of sexuality.

Molecular Genetics

In examining the question whether, and perhaps to what extent, there may be genetic contributions to homosexuality, we have so far looked at studies that employ methods of classical genetics to estimate the heritability of a trait like sexual orientation but that do not identify particular genes that may be associated with the trait.[47] But genetics can also be studied using what are often called molecular methods that provide estimates of which particular genetic variations are associated with traits, whether physical or behavioral.

One early attempt to identify a more specific genetic basis for homosexuality was a 1993 study by geneticist Dean Hamer and colleagues of 40 pairs of homosexual brothers.[48] By examining the family history of homosexuality for these individuals, they identified a possible linkage between homosexuality in males and genetic markers on the Xq28 region of the X chromosome. Attempts to replicate this influential study's results have had mixed results: George Rice and colleagues attempted and failed to replicate Hamer's findings,[49] though in 2015 Alan R. Sanders and colleagues were able to replicate Hamer's original findings using a larger population size of 409 male twin pairs of homosexual brothers, and to find additional genetic linkage sites.[50] (Since the effect was small, however, the genetic marker would not be a good predictor of sexual orientation.)

Genetic linkage studies like the ones discussed above are able to identify particular regions of chromosomes that may be associated with a trait by looking at patterns of inheritance. Today, one of the chief methods for inferring which genetic variants are associated with a trait is the genome-wide association study, which uses DNA sequencing technologies to identify particular differences in DNA that may be associated with a trait. Scientists examine millions of genetic variants in large numbers of individuals who have a particular trait, as well as individuals who do not have the trait, and compare the frequency of genetic variants among those who do and do not have the trait. Specific genetic variants that occur more frequently among those who have than those who do not have the trait are inferred to have some association with that trait. Genome-wide association studies have become popular in recent years, yet few such scientific studies have found significant associations of genetic variants with sexual

orientation. The largest attempt to identify genetic variants associated with homosexuality, a study of over 23,000 individuals from the 23andMe database presented at the American Society of Human Genetics annual meeting in 2012, found no linkages reaching genome-wide significance for same-sex sexual identity for males or females.[51]

So, again, the evidence for a genetic basis for homosexuality is inconsistent and inconclusive, which suggests that, though genetic factors explain some of the variation in sexual orientation, the genetic contribution to this trait is not likely to be strong and even less likely to be decisive.

As is often true of human behavioral tendencies, there may be genetic contributions to the tendency toward homosexual inclinations or behaviors. Phenotypic expression of genes is usually influenced by environmental factors—different environments may lead to different phenotypes even for the same genes. So even if there are genetic factors that contribute to homosexuality, an individual's sexual attractions or preferences may also be influenced by a number of environmental factors, such as social stressors, including emotional, physical, or sexual abuse. Looking to developmental, environmental, experiential, social, or volitional factors will be necessary to arrive at a fuller picture of how sexual interests, attractions, and desires develop.

The Limited Role of Genetics

Lay readers might note at this point that even at the purely biological level of genetics, the shopworn "nature vs. nurture" debates regarding human psychology have been abandoned by scientists, who recognize that no credible hypothesis can be offered for any particular traits that would be determined either purely by genetics or the environment. The growing field of epigenetics, for example, demonstrates that even for relatively simple traits, gene expression itself can be influenced by innumerable other external factors that can shape the functioning of genes.[52] This is even more relevant when it comes to the relationship between genes and complex traits like sexual attraction, drives, and behaviors.

These gene-environment relationships are complex and multidimensional. Non-genetic developmental factors and environmental experiences may be sculpted, in part, by genetic factors working in subtle ways. For example, social geneticists have documented the indirect role of genes in peer-aligned behaviors, such that an individual's physical appearance could influence whether a particular social group will include or exclude that individual.[53]

Contemporary geneticists know that genes can influence a person's range of interests and motivations, therefore indirectly affecting behavior. While genes may in this way incline a person to certain behaviors, compelling behavior directly, independently of a wide range of other factors, seems less plausible. They may influence behavior in more subtle ways, depending on external environmental stimuli (for instance, peer pressure, suggestion, and behavioral rewards) in conjunction with psychological factors and physical makeup. Dean Hamer, whose work on the possible role of genetics in homosexuality was examined above, explained some of the limitations of behavioral genetics in a 2002 article in *Science*: "The real culprit [of lack of progress in behavioral genetics] is the assumption that the rich complexity of human thought and emotion can be reduced to a simple, linear relation between individual genes and behaviors.... This oversimplified model, which underlies most current research in behavior genetics, ignores the critical importance of the brain, the environment, and gene expression networks."[54]

The genetic influences affecting any complex human behavior—whether sexual behaviors, or interpersonal interactions—depend in part on individuals' life experiences as they mature. Genes constitute only one of the many key influences on behavior in addition to environmental influences, personal choices, and interpersonal experiences. The weight of evidence to date strongly suggests that the contribution of genetic factors is modest. We can say with confidence that genes are not the sole, essential cause of sexual orientation; there is evidence that genes play a modest role in contributing to the development of sexual attractions and behaviors but little evidence to support a simplistic "born that way" narrative concerning the nature of sexual orientation.

The Influence of Hormones

Another area of research relevant to the hypothesis that people are born with dispositions toward different sexual orientations involves prenatal hormonal influences on physical development and subsequent male- or female-typical behaviors in early childhood. For ethical and practical reasons, the experimental work in this field is carried out in non-human mammals, which limits how this research can be generalized to human cases. However, children who are born with disorders of sexual development (DSD) serve as a population in which to examine the influence of genetic and hormonal abnormalities on the subsequent development of non-typical sexual identity and sexual orientation.

Hormones responsible for sexual differentiation are generally thought to exert on the developing fetus either *organizational* effects—which produce permanent changes in the wiring and sensitivity of the brain, and thus are considered largely irreversible—or *activating* effects, which occur later in an individual's life (at puberty, and into adulthood).[55] Organizational hormones may prime the fetal systems (including the brain) structurally, and set the stage for sensitivity to hormones presenting at puberty and beyond, when the hormone will then "activate" systems which were "organized" prenatally.

Periods of peak response to the hormonal environment are thought to occur during gestation. For example, testosterone is thought to influence the male fetus maximally between weeks 8 and 24, and then again at birth, until about three months of age.[56] Estrogens are provided throughout gestation by the placenta and the mother's blood system.[57] Studies in animals reveal there may even be multiple periods of sensitivity for a variety of hormones, that the presence of one hormone may influence the action of another hormone, and the sensitivity of the receptors for these hormones can influence their actions.[58] Sexual differentiation, alone, is a highly complex system.

Specific hormones of interest in this area of research are testosterone, dihydrotestosterone (a metabolite of testosterone, and more potent than testosterone), estradiol, progesterone, and cortisol. The generally accepted pathways of normal hormonal influence of development in utero are as follows. The typical pattern of sex differentiation in human fetuses begins with the differentiation of the sex organs into testes or ovaries, a process that is largely genetically controlled. Once these organs have differentiated, they produce specific hormones that determine development of external genitalia. This window of time in gestation is when hormones exert their phenotypic and neurological effects. Testosterone secreted by the testes contributes to the development of male external genitalia and affects neurological development in males;[59] it is the absence of testosterone in females which allows for the female pattern of external genitalia to develop.[60] Imbalances of testosterone or estrogen, as well as their presence or absence at specific critical periods of gestation, may cause disorders of sexual development. (Genetic or environmental effects can also lead to disorders of sexual development.)

Stress may also play some role in influencing the way hormones shape gonadal development, neurodevelopment, and subsequent sex-typical behaviors in early childhood.[61] Cortisol is the main hormone associated

with stress responses. It may originate from the mother, if she experiences severe stressors during her pregnancy, or from the fetus under stress.[62] Elevated levels of cortisol may also occur from genetic defects.[63] One of the most extensively studied disorders of sexual development is congenital adrenal hyperplasia (CAH), which in females can result in genital virilization.[64] Over 90% of cases of CAH result from a mutation in a gene that codes for an enzyme that helps synthesize cortisol.[65] This results in an overproduction of cortisol precursors, some of which are converted into androgens (hormones associated with male sex development).[66] As a result, girls are born with some degree of virilization of their genitalia, depending on the severity of the genetic defect.[67] For severe cases of genital virilization, surgical intervention is sometimes performed to normalize the genitalia. Hormone therapies are also often administered to mitigate the effects of excess androgen production.[68] Females with CAH, who as fetuses were exposed to above-average levels of androgens, are less likely to be exclusively heterosexual than females without CAH, and females with more severe forms of CAH are more likely to be non-heterosexual than females with milder forms of the condition.[69]

Likewise, there are disorders of sexual development in genetic males affected by androgen insensitivity. In males with androgen insensitivity syndrome, the testes produce testosterone normally, but the receptors to testosterone are not functional.[70] The genitalia, at birth, appear to be female, and the child is usually raised as a female. The individual's endogenous testosterone is broken down into estrogen, such that the individual begins to develop female secondary sex characteristics.[71] It does not become apparent that there is a problem until puberty, when the individual does not start menses appropriately.[72] These patients generally prefer to continue life as females, and their sexual orientation does not differ from females having an XX genotype.[73] Studies have suggested that they are just as likely if not more likely to be exclusively interested in male partners than XX females.[74]

There are other disorders of sexual development affecting some genetic males (i.e., with an XY genotype) in whom androgen deficiencies are a direct result of the lack of enzymes either to synthesize dihydrotestosterone from testosterone or to produce testosterone from its precursor hormone.[75] Individuals with these deficiencies are born with varied degrees of ambiguous genitalia, and are sometimes raised as girls. During puberty, however, these individuals often experience physical virilization, and must then decide whether to live as men or women. Peggy T. Cohen-Kettenis, a professor of gender development and psychopathology, found that 39 to

64% of individuals with these deficiencies who are raised as girls change to live as men in adolescence and early adulthood, and she also reported that "the degree of external genital masculinization at birth does not seem to be related to gender role changes in a systematic way."[76]

The twin studies reviewed earlier may shed light on the role of maternal hormonal influences, since both identical and fraternal twins are exposed to similar maternal hormonal influences in utero. The relatively weak concordance rates in the twin studies suggest that prenatal hormones, like genetic factors, do not play a strongly determinative role in sexual orientation. Other attempts at finding significant hormonal influences on sexual development have likewise been mixed, and the salience of the findings is not yet clear. Since direct studies of prenatal hormonal influences on sexual development are methodologically difficult, some studies have tried to develop models whereby differences in prenatal hormonal exposure can be inferred indirectly—by measuring subtle morphological changes or by examining hormonal disorders that are present later during development.

For example, one rough proxy of prenatal testosterone levels used by researchers is the ratio between the length of the second finger (index finger) and the fourth finger (ring finger), which is commonly called the "2D:4D ratio." Some evidence suggests that the ratio may be influenced by prenatal exposure to testosterone, such that in males higher levels of exposure to testosterone cause shorter index fingers relative to the ring finger (or having a low 2D:4D ratio), and vice versa.[77] According to one hypothesis, homosexual men may have a higher 2D:4D ratio (closer to the ratio found in females than in heterosexual males), while another hypothesis suggests the opposite, that homosexual men may be hypermasculinized by prenatal testosterone, resulting in a lower ratio than in heterosexual men. For women, the hypothesis for homosexuality that they have been hypermasculinized (lower ratio, higher testosterone) has also been proposed. Several studies comparing this trait in homosexually versus heterosexually identified men and women have shown mixed results.

A study published in *Nature* in 2000 found that in a sample of 720 California adults, the right-hand 2D:4D ratio of homosexual women was significantly more masculine (that is, the ratio was smaller) than that of heterosexual women and did not differ significantly from that of heterosexual men.[78] This study also found no significant difference in mean 2D:4D ratio between heterosexual and homosexual men. Another study that year, which used a relatively small sample of homosexual and heterosexual men from the United Kingdom, reported a lower 2D:4D (that

is, more masculine) ratio in homosexual men.[79] A 2003 study using a London-based sample also found that homosexual men had a lower 2D:4D ratio than heterosexuals,[80] while two other studies with samples from California and Texas showed *higher* 2D:4D ratios for homosexual men.[81]

A 2003 twin study compared seven female monozygotic twin pairs discordant for homosexuality (one twin was lesbian) and five female monozygotic twin pairs concordant for homosexuality (both twins were lesbian).[82] In the twin pairs discordant for sexual orientation, the individuals identifying as homosexual had significantly lower 2D:4D ratios than their twins, whereas the concordant twins showed no difference. The authors interpreted this result as suggesting that "low 2D:4D ratio is a result of differences in prenatal environment."[83] Finally, a 2005 study of 2D:4D ratios in an Austrian sample of 95 homosexual and 79 heterosexual men found that the 2D:4D ratios of heterosexual men were not significantly different from those of homosexual men.[84] After reviewing the several studies on this trait, the authors conclude that "more data are essential before we can be sure whether there is a 2D:4D effect for sexual orientation in men when ethnic variation is controlled for."[85]

Much research has examined the effects of prenatal hormones on behavior and brain structure. Again, these results come primarily from studies of non-human primates, but the study of disorders of sexual development has provided helpful insights into the effects of hormones on sexual development in humans. Since hormonal influences typically occur during time-sensitive periods of development, when their effects manifest physically, it is reasonable to assume that organizational effects of these early, time-linked hormonal patterns are likely to direct aspects of neural development. Neuroanatomical connectivity and neurochemical sensitivities may be among such influences.

In 1983, Günter Dörner and colleagues performed a study investigating whether there is any relationship between maternal stress during pregnancy and later sexual identity of their children, interviewing two hundred men about stressful events that may have occurred to their mothers during their prenatal lives.[86] Many of these events occurred as a consequence of World War II. Of men who reported that their mothers had experienced moderately to severely stressful events during pregnancy, 65% were homosexual, 25% were bisexual, and 10% were heterosexual. (Sexual orientation was assessed using the Kinsey scale.) However, more recent studies have shown much smaller or no significant correlations.[87] In a 2002 prospective study on the relationship between sexual orientation and prenatal stress during the second and third trimesters, Hines

and colleagues found that stress reported by mothers during pregnancy showed "only a small relationship" to male-typical behaviors in their daughters at the age of 42 months, "and no relationship at all" to female-typical behaviors in their sons.[88]

In summary, some forms of prenatal hormone exposure, particularly CAH in females, are associated with differences in sexual orientation, while other factors are often important in determining the physical and psychological effects of those exposures. Hormonal conditions that contribute to disorders of sex development may contribute to the development of non-heterosexual orientations in some individuals, but this does not demonstrate that such factors explain the development of sexual attractions, desires, and behaviors in the majority of cases.

Sexual Orientation and the Brain

There have been several studies examining neurobiological differences between individuals who identify as heterosexual and those who identify as homosexual. This work began with neuroscientist Simon LeVay's 1991 study that reported biological differences in the brains of gay men as compared to straight men—specifically, a difference in volume in a particular cell group of the interstitial nuclei of the anterior hypothalamus (INAH3).[89] Later work by psychiatrist William Byne and colleagues showed more nuanced findings: "In agreement with two prior studies… we found INAH3 to be sexually dimorphic, occupying a significantly greater volume in males than females. In addition, we determined that the sex difference in volume was attributable to a sex difference in neuronal number and not in neuronal size or density."[90] The authors noted that, "Although there was a trend for INAH3 to occupy a smaller volume in homosexual men than in heterosexual men, there was no difference in the number of neurons within the nucleus based on sexual orientation." They speculated that "postnatal experience" may account for the differences in volume in this region between homosexual and heterosexual men, though this would require further research to confirm.[91] They also noted that the functional significance of sexual dimorphism in INAH3 is unknown. The authors conclude: "Based on the results of the present study as well as those of LeVay (1991), sexual orientation cannot be reliably predicted on the basis of INAH3 volume alone."[92] In 2002, psychologist Mitchell S. Lasco and colleagues published a study examining a different part of the brain—the anterior commissure—and found that there were no significant differences in that area based either on sex or sexual orientation.[93]

Other studies have since been conducted to ascertain structural or functional differences between the brains of heterosexual and homosexual individuals (using a variety of criteria to define these categories). Findings from several of these studies are summarized in a 2008 commentary published in the *Proceedings of the National Academy of Sciences*.[94] Research of this kind, however, does not seem to reveal much of relevance regarding the etiology or biological origins of sexual orientation. Due to inherent limitations, this research literature is fairly unremarkable. For example, in one study functional MRI was used to measure activity changes in the brain when pictures of men and women were shown to subjects, finding that viewing a female face produced stronger activity in the thalamus and orbitofrontal cortex of heterosexual men and homosexual women, whereas in homosexual men and heterosexual women these structures reacted more strongly to the face of a man.[95] That the brains of heterosexual women and homosexual men reacted distinctively to the faces of men, whereas the brains of heterosexual men and homosexual women reacted distinctively to the faces of women, is a finding that seems rather trivial with respect to understanding the etiology of homosexual attractions. In a similar vein, one study reported different responses to pheromones between homosexual and heterosexual men,[96] and a follow-up study showed a similar finding in homosexual compared to heterosexual women.[97] Another study showed differences in cerebral asymmetry and functional connectivity between homosexual and heterosexual subjects.[98]

While findings of this kind may suggest avenues for future investigation, they do not move us much closer to an understanding of the biological or environmental determinants of sexual attractions, interests, preferences, or behaviors. We will say more about this below. For now, we will briefly illustrate a few of the inherent limitations in this area of research with the following hypothetical example. Suppose we were to study the brains of yoga teachers and compare them to the brains of bodybuilders. If we search long enough, we will eventually find statistically significant differences in some area of brain morphology or brain function between these two groups. But this would not imply that such differences determined the different life trajectories of the yoga teacher and the bodybuilder. The brain differences could have been the result, rather than the cause, of distinctive patterns of behavior or interests.[99] Consider another example. Suppose that gay men tend to have less body fat than straight men (as indicated by lower average scores on body mass indices). Even though body mass is, in part, determined by genetics, we could not claim based on this finding that there is some innate, genetic cause of both body

mass and homosexuality at work. It could be the case, for instance, that being gay is associated with a diet that lowers body mass. These examples illustrate one of the common problems encountered in the popular interpretation of such research: the suggestion that the neurobiological pattern determines a particular behavioral expression.

With this overview of studies on biological factors that might influence sexual attraction, preferences, or desires, we can understand the rather strong conclusion by social psychologist Letitia Anne Peplau and colleagues in a 1999 review article: "To recap, more than 50 years of research has failed to demonstrate that biological factors are a major influence in the development of women's sexual orientation.... Contrary to popular belief, scientists have not convincingly demonstrated that biology determines women's sexual orientation."[100] In light of the studies we have summarized here, this statement could also be made for research on male sexual orientation, however this concept is defined.

Misreading the Research

There are some significant built-in limitations to what the kind of empirical research summarized in the preceding sections can show. Ignoring these limitations is one of the main reasons the research is routinely misinterpreted in the public sphere. It may be tempting to assume, as we just saw with the example of brain structure, that if a particular biological profile is associated with some behavioral or psychological trait, then that biological profile *causes* that trait. This reasoning relies on a fallacy, and in this section we explain why, using concepts from the field of epidemiology. While some of these issues are rather technical in detail, we will try to explain them in a general way that is accessible to the non-specialist reader.

Suppose for the sake of illustration that one or more differences in a biological trait are found between homosexual and heterosexual men. That difference could be a discrete measure (call this D) such as presence of a genetic marker, or it could be a continuous measure (call this C) such as the average volume of a particular part of the brain.

Showing that a risk factor significantly increases the chances of a particular health outcome or a behavior might give us a clue to development of that health outcome or that behavior, but it does not provide evidence of causation. Indeed, it may not provide evidence of anything but the weakest of correlations. The inference is sometimes made that if it can be shown that gay men and straight men differ significantly in the

probability that D is present (whether a gene, a hormonal factor, or something else), no matter how low that probability, then this finding suggests that being gay has a biological basis. But this inference is unwarranted. Doubling (or even tripling or quadrupling) the probability of a relatively rare trait can have little value in terms of predicting who will or will not identify as gay.

The same would be true for any continuous variable (C). Showing a significant difference at the mean or average for a given trait (such as the volume of a particular brain region) between men who identify as heterosexual and men who identify as homosexual does not suffice to show that this average difference contributes to the probability of identifying as heterosexual or homosexual. In addition to the reasons explained above, a significant difference at the means of two distributions can be consistent with a great deal of overlap between the distributions. That is, there may be virtually no separation in terms of distinguishing between some individual members of each group, and thus the measure would not provide much predictability for sexual orientation or preference.

Some of these issues could, in part, be addressed by additional methodological approaches, such as the use of a training sample or cross-validation procedures. A training sample is a small sample used to develop a model (or hypothesis); this model is then tested on a larger independent sample. This method avoids testing a hypothesis on the same data used to develop the hypothesis. Cross-validation includes procedures used to examine whether a statistically significant effect is really there or just due to chance. If one wants to show the result did not occur by chance (and if the sample is large), one can run the same tests on a random split of the relevant sample. After finding a difference in the prevalence of trait D or C between a gay sample and a straight sample, researchers could randomly split the gay sample into two groups and then show that these two groups do not differ regarding D or C. Suppose one finds five differences out of 100 comparing gay to straight men in the overall samples, then finds five differences out of 100 when comparing the split gay samples. This would cast additional doubt on the initial finding of a difference between the means of gay and straight individuals.

Sexual Abuse Victimization

Whereas the preceding discussion considered the part that biological factors might play in the development of sexual orientation, this section will summarize evidence that a particular environmental factor—childhood

sexual abuse—is reported significantly more often among those who later identify as homosexual. The results presented below raise the question whether there is an association between sexual abuse, particularly in childhood, and later expressions of sexual attraction, behavior, or identity. If so, might child abuse increase the probability of having a non-heterosexual orientation?

Correlations, at least, have been found, as we will summarize below. But we should note first that they might be accounted for by one or more of the following conjectures:

1. Abuse might contribute to the development of non-heterosexual orientation.

2. Children with (signs of future) non-heterosexual tendencies might attract abusers, placing them at elevated risk.

3. Certain factors might contribute to *both* childhood sexual abuse and non-heterosexual tendencies (for instance, a dysfunctional family or an alcoholic parent).

It should be kept in mind that these three hypotheses are not mutually exclusive; all three, and perhaps others, might be operative. As we summarize the studies on this issue, we will try to evaluate each of these hypotheses in light of current scientific research.

Behavioral and community health professor Mark S. Friedman and colleagues conducted a 2011 meta-analysis of 37 studies from the United States and Canada examining sexual abuse, physical abuse, and peer victimization in heterosexuals as compared to non-heterosexuals.[101] Their results showed that non-heterosexuals were on average 2.9 times more likely to report having been abused as children (under 18 years of age). In particular, non-heterosexual males were 4.9 times likelier—and non-heterosexual females, 1.5 times likelier—than their heterosexual counterparts to report sexual abuse. Non-heterosexual adolescents as a whole were 1.3 times likelier to indicate physical abuse by parents than their heterosexual peers, but gay and lesbian adolescents were only 0.9 times as likely (bisexuals were 1.4 times as likely). As for peer victimization, non-heterosexuals were 1.7 times likelier to report being injured or threatened with a weapon or being attacked.

The authors note that although they hypothesized that the rates of abuse would decrease as social acceptance of homosexuality rose, "disparities in prevalence rates of sexual abuse, parental physical abuse, and peer

victimization between sexual minority and sexual nonminority youths did not change from the 1990s to the first decade of the 2000s."[102] While these authors cite authorities who claim that sexual abuse does not "cause individuals to become gay, lesbian, or bisexual,"[103] their data do not give evidence against the hypothesis that childhood sexual abuse might affect sexual orientation. On the other hand, the causal path could be in the opposite direction or bi-directional. The evidence does not refute or support this conjecture; the study's design is not capable of shedding much light on the question of directionality.

The authors invoke a widely-cited hypothesis to explain the higher rates of sexual abuse among non-heterosexuals, the hypothesis that "sexual minority individuals are…more likely to be targeted for sexual abuse, as youths who are perceived to be gay, lesbian, or bisexual are more likely to be bullied by their peers."[104] The two conjectures—that abuse is a cause and that it is a result of non-heterosexual tendencies—are not mutually exclusive: abuse may be a causal factor in the development of non-heterosexual attractions and desires, and at the same time non-heterosexual attractions, desires, and behaviors may increase the risk of being targeted for abuse.

Community health sciences professor Emily Faith Rothman and colleagues conducted a 2011 systematic review of the research investigating the prevalence of sexual assault against people who identify as gay, lesbian, or bisexual in the United States.[105] They examined 75 studies (25 of which used probability sampling) involving a total of 139,635 gay or bisexual (GB) men and lesbian or bisexual (LB) women, which measured the prevalence of victimization due to lifetime sexual assault (LSA), childhood sexual assault (CSA), adult sexual assault (ASA), intimate partner sexual assault (IPSA), and hate-crime-related sexual assault (HC). Although the study was limited by not having a heterosexual control group, it showed alarmingly high rates of sexual assault, including childhood sexual assault, for this population, as summarized in Table 1.

Using a multi-state probability-based sample in a 2013 study, psychologist Judith Anderson and colleagues compared differences in adverse childhood experiences—including dysfunctional households; physical, sexual, or emotional abuse; and parental discord—among self-identified homosexual, heterosexual, and bisexual adults.[106] They found that bisexuals had significantly higher proportions than heterosexuals of all adverse childhood experience factors, and that gays and lesbians had significantly higher proportions than heterosexuals of all these measures except parental separation or divorce. Overall, gays and lesbians had nearly 1.7 times,

Table 1. Sexual Assault among Gay/Bisexual Men and Lesbian/Bisexual Women

GB Men (%)	LB Women (%)
CSA: 4.1–59.2 (median 22.7)	CSA: 14.9–76.0 (median 34.5)
ASA: 10.8–44.7 (median 14.7)	ASA: 11.3–53.2 (median 23.2)
LSA: 11.8–54.0 (median 30.4)	LSA: 15.6–85.0 (median 43.4)
IPSA: 9.5–57.0 (median 12.1)	IPSA: 3.0–45.0 (median 13.3)
HC: 3.0–19.8 (median 14.0)	HC: 1.0–12.3 (median 5.0)

and bisexuals 1.6 times, the heterosexual rate of adverse childhood experiences. The data for abuse are summarized in Table 2.

While this study, like some others we have discussed, may be limited by recall bias—that is, inaccuracies introduced by errors of memory—it has the merit of having a control group of self-identified heterosexuals to compare with self-identified gay/lesbian and bisexual cohorts. In their discussion of findings, the authors critique the hypothesis that childhood trauma has a causal relationship to homosexual preferences. Among their reasons for skepticism, they note that the vast majority of individuals who suffer childhood trauma do not become gay or bisexual, and that gender-nonconforming behavior may help explain the elevated rates of abuse. However, it is plausible from these and related results to hypothesize

Table 2. Adverse Childhood Experiences among Gays/Lesbians, Bisexuals, and Heterosexuals

Sexual Abuse (%)

GLs	Bisexuals	Heterosexuals
29.7	34.9	14.8

Emotional Abuse (%)

GLs	Bisexuals	Heterosexuals
47.9	48.4	29.6

Physical Abuse (%)

GLs	Bisexuals	Heterosexuals
29.3	30.3	16.7

that adverse childhood experiences may be a significant—but not a determinative—factor in developing homosexual preferences. Further studies are needed to see whether either or both hypotheses have merit.

A 2010 study by professor of social and behavioral sciences Andrea Roberts and colleagues examined sexual orientation and risk of post-traumatic stress disorder (PTSD) using data from a national epidemiological face-to-face survey of nearly 35,000 adults.[107] Individuals were placed into several categories: heterosexual with no same-sex attraction or partners (reference group); heterosexual with same-sex attraction but no same-sex partners; heterosexual with same-sex partners; self-identified gay/lesbian; and self-identified bisexual. Among those reporting exposure to traumatic events, gay and lesbian individuals as well as bisexuals had about twice the lifetime risk of PTSD compared to the heterosexual reference group. Differences were found in rates of childhood maltreatment and interpersonal violence: gays, lesbians, bisexuals, and heterosexuals with same-sex partners reported experiencing worse traumas during childhood and adolescence than the reference group. The findings are summarized in Table 3.

Similar patterns emerged in a 2012 study by psychologist Brendan Zietsch and colleagues that primarily focused on the distinct question of whether common causal factors could explain the association between sexual orientation—in this study defined as sexual preference—and depression.[108] In a community sample of 9,884 adult twins, the authors found that non-heterosexuals had significantly elevated prevalence of lifetime depression (odds ratio for males 2.8; odds ratio for females 2.7). As the authors point out, the data raised questions about whether higher rates of depression for non-heterosexuals could be explained, in their entirety, by the social stress hypothesis (the idea, discussed in depth in Part Two of this report, that social stress

Table 3. Childhood Exposure to Maltreatment or Interpersonal Violence (before Age 18)

Women	Men
49.2% of lesbians	31.5% of gays
51.2% of bisexuals	Approximately 32% of bisexuals[109]
40.9% of heterosexuals with same-sex partners	27.9% of heterosexuals with same-sex partners
21.2% of heterosexuals	19.8% of heterosexuals

experienced by sexual minorities accounts for their elevated risks of poor mental health outcomes). Heterosexuals with a non-heterosexual twin had higher rates of depression (39%) than heterosexual twin pairs (31%), suggesting that genetic, familial, or other factors may play a role.

The authors note that "in both males and females, significantly higher rates of non-heterosexuality were found in participants who experienced childhood sexual abuse and in those with a risky childhood family environment."[110] Indeed, 41% of non-heterosexual males and 42% of non-heterosexual females reported childhood family dysfunction, compared to 24% and 30% of heterosexual males and females, respectively. And 12% of non-heterosexual males and 24% of non-heterosexual females reported sexual abuse before the age of 14, compared with 4% and 11% of heterosexual males and females, respectively. The authors are careful to emphasize that their findings should not be interpreted as disproving the social stress hypothesis, but suggest that there may be other factors at work. Their findings do, however, suggest there could be common etiological factors for depression and non-heterosexual preferences, as they found that genetic factors account for 60% of the correlation between sexual orientation and depression.[111]

In a 2001 study, psychologist Marie E. Tomeo and colleagues noted that the previous literature had consistently found increased rates of reported childhood molestation in the homosexual population, with somewhere between 10% and 46% reporting that they had experienced childhood sexual abuse.[112] The authors found that 46% of homosexual men and 22% of homosexual women reported that they had been molested by a person of the same gender, as compared with 7% of heterosexual men and 1% of heterosexual women. Moreover, 38% of homosexual women interviewed did not identify as homosexual until after the abuse, while the authors report conflicting figures—68% in one part of the paper and (by inference) 32% in another—for the number of homosexual men who did not identify as homosexual until after the abuse. The sample for this study was relatively small, only 267 individuals; also, the "sexual contact" measure of abuse in the survey was somewhat vague, and the subjects were recruited from participants in gay pride events in California. But the authors state that "it is most unlikely that all the present findings apply only to homosexual persons who go to homosexual fairs and volunteer to participate in questionnaire research."[113]

In 2010, psychologists Helen Wilson and Cathy S. Widom published a prospective 30-year follow-up study—one that looked at children who had experienced abuse or neglect between 1961 and 1971, and then followed up with those children after 30 years—to ascertain whether physical abuse, sexual abuse, or neglect in childhood increased the likelihood of same-sex

sexual relationships later in life.[114] An original sample of 908 abused and/or neglected children was matched with a non-maltreated control group of 667 individuals (matched for age, sex, race or ethnicity, and approximate socioeconomic status). Homosexuality was operationalized as anyone who had cohabited with a same-sex romantic partner or had a same-sex sexual partner, which made up 8% of the sample. Among these 8%, most individuals also reported having had opposite-sex partners, suggesting high rates of bisexuality or fluidity in sexual attractions or behaviors. The study found that those who reported histories of childhood sexual abuse were 2.8 times more likely to report having had same-sex sexual relationships, though the "relationship between childhood sexual abuse and same-sex sexual orientation was significant only for men."[115] This finding suggested that boys who are sexually abused may be more likely to establish both heterosexual and homosexual relationships.

The authors advised caution in interpreting this result, because the sample size of sexually abused men was small, but the association remained statistically significant when they controlled for total lifetime number of sexual partners and for engaging in prostitution. The study was also limited by a definition of sexual orientation that was not sensitive to how participants identified themselves. It may have failed to capture people with same-sex attractions but no same-sex romantic relationship history. The study had two notable methodological strengths. The prospective design is better suited for evaluating causal relationships than the typical retrospective design. Also, the childhood abuse recorded was documented when it occurred, thus mitigating recall bias.

Having examined the statistical association between childhood sexual abuse and later homosexuality, we turn to the question of whether the association suggests causation.

A 2013 analysis by health researcher Andrea Roberts and colleagues attempted to provide an answer to this question.[116] The authors noted that while studies show 1.6 to 4 times more reported childhood sexual and physical abuse among gay and lesbian individuals than among heterosexuals, conventional statistical methods cannot demonstrate a strong enough statistical relationship to support the argument of causation. They argued that a sophisticated statistical method called "instrumental variables," imported from econometrics and economic analysis, could increase the level of association.[117] (The method is somewhat similar to the method of "propensity scores," which is more sophisticated and more familiar to public health researchers.) The authors applied the method of instrumental variables to data collected from a nationally representative sample.

They used three dichotomous measures of sexual orientation: any vs. no same-sex attraction; any vs. no lifetime same-sex sexual partners; and lesbian, gay, or bisexual vs. heterosexual self-identification. As in other studies, the data showed associations between childhood sexual abuse or maltreatment and all three dimensions of non-heterosexuality (attraction, partners, identity), with associations between sexual abuse and sexual identity being the strongest.

The authors' instrumental variable models suggested that early sexual abuse increased the predicted rate of same-sex attraction by 2.0 percentage points, same-sex partnering by 1.4 percentage points, and same-sex identity by 0.7 percentage points. The authors estimated the rate of homosexuality that might be attributable to sexual abuse "using effect estimates from conventional models" and found that on conventional effect estimates, "9% of same-sex attraction, 21% of any lifetime same-sex sexual partnering, and 23% of homosexual or bisexual identity was due to childhood sexual abuse."[118] We should note that these correlations are cross-sectional: they compare groups of people to groups of people, rather than model the course of individuals over time. (A study design with a time-series analysis would give the strongest statistical support to the claim of causality.) Additionally, these results have been strongly criticized on methodological grounds for having made unjustified assumptions in the instrumental variables regression; a commentary by Drew H. Bailey and J. Michael Bailey claims, "Not only do Roberts et al.'s results fail to provide support for the idea that childhood maltreatment causes adult homosexuality, the pattern of differences between males and females is opposite what should be expected based on better evidence."[119]

Roberts and colleagues conclude their study with several conjectures to explain the epidemiological associations. They echo suggestions made elsewhere that sexual abuse perpetrated by men might cause boys to think they are gay or make girls averse to sexual contact with men. They also conjecture that sexual abuse might leave victims feeling stigmatized, which in turn might make them more likely to act in ways that are socially stigmatized (as by engaging in same-sex sexual relationships). The authors also point to the biological effects of maltreatment, citing studies that show that "quality of parenting" can affect chemical and hormonal receptors in children, and hypothesizing that this might influence sexuality "through epigenetic changes, particularly in the stria terminalis and the medial amygdala, brain regions that regulate social behavior."[120] They also mention the possibilities that emotional numbing caused by maltreatment may drive victims to seek out risky behaviors associated

with same-sex sexuality, or that same-sex attractions and partnering may result from "the drive for intimacy and sex to repair depressed, stressed, or angry moods," or from borderline personality disorder, which is a risk factor in individuals who have been maltreated.[121]

In short, while this study suggests that sexual abuse may sometimes be a causal contributor to having a non-heterosexual orientation, more research is needed to elucidate the biological or psychological mechanisms. Without such research, the idea that sexual abuse may be a causal factor in sexual orientation remains speculative.

Distribution of Sexual Desires and Changes Over Time

However sexual desires and interests develop, there is a related issue that scientists debate: whether sexual desires and attractions tend to remain fixed and unalterable across the lifespan of a person—or are fluid and subject to change over time but tend to become fixed after a certain age or developmental period. Advocates of the "born that way" hypothesis, as mentioned earlier, sometimes argue that a person is not only born with a sexual orientation but that that orientation is immutable; it is fixed for life.

There is now considerable scientific evidence that sexual desires, attractions, behaviors, and even identities can, and sometimes do, change over time. For findings in this area we can turn to the most comprehensive study of sexuality to date, the 1992 National Health and Social Life Survey conducted by the National Opinion Research Center at the University of Chicago (NORC).[122] Two important publications have appeared using data from NORC's comprehensive survey: *The Social Organization of Sexuality: Sexual Practices in the United States*, a large tome of data intended for the research community, and *Sex in America: A Definitive Survey*, a smaller and more accessible book summarizing the findings for the general public.[123] These books present data from a reliable probability sample of the American population between ages 18 and 59.

According to data from the NORC survey, the estimated prevalence of non-heterosexuality, depending on how it was operationalized, and on whether the subjects were male or female, ranged between roughly 1% and 9%.[124] The NORC studies added scientific respectability to sexual surveys, and these findings have been largely replicated in the United States and abroad. For example, the British National Survey of Sexual Attitudes and Lifestyles (Natsal) is probably the most reliable source of information on sexual behavior in that country—a study conducted every ten years since 1990.[125]

The NORC study also suggested ways in which sexual behaviors and identities can vary significantly under different social and environmental circumstances. The findings revealed, for example, a sizable difference in rates of male homosexual behavior among individuals who spent their adolescence in rural as compared to large metropolitan cities in America, suggesting the influence of social and cultural environments. Whereas only 1.2% of males who had spent their adolescence in a rural environment responded that they had had a male sexual partner in the year of the survey, those who had spent adolescence living in metropolitan areas were close to four times (4.4%) more likely to report that they had had such an encounter.[126] From these data one cannot infer differences between these environments in the prevalence of sexual interests or attractions, but the data do suggest differences in sexual behaviors. Also of note is that women who attended college were nine times more likely to identify as lesbians than women who did not.[127]

Moreover, other population-based surveys suggest that sexual desire may be fluid for a considerable number of individuals, especially among adolescents as they mature through the early stages of adult development. In this regard, opposite-sex attraction and identity seem to be more stable than same-sex or bisexual attraction and identity. This is suggested by data from the National Longitudinal Study of Adolescent to Adult Health (the "Add Health" study discussed earlier). This prospective longitudinal study of a nationally representative sample of U.S. adolescents starting in grades 7–12 began during the 1994–1995 school year, and followed the cohort into young adulthood, with four follow-up interviews (referred to as Waves I, II, III, IV in the literature).[128] The most recent was in 2007–2008, when the sample was aged 24–32.

Same-sex or both-sex romantic attractions were quite prevalent in the study's first wave, with rates of approximately 7% for the males and 5% for the females.[129] However, 80% of the adolescent males who had reported same-sex attractions at Wave I later identified themselves as exclusively heterosexual as young adults at Wave IV.[130] Similarly, for adolescent males who, at Wave I, reported romantic attraction to both sexes, over 80% of them reported no same-sex romantic attraction at Wave III.[131] The data for the females surveyed were similar but less striking: for adolescent females who had both-sex attractions at Wave I, more than half reported exclusive attraction to males at Wave III.[132]

J. Richard Udry, the director of Add Health for Waves I, II, and III,[133] was among the first to point out the fluidity and instability of romantic attraction between the first two waves. He reported that among boys who

reported romantic attraction *only* to boys and *never* to girls at Wave I, 48% did so during Wave II; 35% reported no attraction to either sex; 11% reported exclusively same-sex attraction; and 6% reported attraction to both sexes.[134]

Ritch Savin-Williams and Geoffrey Ream published a 2007 analysis of the data from Waves I–III of Add Health.[135] Measures used included whether individuals ever had a romantic attraction for a given sex, sexual behavior, and sexual identity. (The categories for sexual identity were 100% heterosexual, mostly heterosexual but somewhat same-sex attracted, bisexual, mostly homosexual but somewhat attracted to opposite sex, and 100% homosexual.) While the authors noted the "stability of opposite-sex attraction and behavior" between Waves I and III, they found a "high proportion of participants with same- and both-sex attraction and behavior that migrated into opposite-sex categories between waves."[136] A much smaller proportion of those in the heterosexual categories, and a similar proportion of those without attraction, moved to non-heterosexual categories. The authors summarize: "All attraction categories other than opposite-sex were associated with a lower likelihood of stability over time. That is, individuals reporting any same-sex attractions were more likely to report subsequent shifts in their attractions than were individuals without any same-sex attractions."[137]

The authors also note the difficulties these data present for trying to define sexual orientation and to classify individuals according to such categories: "the critical consideration is whether having 'any' same-sex sexuality qualifies as nonheterosexuality. How much of a dimension must be present to tip the scales from one sexual orientation to another was not resolved with the present data, only that such decisions matter in terms of prevalence rates."[138] The authors suggested that researchers could "forsake the general notion of sexual orientation altogether and assess only those components relevant for the research question."[139]

Another prospective study by biostatistician Miles Ott and colleagues of 10,515 youth (3,980 males; 6,535 females) in 2013 showed findings on sexual orientation change in adolescents consistent with the findings of the Add Health data, again suggesting fluidity and plasticity of same-sex attractions among many adolescents.[140]

A few years after the Add Health data were originally published, the *Archives of Sexual Behavior* published an article by Savin-Williams and Joyner that critiqued the Add Health data on sexual attraction change.[141] Before outlining their critique, Savin-Williams and Joyner summarize the key Add Health findings: "in the approximately 13 years between Waves

I and IV, regardless of whether the measure was identical across waves (romantic attraction) or discrepant in words but not in theory (romantic attraction and sexual orientation identity), approximately 80% of adolescent boys and half of adolescent girls who expressed either partial or exclusive same-sex romantic attraction at Wave I 'turned' heterosexual (opposite-sex attraction or exclusively heterosexual identity) as young adults."[142] The authors propose three hypotheses to explain these discrepancies:

> (1) gay adolescents going into the closet during their young adult years; (2) confusion regarding the use and meaning of romantic attraction as a proxy for sexual orientation; and (3) the existence of mischievous adolescents who played a 'jokester' role by reporting same-sex attraction when none was present.[143]

Savin-Williams and Joyner reject the first hypothesis but find support for the second and the third. With respect to the second hypothesis, they question the use of romantic attraction to operationalize sexual identity:

> To help us assess whether the construct/measurement issue (romantic attraction versus sexual orientation identity) was driving results, we compared the two constructs at Wave IV.... Whereas over 99% of young adults with opposite-sex romantic attraction identified as heterosexual or mostly heterosexual and 94% of those with same-sex romantic attraction identified as homosexual or mostly homosexual, 33% of both-sex attracted men identified as heterosexual (just 6% of both-sex attracted women identified as heterosexual). These data indicated that young adult men and women generally understood the meaning of romantic attraction to the opposite- or same-sex to imply a particular (and consistent) sexual orientation identity, with one glaring exception—a substantial subset of young adult men who, despite their stated both-sex romantic attraction, identified as heterosexual.

Regarding the third hypothesis for explaining the Add Health data, Savin-Williams and Joyner note that surveys of adolescents sometimes yield unusual or distorted results due to adolescents who do not respond truthfully. The Add Health survey, they observe, had a significant number of unusual responders. For example, several hundred adolescents reported in the Wave I questionnaire that they had an artificial limb, whereas in later at-home interviews, only two of those adolescents reported having an artificial limb.[144] Adolescent boys who went from nonheterosexual in Wave I to heterosexual in Wave IV were significantly less likely to report

having filled out the Wave I questionnaire honestly; these boys also displayed other significant differences, such as lower grade point averages. Additionally, like consistently heterosexual boys, boys who were inconsistent between Waves I and IV were more popular in their school with boys than girls, whereas consistently nonheterosexual boys were more popular with girls. These and other data[145] led the authors to conclude that "boys who emerged from a gay or bisexual adolescence to become a heterosexual young adulthood were, by-and-large, heterosexual adolescents who were either confused and did not understand the measure of romantic attraction or jokesters who decided, for reasons we were not able to detect, to dishonestly report their sexuality."[146] However, the authors were not able to estimate the proportion of inaccurate responders, which would have helped evaluate the explanatory power of the hypotheses.

Later in 2014, the *Archives of Sexual Behavior* published a critique of the Savin-Williams and Joyner explanation of Add Health data by psychologist Gu Li and colleagues.[147] Along with criticizing the methodology of Savin-Williams and Joyner, these authors argued that the data were consistent with a scenario in which some nonheterosexual adolescents went "back into the closet" in later years as a possible reaction to social stress. (We will examine the effects of social stress on mental health in LGBT populations in Part Two of this report.) They also claimed that "it makes little sense to use responses to Wave IV sexual identity to validate or invalidate responses to Waves I or IV romantic attractions when these aspects of sexual orientation may not align in the first place."[148] Regarding the jokester hypothesis, these authors pose this difficulty: "Although some participants might be 'jokesters,' and we as researchers should be cautious of problems associated with self-report surveys whenever analyzing and interpreting data, it is unclear why the 'jokesters' would answer questions about delinquency honestly, but not questions about their sexual orientation."[149]

Savin-Williams and Joyner published a response to the critique in the same issue of the journal.[150] Responding to the criticism that their comparison of Wave IV self-reported sexual identity to Wave I self-reported romantic attractions was unsound, Savin-Williams and Joyner claimed that the results were quite similar if one used attraction as the Wave IV measure. They also deemed it highly unlikely that a large proportion of the respondents who were classified as nonheterosexuals in Wave I and heterosexuals in Wave IV went "back into the closet," because the proportion of individuals in adolescence and young adulthood who are "out of the closet" usually increases over time.[151]

The following year, the *Archives of Sexual Behavior* published another response to Savin-Williams and Joyner by psychologist Sabra Katz-Wise and colleagues, which argued that Savin-Williams and Joyner's "approach to identifying 'dubious' sexual minority youth is inherently flawed."[152] They wrote that "romantic attraction and sexual orientation identity are two distinct dimensions of sexual orientation that may not be concordant, even at a single time point."[153] They also claimed that "even if Add Health had assessed the same facets of sexual orientation at all waves, it would still be incorrect to infer 'dubious' sexual minorities from changes on the same dimension of sexual orientation, because these changes may reflect sexual fluidity."[154]

Unfortunately, the Add Health study does not appear to contain the data that would allow an assessment to determine which, if any, of these interpretations is likely to be correct. It may well be the case that a combination of factors contributed to the differences between the Wave I and Wave IV data. For example, there may have been some adolescents who responded to the Wave I sexual attraction questions inaccurately, some openly nonheterosexual adolescents who later went "back into the closet," and some adolescents who experienced nonheterosexual attractions before Wave I that largely disappeared by Wave IV. Other prospective study designs that track specific individuals across adolescent and adult development may shed further light on these issues.

While ambiguities in defining and characterizing sexual desire and orientation make changes in sexual desire difficult to study, data from these large, population-based national studies of randomly sampled individuals do suggest that all three dimensions of sexuality—affect, behavior, and identity—may change over time for some people. It is unclear, and current research does not address, whether and to what extent factors subject to volitional control—choice of sexual partners or sexual behaviors, for example—may influence such changes through conditioning and other mechanisms that are characterized in the behavioral sciences.

Several researchers have suggested that sexual orientation and attractions may be especially plastic for women.[155] For example, Lisa Diamond argued in her 2008 book *Sexual Fluidity* that "women's sexuality is fundamentally more fluid than men's, permitting greater variability in its development and expression over the life course," based on research by her and many others.[156]

Diamond's longitudinal five-year interviews of women in sexual relationships with other women also shed light on the problems with the concept of sexual orientation. In many cases, the women in her study

reported not so much setting out to form a lesbian sexual relationship but rather experiencing a gradual growth of affective intimacy with a woman that eventually led to sexual involvement. Some of these women rejected the labels of "lesbian," "straight," or "bisexual" as being inconsistent with their lived experience.[157] In another study, Diamond calls into question the utility of the concept of sexual orientation, especially as it applies to females.[158] She points out that if the neural basis of parent-child attachment—including attachment to one's mother—forms at least part of the basis for romantic attachments in adulthood, then it would not be surprising for a woman to experience romantic feelings for another woman without necessarily wanting to be sexually intimate with her. Diamond's research indicates that these kinds of relationships form more often than we typically recognize, especially among women.

Some researchers have also suggested that men's sexuality is more fluid than it was previously thought. For example, Diamond presented a 2014 conference paper, based on initial results from a survey of 394 people, entitled "I Was Wrong! Men Are Pretty Darn Sexually Fluid, Too!"[159] Diamond based this conclusion on a survey of men and women between the ages of 18 and 35, which asked about their sexual attractions and self-described identities at different stages of their lives. The survey found that 35% of self-identified gay men reported experiencing opposite-sex attractions in the past year, and 10% of self-identified gay men reported opposite-sex sexual behavior during the same period. Additionally, nearly as many men transitioned at some time in their life from gay to bisexual, queer, or unlabeled identity as did men from bisexual to gay identity.

In a 2012 review article entitled "Can We Change Sexual Orientation?" published in the *Archives of Sexual Behavior*, psychologist Lee Beckstead wrote, "Although their sexual behavior, identity, and attractions may change throughout their lives, this may not indicate a change in sexual orientation…but a change in awareness and an expansion of sexuality."[160] It is difficult to know how to interpret this claim—that sexual behavior, identity, and attractions may change but that this does not necessarily indicate a change in sexual orientation. We have already analyzed the inherent difficulties of defining sexual orientation, but however one chooses to define this construct, it seems that the definition would somehow be tied to sexual behavior, identity, or attraction. Perhaps we can take Beckstead's claim here as one more reason to consider dispensing with the construct of sexual orientation in the context of social science research, as it seems that whatever it might represent, it is only loosely or inconsistently tied to empirically measurable phenomena.

Given the possibility of changes in sexual desire and attraction, which research suggests is not uncommon, any attempt to infer a stable, innate, and fixed identity from a complex and often shifting mélange of inner fantasies, desires, and attractions—sexual, romantic, aesthetic, or otherwise—is fraught with difficulties. We can imagine, for example, a sixteen-year-old boy who becomes infatuated with a young man in his twenties, developing fantasies centered around the other's body and build, or perhaps on some of his character traits or strengths. Perhaps one night at a party the two engage in physical intimacy, catalyzed by alcohol and by the general mood of the party. This young man then begins an anguished process of introspection and self-exploration aimed at finding the answer to the enigmatic question, "Does this mean I'm gay?"

Current research from the biological, psychological, and social sciences suggests that this question, at least as it is framed, makes little sense. As far as science can tell us, there is nothing "there" for this young man to discover—no fact of nature to uncover or to find buried within himself. What his fantasies, or his one-time liaison, "really mean" is subject to any number of interpretations: that he finds the male figure beautiful, that he was lonely and feeling rejected the night of the party and responded to his peer's attentions and affections, that he was intoxicated and influenced by the loud music and strobe lights, that he does have a deep-seated sexual or romantic attraction to other men, and so on. Indeed, psychodynamic interpretations of such behaviors citing unconscious motivational factors and inner conflicts, many of them interesting, most impossible to prove, can be spun endlessly.

What we can say with more confidence is that this young man had an experience encompassing complex feelings, or that he engaged in a sexual act conditioned by multiple complex factors, and that such fantasies, feelings, or associated behaviors may (or may not) be subject to change as he grows and develops. Such behaviors could become more habitual with repetition and thus more stable, or they may extinguish and recur rarely or never. The research on sexual behaviors, sexual desire, and sexual identity suggests that both trajectories are real possibilities.

Conclusion

The concept of sexual orientation is unusually ambiguous compared to other psychological traits. Typically, it refers to at least one of three things: attractions, behaviors, or identity. Additionally, we have seen that sexual orientation often refers to several other things as well: belonging

to a certain community, fantasies (as distinct in some respects from attractions), longings, strivings, felt needs for certain forms of companionship, and so on. It is important, then, that researchers are clear about which of these domains are being studied, and that we keep in mind the researchers' specified definitions when we interpret their findings.

Furthermore, not only can the term "sexual orientation" be understood in several different senses, most of the senses are themselves complex concepts. Attraction, for example, could refer to arousal patterns, or to romantic feelings, or to desires for company, or other things; and each of these things can be present either sporadically and temporarily or pervasively and long-term, either exclusively or not, either in a deep or shallow way, and so forth. For this reason, even specifying one of the basic senses of orientation (attraction, behavior, or identity) is insufficient for doing justice to the richly varied phenomenon of human sexuality.

In this part we have criticized the common assumption that sexual *desires*, *attractions*, or *longings* reveal some innate and fixed feature of our biological or psychological constitution, a fixed sexual *identity* or *orientation*. Furthermore, we may have some reasons to doubt the common assumption that in order to live happy and flourishing lives, we must somehow discover this innate fact about ourselves that we call *sexuality* or *sexual orientation*, and invariably express it through particular patterns of sexual behavior or a particular life trajectory. Perhaps we ought instead to consider what sorts of behaviors—whether in the sexual realm or elsewhere—tend to be conducive to health and flourishing, and what kinds of behaviors tend to undermine a healthy and flourishing life.

Notes

Part One: Sexual Orientation

1. Alex Witchel, "Life After 'Sex,'" *The New York Times Magazine*, January 19, 2012, http://www.nytimes.com/2012/01/22/magazine/cynthia-nixon-wit.html.

2. Brandon Ambrosino, "I Wasn't Born This Way. I Choose to Be Gay," *The New Republic*, January 28, 2014, https://newrepublic.com/article/116378/macklemores-same-love-sends-wrong-message-about-being-gay.

3. J. Michael Bailey *et al.*, "A Family History Study of Male Sexual Orientation Using Three Independent Samples," *Behavior Genetics* 29, no. 2 (1999): 79–86, http://dx.doi.org/10.1023/A:1021652204405; Andrea Camperio-Ciani, Francesca Corna, Claudio Capiluppi, "Evidence for maternally inherited factors favouring male homosexuality and promoting female fecundity," *Proceedings of the Royal Society B* 271, no. 1554 (2004): 2217–2221, http://dx.doi.org/10.1098/rspb.2004.2872; Dean H. Hamer *et al.*, "A linkage between DNA markers on the X chromosome and male sexual orientation," *Science* 261, no. 5119 (1993): 321–327, http://dx.doi.org/10.1126/science.8332896.

4. Elizabeth Norton, "Homosexuality May Start in the Womb," *Science*, December 11, 2012, http://www.sciencemag.org/news/2012/12/homosexuality-may-start-womb.

5. Mark Joseph Stern, "No, Being Gay Is Not a Choice," *Slate*, February 4, 2014, http://www.slate.com/blogs/outward/2014/02/04/choose_to_be_gay_no_you_don_t.html.

6. David Nimmons, "Sex and the Brain," *Discover*, March 1, 1994, http://discovermagazine.com/1994/mar/sexandthebrain346/.

7. Leonard Sax, *Why Gender Matters: What Parents and Teachers Need to Know about the Emerging Science of Sex Differences* (New York: Doubleday, 2005), 206.

8. Benoit Denizet-Lewis, "The Scientific Quest to Prove Bisexuality Exists," *The New York Times Magazine*, March 20, 2014, http://www.nytimes.com/2014/03/23/magazine/the-scientific-quest-to-prove-bisexuality-exists.html.

9. *Ibid.*

10. *Ibid.*

11. Stephen B. Levine, "Reexploring the Concept of Sexual Desire," *Journal of Sex & Marital Therapy*, 28, no. 1 (2002), 39, http://dx.doi.org/10.1080/009262302317251007.

12. *Ibid.*

13. See Lori A. Brotto *et al.*, "Sexual Desire and Pleasure," in *APA Handbook of Sexuality and Psychology*, Volume 1: Person-based Approaches, APA (2014): 205–244; Stephen B. Levine, "Reexploring the Concept of Sexual Desire," *Journal of Sex & Marital Therapy* 28, no. 1 (2002): 39–51, http://dx.doi.org/10.1080/009262302317251007; Lisa M. Diamond, "What Does Sexual Orientation Orient? A Biobehavioral Model Distinguishing Romantic Love and Sexual Desire," *Psychological Review* 110, no. 1 (2003): 173–192,

http://dx.doi.org/10.1037/0033-295X.110.1.173; Gian C. Gonzaga *et al.*, "Romantic Love and Sexual Desire in Close Relationships," *Emotion* 6, no. 2 (2006): 163–179, http://dx.doi.org/10.1037/1528-3542.6.2.163.

14. Alexander R. Pruss, *One Body: An Essay in Christian Sexual Ethics* (Notre Dame, Ind.: University of Notre Dame Press, 2012), 360.

15. Neil A. Campbell and Jane B. Reece, *Biology*, Seventh Edition (San Francisco: Pearson Education, 2005), 973.

16. See, for instance, Nancy Burley, "The Evolution of Concealed Ovulation," *American Naturalist* 114, no. 6 (1979): 835–858, http://dx.doi.org/10.1086/283532.

17. David Woodruff Smith, "Phenomenology," *Stanford Encyclopedia of Philosophy* (2013), http://plato.stanford.edu/entries/phenomenology/.

18. See, for instance, Abraham Maslow, *Motivation and Personality*, Third Edition (New York: Addison-Wesley Educational Publishers, 1987).

19. Marc-André Raffalovich, *Uranisme et unisexualité: étude sur différentes manifestations de l'instinct sexuel* (Lyon, France: Storck, 1896).

20. See, generally, Brocard Sewell, *In the Dorian Mode: Life of John Gray 1866–1934* (Padstow, Cornwall, U.K.: Tabb House, 1983).

21. For more on the Kinsey scale, see "Kinsey's Heterosexual-Homosexual Rating Scale," Kinsey Institute at Indiana University, http://www.kinseyinstitute.org/research/publications/kinsey-scale.php.

22. Brief as *Amicus Curiae* of Daniel N. Robinson in Support of Petitioners and Supporting Reversal, *Hollingsworth v. Perry*, 133 S. Ct. 2652 (2013).

23. See, for example, John Bowlby, "The Nature of the Child's Tie to His Mother," *The International Journal of Psycho-Analysis* 39 (1958): 350–373.

24. Edward O. Laumann *et al.*, *The Social Organization of Sexuality: Sexual Practices in the United States* (Chicago: University of Chicago Press, 1994).

25. American Psychological Association, "Answers to Your Questions for a Better Understanding of Sexual Orientation & Homosexuality," 2008, http://www.apa.org/topics/lgbt/orientation.pdf.

26. Laumann *et al.*, *The Social Organization of Sexuality*, 300–301.

27. Lisa M. Diamond and Ritch C. Savin-Williams, "Gender and Sexual Identity," in *Handbook of Applied Development Science*, eds. Richard M. Lerner, Francine Jacobs, and Donald Wertlieb (Thousand Oaks, Calif.: SAGE Publications, 2002), 101. See also A. Elfin Moses and Robert O. Hawkins, *Counseling Lesbian Women and Gay Men: A Life-Issues Approach* (Saint Louis, Mo.: Mosby, 1982).

28. John. C. Gonsiorek and James D. Weinrich, "The Definition and Scope of Sexual Orientation," in *Homosexuality: Research Implications for Public Policy*, eds. John. C. Gonsiorek and James D. Weinrich (Newberry Park, Calif.: SAGE Publications, 1991), 8.

29. Letitia Anne Peplau *et al.*, "The Development of Sexual Orientation in Women,"

Annual Review of Sex Research 10, no. 1 (1999): 83, http://dx.doi.org/10.1080/10532528.1999.10559775.

30. Lisa M. Diamond, "New Paradigms for Research on Heterosexual and Sexual-Minority Development," *Journal of Clinical Child & Adolescent Psychology* 32, no. 4 (2003): 492.

31. Franz J. Kallmann, "Comparative Twin Study on the Genetic Aspects of Male Homosexuality," *Journal of Nervous and Mental Disease* 115, no. 4 (1952): 283–298, http://dx.doi.org/10.1097/00005053-195201000-00025.

32. Edward Stein, *The Mismeasure of Desire: The Science, Theory, and Ethics of Sexual Orientation* (New York: Oxford University Press, 1999), 145.

33. J. Michael Bailey, Michael P. Dunne, and Nicholas G. Martin, "Genetic and environmental influences on sexual orientation and its correlates in an Australian twin sample," *Journal of Personality and Social Psychology* 78, no. 3 (2000): 524–536, http://dx.doi.org/10.1037/0022-3514.78.3.524.

34. Bailey and colleagues calculated these concordance rates using a "strict" criterion for determining non-heterosexuality, which was a Kinsey score of 2 or greater. They also calculated concordance rates using a "lenient" criterion, a Kinsey score of 1 or greater. The concordance rates for this lenient criterion were 38% for men and 30% for women in identical twins, compared to 6% for men and 30% for women in fraternal twins. The differences between the identical and fraternal concordance rates using the lenient criterion were statistically significant for men but not for women.

35. Bailey, Dunne, and Martin, "Genetic and environmental influences on sexual orientation and its correlates in an Australian twin sample," 534.

36. These examples are drawn from Ned Block, "How heritability misleads about race," *Cognition* 56, no. 2 (1995): 103–104, http://dx.doi.org/10.1016/0010-0277(95)00678-R.

37. Niklas Långström *et al.*, "Genetic and Environmental Effects on Same-sex Sexual Behavior: A Population Study of Twins in Sweden," *Archives of Sexual Behavior* 39, no. 1 (2010): 75–80, http://dx.doi.org/10.1007/s10508-008-9386-1.

38. *Ibid.*, 79.

39. Peter S. Bearman and Hannah Brückner, "Opposite-Sex Twins and Adolescent Same-Sex Attraction," *American Journal of Sociology* 107, no. 5 (2002): 1179–1205, http://dx.doi.org/10.1086/341906.

40. *Ibid.*, 1199.

41. See, for example, Ray Blanchard and Anthony F. Bogaert, "Homosexuality in men and number of older brothers," *American Journal of Psychiatry* 153, no. 1 (1996): 27–31, http://dx.doi.org/10.1176/ajp.153.1.27.

42. Peter S. Bearman and Hannah Brückner, 1198.

43. *Ibid.*, 1198.

44. *Ibid.*, 1179.

45. Kenneth S. Kendler *et al.*, "Sexual Orientation in a U.S. National Sample of Twin and Nontwin Sibling Pairs," *American Journal of Psychiatry* 157, no. 11 (2000): 1843–1846, http://dx.doi.org/10.1176/appi.ajp.157.11.1843.

46. *Ibid.*, 1845.

47. Quantitative genetic studies, including twin studies, rely on an abstract model based on many assumptions, rather than on the measurement of correlations between genes and phenotypes. This abstract model is used to infer the presence of a genetic contribution to a trait by means of correlation among relatives. Environmental effects can be controlled in experiments with laboratory animals, but in humans this is not possible, so it is likely that the best that can be done is to study identical twins raised apart. But it should be noted that even these studies can be somewhat misinterpreted because identical twins adopted separately tend to be adopted into similar socioeconomic environments. The twin studies on homosexuality do not include any separated twin studies, and the study designs report few effective controls for environmental effects (for instance, identical twins likely share a common rearing environment to a greater extent than ordinary siblings or even fraternal twins).

48. Dean H. Hamer *et al.*, "A linkage between DNA markers on the X chromosome and male sexual orientation," *Science* 261, no. 5119 (1993): 321–327, http://dx.doi.org/10.1126/science.8332896.

49. George Rice *et al.*, "Male Homosexuality: Absence of Linkage to Microsatellite Markers at Xq28," *Science* 284, no. 5414 (1999): 665–667, http://dx.doi.org/10.1126/science.284.5414.665.

50. Alan R. Sanders *et al.*, "Genome-wide scan demonstrates significant linkage for male sexual orientation," *Psychological Medicine* 45, no. 07 (2015): 1379–1388, http://dx.doi.org/10.1017/S0033291714002451.

51. E. M. Drabant *et al.*, "Genome-Wide Association Study of Sexual Orientation in a Large, Web-based Cohort," 23andMe, Inc., Mountain View, Calif. (2012), http://blog.23andme.com/wp-content/uploads/2012/11/Drabant-Poster-v7.pdf.

52. Richard C. Francis, *Epigenetics: How Environment Shapes Our Genes* (New York: W. W. Norton & Company, 2012).

53. See, for example, Richard P. Ebstein *et al.*, "Genetics of Human Social Behavior," *Neuron* 65, no. 6 (2010): 831–844, http://dx.doi.org/10.1016/j.neuron.2010.02.020.

54. Dean Hamer, "Rethinking Behavior Genetics," *Science* 298, no. 5591 (2002): 71, http://dx.doi.org/10.1126/science.1077582.

55. For an overview of the distinction between the organizational and activating effects of hormones and its importance in the field of endocrinology, see Arthur P. Arnold, "The organizational-activational hypothesis as the foundation for a unified theory of sexual differentiation of all mammalian tissues," *Hormones and Behavior* 55, no. 5 (2009): 570–578, http://dx.doi.org/10.1016/j.yhbeh.2009.03.011.

56. Melissa Hines, "Prenatal endocrine influences on sexual orientation and on sexually differentiated childhood behavior," *Frontiers in Neuroendocrinology* 32, no. 2 (2011):

170–182, http://dx.doi.org/10.1016/j.yfrne.2011.02.006.

57. Eugene D. Albrecht and Gerald J. Pepe, "Estrogen regulation of placental angiogenesis and fetal ovarian development during primate pregnancy," *The International Journal of Developmental Biology* 54, no. 2–3 (2010): 397–408, http://dx.doi.org/10.1387/ijdb.082758ea.

58. Sheri A. Berenbaum, "How Hormones Affect Behavioral and Neural Development: Introduction to the Special Issue on 'Gonadal Hormones and Sex Differences in Behavior,'" *Developmental Neuropsychology* 14 (1998): 175–196, http://dx.doi.org/10.1080/87565649809540708.

59. Jean D. Wilson, Fredrick W. George, and James E. Griffin, "The Hormonal Control of Sexual Development," *Science* 211 (1981): 1278–1284, http://dx.doi.org/10.1126/science.7010602.

60. *Ibid.*

61. See, for example, Celina C. C. Cohen-Bendahan, Cornelieke van de Beek, and Sheri A. Berenbaum, "Prenatal sex hormone effects on child and adult sex-typed behavior: methods and findings," *Neuroscience & Biobehavioral Reviews* 29, no. 2 (2005): 353–384, http://dx.doi.org/10.1016/j.neubiorev.2004.11.004; Marta Weinstock, "The potential influence of maternal stress hormones on development and mental health of the offspring," *Brain, Behavior, and Immunity* 19, no. 4 (2005): 296–308, http://dx.doi.org/10.1016/j.bbi.2004.09.006; Marta Weinstock, "Gender Differences in the Effects of Prenatal Stress on Brain Development and Behaviour," *Neurochemical Research* 32, no. 10 (2007): 1730–1740, http://dx.doi.org/10.1007/s11064-007-9339-4.

62. Vivette Glover, T. G. O'Connor, and Kieran O'Donnell, "Prenatal stress and the programming of the HPA axis," *Neuroscience & Biobehavioral Reviews* 35, no. 1 (2010): 17–22, http://dx.doi.org/10.1016/j.neubiorev.2009.11.008.

63. See, for example, Felix Beuschlein *et al.*, "Constitutive Activation of PKA Catalytic Subunit in Adrenal Cushing's Syndrome," *New England Journal of Medicine* 370, no. 11 (2014): 1019–1028, http://dx.doi.org/10.1056/NEJMoa1310359.

64. Phyllis W. Speiser, and Perrin C. White, "Congenital Adrenal Hyperplasia," *New England Journal of Medicine* 349, no. 8 (2003): 776–788, http://dx.doi.org/10.1056/NEJMra021561.

65. *Ibid.*, 776.

66. *Ibid.*

67. *Ibid.*, 778.

68. Phyllis W. Speiser *et al.*, "Congenital Adrenal Hyperplasia Due to Steroid 21-Hydroxylase Deficiency: An Endocrine Society Clinical Practice Guideline," *The Journal of Clinical Endocrinology and Metabolism* 95, no. 9 (2009): 4133–4160, http://dx.doi.org/10.1210/jc.2009-2631.

69. Melissa Hines, "Prenatal endocrine influences on sexual orientation and on sexually differentiated childhood behavior," 173–174.

70. Ieuan A. Hughes *et al.*, "Androgen insensitivity syndrome," *The Lancet* 380, no. 9851 (2012): 1419–1428, http://dx.doi.org/10.1016/S0140-6736%2812%2960071-3.

71. *Ibid.*, 1420.

72. *Ibid.*, 1419.

73. Melissa S. Hines, Faisal Ahmed, and Ieuan A. Hughes, "Psychological Outcomes and Gender-Related Development in Complete Androgen Insensitivity Syndrome," *Archives of Sexual Behavior* 32, no. 2 (2003): 93–101, http://dx.doi.org/10.1023/A:1022492106974.

74. See, for example, Claude J. Migeon Wisniewski *et al.*, "Complete Androgen Insensitivity Syndrome: Long-Term Medical, Surgical, and Psychosexual Outcome," *The Journal of Clinical Endocrinology & Metabolism* 85, no. 8 (2000): 2664–2669, http://dx.doi.org/10.1210/jcem.85.8.6742.

75. Peggy T. Cohen-Kettenis, "Gender Change in 46,XY Persons with 5α-Reductase-2 Deficiency and 17β-Hydroxysteroid Dehydrogenase-3 Deficiency," *Archives of Sexual Behavior* 34, no. 4 (2005): 399–410, http://dx.doi.org/10.1007/s10508-005-4339-4.

76. *Ibid.*, 399.

77. See, for example, Johannes Hönekopp *et al.*, "Second to fourth digit length ratio (2D:4D) and adult sex hormone levels: New data and a meta-analytic review," *Psychoneuroendocrinology* 32, no. 4 (2007): 313–321, http://dx.doi.org/10.1016/j.psyneuen.2007.01.007.

78. Terrance J. Williams *et al.*, "Finger-length ratios and sexual orientation," *Nature* 404, no. 6777 (2000): 455–456, http://dx.doi.org/10.1038/35006555.

79. S. J. Robinson and John T. Manning, "The ratio of 2nd to 4th digit length and male homosexuality," *Evolution and Human Behavior* 21, no. 5 (2000): 333–345, http://dx.doi.org/10.1016/S1090-5138(00)00052-0.

80. Qazi Rahman and Glenn D. Wilson, "Sexual orientation and the 2nd to 4th finger length ratio: evidence for organising effects of sex hormones or developmental instability?," *Psychoneuroendocrinology* 28, no. 3 (2003): 288–303, http://dx.doi.org/10.1016/S0306-4530(02)00022-7.

81. Richard A. Lippa, "Are 2D:4D Finger-Length Ratios Related to Sexual Orientation? Yes for Men, No for Women," *Journal of Personality and Social Psychology* 85, no. 1 (2003): 179–188, http://dx.doi.org/10.1037/0022-3514.85.1.179; Dennis McFadden and Erin Shubel, "Relative Lengths of Fingers and Toes in Human Males and Females," *Hormones and Behavior* 42, no. 4 (2002): 492–500, http://dx.doi.org/10.1006/hbeh.2002.1833.

82. Lynn S. Hall and Craig T. Love, "Finger-Length Ratios in Female Monozygotic Twins Discordant for Sexual Orientation," *Archives of Sexual Behavior* 32, no. 1 (2003): 23–28, http://dx.doi.org/10.1023/A:1021837211630.

83. *Ibid.*, 23.

84. Martin Voracek, John T. Manning, and Ivo Ponocny, "Digit ratio (2D:4D) in homosexual and heterosexual men from Austria," *Archives of Sexual Behavior* 34, no. 3 (2005): 335–340, http://dx.doi.org/10.1007/s10508-005-3122-x.

85. *Ibid.*, 339.

86. Günter Dörner *et al.*, "Stressful Events in Prenatal Life of Bi- and Homosexual Men," *Experimental and Clinical Endocrinology* 81, no. 1 (1983): 83–87, http://dx.doi.org/10.1055/s-0029-1210210.

87. See, for example, Lee Ellis *et al.*, "Sexual orientation of human offspring may be altered by severe maternal stress during pregnancy," *Journal of Sex Research* 25, no. 2 (1988): 152–157, http://dx.doi.org/10.1080/00224498809551449; J. Michael Bailey, Lee Willerman, and Carlton Parks, "A Test of the Maternal Stress Theory of Human Male Homosexuality," *Archives of Sexual Behavior* 20, no. 3 (1991): 277–293, http://dx.doi.org/10.1007/BF01541847; Lee Ellis and Shirley Cole-Harding, "The effects of prenatal stress, and of prenatal alcohol and nicotine exposure, on human sexual orientation," *Physiology & Behavior* 74, no. 1 (2001): 213–226, http://dx.doi.org/10.1016/S0031-9384(01)00564-9.

88. Melissa Hines *et al.*, "Prenatal Stress and Gender Role Behavior in Girls and Boys: A Longitudinal, Population Study," *Hormones and Behavior* 42, no. 2 (2002): 126–134, http://dx.doi.org/10.1006/hbeh.2002.1814.

89. Simon LeVay, "A Difference in Hypothalamic Structure between Heterosexual and Homosexual Men," *Science* 253, no. 5023 (1991): 1034–1037, http://dx.doi.org/10.1126/science.1887219.

90. William Byne *et al.*, "The Interstitial Nuclei of the Human Anterior Hypothalamus: An Investigation of Variation with Sex, Sexual Orientation, and HIV Status," *Hormones and Behavior* 40, no. 2 (2001): 87, http://dx.doi.org/10.1006/hbeh.2001.1680.

91. *Ibid.*, 91.

92. *Ibid.*

93. Mitchell S. Lasco, *et al.*, "A lack of dimorphism of sex or sexual orientation in the human anterior commissure," *Brain Research* 936, no. 1 (2002): 95–98, http://dx.doi.org/10.1016/S0006-8993(02)02590-8.

94. Dick F. Swaab, "Sexual orientation and its basis in brain structure and function," *Proceedings of the National Academy of Sciences* 105, no. 30 (2008): 10273–10274, http://dx.doi.org/10.1073/pnas.0805542105.

95. Felicitas Kranz and Alumit Ishai, "Face Perception Is Modulated by Sexual Preference," *Current Biology* 16, no. 1 (2006): 63–68, http://dx.doi.org/10.1016/j.cub.2005.10.070.

96. Ivanka Savic, Hans Berglund, and Per Lindström, "Brain response to putative pheromones in homosexual men," *Proceedings of the National Academy of Sciences* 102, no. 20 (2005): 7356–7361, http://dx.doi.org/10.1073/pnas.0407998102.

97. Hans Berglund, Per Lindström, and Ivanka Savic, "Brain response to putative pheromones in lesbian women," *Proceedings of the National Academy of Sciences* 103, no. 21 (2006): 8269–8274, http://dx.doi.org/10.1073/pnas.0600331103.

98. Ivanka Savic and Per Lindström, "PET and MRI show differences in cerebral asymmetry and functional connectivity between homo- and heterosexual subjects,"

Proceedings of the National Academy of Sciences 105, no. 27 (2008): 9403–9408, http://dx.doi.org/10.1073/pnas.0801566105.

99. Research on neuroplasticity shows that while there are critical periods of development in which the brain changes more rapidly and profoundly (for instance, during development of language in toddlers), the brain continues to change across the lifespan in response to behaviors (like practicing juggling or playing a musical instrument), life experiences, psychotherapy, medications, psychological trauma, and relationships. For a helpful and generally accessible overview of the research related to neuroplasticity, see Norman Doidge, *The Brain That Changes Itself: Stories of Personal Triumph from the Frontiers of Brain Science* (New York: Penguin, 2007).

100. Letitia Anne Peplau *et al.*, "The Development of Sexual Orientation in Women," *Annual Review of Sex Research* 10, no. 1 (1999): 81, http://dx.doi.org/10.1080/10532528.1999.10559775. Also see J. Michael Bailey, "What is Sexual Orientation and Do Women Have One?" in *Contemporary Perspectives on Lesbian, Gay, and Bisexual Identities*, ed. Debra A. Hope (New York: Springer, 2009), 43–63, http://dx.doi.org/10.1007/978-0-387-09556-1_3.

101. Mark S. Friedman *et al.*, "A Meta-Analysis of Disparities in Childhood Sexual Abuse, Parental Physical Abuse, and Peer Victimization Among Sexual Minority and Sexual Nonminority Individuals," *American Journal of Public Health* 101, no. 8 (2011): 1481–1494, http://dx.doi.org/10.2105/AJPH.2009.190009.

102. *Ibid.*, 1490.

103. *Ibid.*, 1492.

104. *Ibid.*

105. Emily F. Rothman, Deinera Exner, and Allyson L. Baughman, "The Prevalence of Sexual Assault Against People Who Identify as Gay, Lesbian, or Bisexual in the United States: A Systematic Review," *Trauma, Violence, & Abuse* 12, no. 2 (2011): 55–66, http://dx.doi.org/10.1177/1524838010390707.

106. Judith P. Andersen and John Blosnich, "Disparities in Adverse Childhood Experiences among Sexual Minority and Heterosexual Adults: Results from a Multi-State Probability-Based Sample," *PLOS ONE* 8, no. 1 (2013): e54691, http://dx.doi.org/10.1371/journal.pone.0054691.

107. Andrea L. Roberts *et al.*, "Pervasive Trauma Exposure Among US Sexual Orientation Minority Adults and Risk of Posttraumatic Stress Disorder," *American Journal of Public Health* 100, no. 12 (2010): 2433–2441, http://dx.doi.org/10.2105/AJPH.2009.168971.

108. Brendan P. Zietsch *et al.*, "Do shared etiological factors contribute to the relationship between sexual orientation and depression?," *Psychological Medicine* 42, no. 3 (2012): 521–532, http://dx.doi.org/10.1017/S0033291711001577.

109. The exact figure is not reported in the text for reasons the authors do not specify.

110. *Ibid.*, 526.

111. *Ibid.*, 527.

112. Marie E. Tomeo *et al.*, "Comparative Data of Childhood and Adolescence Molestation in Heterosexual and Homosexual Persons," *Archives of Sexual Behavior* 30, no. 5 (2001): 535–541, http://dx.doi.org/10.1023/A:1010243318426.

113. *Ibid.*, 541.

114. Helen W. Wilson and Cathy Spatz Widom, "Does Physical Abuse, Sexual Abuse, or Neglect in Childhood Increase the Likelihood of Same-sex Sexual Relationships and Cohabitation? A Prospective 30-year Follow-up," *Archives of Sexual Behavior* 39, no. 1 (2010): 63–74, http://dx.doi.org/10.1007/s10508-008-9449-3.

115. *Ibid.*, 70.

116. Andrea L. Roberts, M. Maria Glymour, and Karestan C. Koenen, "Does Maltreatment in Childhood Affect Sexual Orientation in Adulthood?," *Archives of Sexual Behavior* 42, no. 2 (2013): 161–171, http://dx.doi.org/10.1007/s10508-012-0021-9.

117. For those interested in the methodological details: this statistical method uses a two-step process where "instruments"—in this case, family characteristics that are known to be related to maltreatment (presence of a stepparent, parental alcohol abuse, or parental mental illness)—are used as the "instrumental variables" to predict the risk of maltreatment. In the second step, the predicted risk of maltreatment is employed as the independent variable and adult sexual orientation as the dependent variable; coefficients from this are the instrumental variable estimates. It should also be noted here that these instrumental variable estimation techniques rely on some important (and questionable) assumptions, in this case the assumption that the instruments (the stepparent, the alcohol abuse, the mental illness) do not affect the child's sexual orientation measures except through child abuse. But this assumption is not demonstrated, and therefore may constitute a foundational limitation of the method. Causation is difficult to support statistically and continues to beguile research in the social sciences in spite of efforts to design studies capable of generating stronger associations that give stronger support to claims of causation.

118. Roberts, Glymour, and Koenen, "Does Maltreatment in Childhood Affect Sexual Orientation in Adulthood?," 167.

119. Drew H. Bailey and J. Michael Bailey, "Poor Instruments Lead to Poor Inferences: Comment on Roberts, Glymour, and Koenen (2013)," *Archives of Sexual Behavior* 42, no. 8 (2013): 1649–1652, http://dx.doi.org/10.1007/s10508-013-0101-5.

120. Roberts, Glymour, and Koenen, "Does Maltreatment in Childhood Affect Sexual Orientation in Adulthood?," 169.

121. *Ibid.*, 169.

122. For information on the study, see "National Health and Social Life Survey," Population Research Center of the University of Chicago, http://popcenter.uchicago.edu/data/nhsls.shtml.

123. Edward O. Laumann *et al.*, *The Social Organization of Sexuality: Sexual Practices in the United States* (Chicago: University of Chicago Press, 1994); Robert T. Michael *et al.*, *Sex in America: A Definitive Survey* (New York: Warner Books, 1994).

124. Laumann *et al.*, *The Social Organization of Sexuality*, 295.

125. The third iteration of Natsal from 2010 found, over an age range from 16 to 74, that 1.0% of women and 1.5% of men consider themselves gay/lesbian, and 1.4% of women and 1.0% of men think of themselves as bisexual. See Catherine H. Mercer *et al.*, "Changes in sexual attitudes and lifestyles in Britain through the life course and over time: findings from the National Surveys of Sexual Attitudes and Lifestyles (Natsal)," *The Lancet* 382, no. 9907 (2013): 1781–1794, http://dx.doi.org/10.1016/S0140-6736(13)62035-8. Full results of this survey are reported in several articles in the same issue of *The Lancet*.

126. See Table 8.1 in Laumann *et al.*, *The Social Organization of Sexuality*, 304.

127. This figure is calculated from Table 8.2 in Laumann *et al.*, *The Social Organization of Sexuality*, 305.

128. For more information on the study design of Add Health, see Kathleen Mullan Harris *et al.*, "Study Design," The National Longitudinal Study of Adolescent to Adult Health, http://www.cpc.unc.edu/projects/addhealth/design. Some studies based on Add Health data use Arabic numerals rather than Roman numerals to label the waves; when describing or quoting from those studies, we stick with the Roman numerals.

129. See Table 1 in Ritch C. Savin-Williams and Kara Joyner, "The Dubious Assessment of Gay, Lesbian, and Bisexual Adolescents of Add Health," *Archives of Sexual Behavior* 43, no. 3 (2014): 413–422, http://dx.doi.org/10.1007/s10508-013-0219-5.

130. *Ibid.*, 415.

131. *Ibid.*

132. *Ibid.*

133. "Research Collaborators," The National Longitudinal Study of Adolescent to Adult Health, http://www.cpc.unc.edu/projects/addhealth/people.

134. J. Richard Udry and Kim Chantala, "Risk Factors Differ According to Same-Sex and Opposite-Sex Interest," *Journal of Biosocial Science* 37, no. 04 (2005): 481–497, http://dx.doi.org/10.1017/S0021932004006765.

135. Ritch C. Savin-Williams and Geoffrey L. Ream, "Prevalence and Stability of Sexual Orientation Components During Adolescence and Young Adulthood," *Archives of Sexual Behavior* 36, no. 3 (2007): 385–394, http://dx.doi.org/10.1007/s10508-006-9088-5.

136. *Ibid.*, 388.

137. *Ibid.*, 389.

138. *Ibid.*, 392–393.

139. *Ibid.*, 393.

140. Miles Q. Ott *et al.*, "Repeated Changes in Reported Sexual Orientation Identity Linked to Substance Use Behaviors in Youth," *Journal of Adolescent Health* 52, no. 4 (2013): 465–472, http://dx.doi.org/10.1016/j.jadohealth.2012.08.004.

141. Savin-Williams and Joyner, "The Dubious Assessment of Gay, Lesbian, and Bisexual

Adolescents of Add Health."

142. *Ibid.*, 416.

143. *Ibid.*, 414.

144. For more analysis of inaccurate responders in the Add Health surveys, see Xitao Fan *et al.*, "An Exploratory Study about Inaccuracy and Invalidity in Adolescent Self-Report Surveys," *Field Methods* 18, no. 3 (2006): 223–244, http://dx.doi.org/10.1177/152822X06289161.

145. Savin-Williams and Joyner were also skeptical of the Add Health survey data because the high proportion of youth reporting same-sex or both-sex attractions (7.3% of boys and 5.0% of girls) in Wave I was very unusual when compared to similar studies, and because of the dramatic reduction in reported same-sex attraction a little over a year later, in Wave II.

146. Savin-Williams and Joyner, "The Dubious Assessment of Gay, Lesbian, and Bisexual Adolescents of Add Health," 420.

147. Gu Li, Sabra L. Katz-Wise, and Jerel P. Calzo, "The Unjustified Doubt of Add Health Studies on the Health Disparities of Non-Heterosexual Adolescents: Comment on Savin-Williams and Joyner (2014)," *Archives of Sexual Behavior*, 43 no. 6 (2014): 1023–1026, http://dx.doi.org/10.1007/s10508-014-0313-3.

148. *Ibid.*, 1024.

149. *Ibid.*, 1025.

150. Ritch C. Savin-Williams and Kara Joyner, "The Politicization of Gay Youth Health: Response to Li, Katz-Wise, and Calzo (2014)," *Archives of Sexual Behavior* 43, no. 6 (2014): 1027–1030, http://dx.doi.org/10.1007/s10508-014-0359-2.

151. See, for example, Stephen T. Russell *et al.*, "Being Out at School: The Implications for School Victimization and Young Adult Adjustment," *American Journal of Orthopsychiatry* 84, no. 6 (2014): 635–643, http://dx.doi.org/10.1037/ort0000037.

152. Sabra L. Katz-Wise *et al.*, "Same Data, Different Perspectives: What Is at Stake? Response to Savin-Williams and Joyner (2014a)," *Archives of Sexual Behavior* 44, no. 1 (2015): 15, http://dx.doi.org/10.1007/s10508-014-0434-8.

153. *Ibid.*, 15.

154. *Ibid.*, 15–16.

155. For example, see Bailey, "What is Sexual Orientation and Do Women Have One?," 43–63; Peplau *et al.*, "The Development of Sexual Orientation in Women," 70–99.

156. Lisa M. Diamond, *Sexual Fluidity* (Cambridge, Mass.: Harvard University Press, 2008), 52.

157. Lisa M. Diamond, "Was It a Phase? Young Women's Relinquishment of Lesbian/Bisexual Identities Over a 5-Year Period," *Journal of Personality and Social Psychology* 84, no. 2 (2003): 352–364, http://dx.doi.org/10.1037/0022-3514.84.2.352.

158. Diamond, "What Does Sexual Orientation Orient?," 173–192.

159. This conference paper was summarized in Denizet-Lewis, "The Scientific Quest to Prove Bisexuality Exists."

160. A. Lee Beckstead, "Can We Change Sexual Orientation?," *Archives of Sexual Behavior* 41, no. 1 (2012): 128, http://dx.doi.org/10.1007/s10508-012-9922-x.

The New Atlantis
A Journal of Technology & Society

Part Two

Sexuality, Mental Health Outcomes, and Social Stress

Compared to the general population, non-heterosexual and transgender subpopulations have higher rates of mental health problems such as anxiety, depression, and suicide, as well as behavioral and social problems such as substance abuse and intimate partner violence. The prevailing explanation in the scientific literature is the social stress model, which posits that social stressors—such as stigmatization and discrimination—faced by members of these subpopulations account for the disparity in mental health outcomes. Studies show that while social stressors do contribute to the increased risk of poor mental health outcomes for these populations, they likely do not account for the entire disparity.

Many of the issues surrounding sexual orientation and gender identity remain controversial among researchers, but there is general agreement on the observation at the heart of Part Two: lesbian, gay, bisexual, and transgender (LGBT) subpopulations are at higher risk, compared to the general population, of numerous mental health problems. Less certain are the causes of that increased risk and thus the social and clinical approaches that may help to ameliorate it. In this part we review some of the research documenting the increased risk, focusing on papers that are data-based with sound methodology, and that are widely cited in the scientific literature.

A robust and growing body of research examines the relationships between sexuality or sexual behaviors and mental health status. The first half of this part discusses the associations of sexual identities or behaviors with psychiatric disorders (such as mood disorders, anxiety disorders, and adjustment disorders), suicide, and intimate partner violence. The second half explores the reasons for the elevated risks of these outcomes among non-heterosexual and transgender populations, and considers what social science research can tell us about one of the most prevalent ways of explaining these risks, the social stress model. As we will see, social stressors such as harassment and stigma likely explain some but not all of the elevated mental health risks for these populations. More research

is needed to understand the causes of and potential solutions for these important clinical and public health issues.

Some Preliminaries

We turn first to the evidence for the statistical links between sexual identities or behaviors and mental health outcomes. Before summarizing the relevant research, we should mention the criteria used in selecting the studies reviewed. In an attempt to distill overall findings of a large body of research, each section begins by summarizing the most extensive and reliable meta-analyses—papers that compile and analyze the statistical data from the published research literature. For some areas of research, no comprehensive meta-analyses have been conducted, and in these areas we rely on review articles that summarize the research literature without going into quantitative analyses of published data. In addition to reporting these summaries, we also discuss a few select studies that are of particular value because of their methodology, sample size, controls for confounding factors, or ways in which concepts such as heterosexuality or homosexuality are operationalized; and we discuss key studies published after the meta-analyses or review articles were published.

As we showed in Part One, explaining the exact biological and psychological origins of sexual desires and behaviors is a difficult scientific task, one that has not yet been and may never be satisfactorily completed. However, researchers can study the correlations between sexual behavior, attraction, or identity and mental health outcomes, though there may be—and often are found to be—differences between how sexual behavior, attraction, and identity relate to particular mental health outcomes. Understanding the scope of the health challenges faced by individuals who engage in particular sexual behaviors or experience certain sexual attractions is a necessary step in providing these individuals with the care they need.

Sexuality and Mental Health

In a 2008 meta-analysis of research on mental health outcomes for non-heterosexuals, University College London professor of psychiatry Michael King and colleagues concluded that gays, lesbians, and bisexuals face "higher risk of suicidal behaviour, mental disorder and substance misuse and dependence than heterosexual people."[1] This survey of the literature examined papers published between January 1966 and April 2005 with data from 214,344 heterosexual and 11,971 non-heterosexual individuals.

The large sample size allowed the authors to generate estimates that are highly reliable, as indicated by the relatively small confidence intervals.[2]

Compiling the risk ratios found in these papers, the authors estimated that lesbian, gay, and bisexual individuals had a 2.47 times higher lifetime risk than heterosexuals for suicide attempts,[3] that they were about twice as likely to experience depression over a twelve-month period,[4] and approximately 1.5 times as likely to experience anxiety disorders.[5] Both non-heterosexual men and women were found to be at an elevated risk for substance abuse problems (1.51 times as likely),[6] with the risk for non-heterosexual women especially high—3.42 times higher than for heterosexual women.[7] Non-heterosexual men, on the other hand, were at a particularly high risk for suicide attempts: while non-heterosexual men and women together were at a 2.47 times greater risk of suicide attempts over their lifetimes, non-heterosexual men were found to be at a 4.28 times greater risk.[8]

These findings have been replicated in other studies, both in the United States and internationally, confirming a consistent and alarming pattern. However, there is considerable variation in the estimates of the increased risks of various mental health problems, depending on how researchers define terms such as "homosexual" or "non-heterosexual." The findings from a 2010 study by Northern Illinois University professor of nursing and health studies Wendy Bostwick and colleagues examined associations of sexual orientation with mood and anxiety disorders among men and women who either identified as gay, lesbian, or bisexual, or who reported engaging in same-sex sexual behavior, or who reported feeling same-sex attractions. The study employed a large, U.S.-based random population sample, using data collected from the 2004–2005 wave of the National Epidemiologic Survey on Alcohol and Related Conditions, which was based on 34,653 interviews.[9] In its sample, 1.4% of respondents identified as lesbian, gay, or bisexual; 3.4% reported some lifetime same-sex sexual behavior; and 5.8% reported non-heterosexual attractions.[10]

Women who identified as lesbian, bisexual, or "not sure" reported higher rates of lifetime mood disorders than women who identified as heterosexual: the prevalence was 44.4% in lesbians, 58.7% in bisexuals, and 36.5% in women unsure of their sexual identity, as compared to 30.5% in heterosexuals. A similar pattern was found for anxiety disorders, with bisexual women experiencing the highest prevalence, followed by lesbians and those unsure, and heterosexual women experiencing the lowest prevalence. Examining the data for women with different sexual *behavior* or sexual *attraction* (rather than identity), those reporting sexual behavior

with or attractions to both men and women had a higher rate of lifetime disorders than women who reported exclusively heterosexual or homosexual behaviors or attractions, and women reporting exclusive same-sex sexual behavior or exclusive same-sex attraction in fact had the *lowest* rates of lifetime mood and anxiety disorders.[11]

Men who identified as gay had more than double the prevalence of lifetime mood disorders compared to men who identified as heterosexual (42.3% vs. 19.8%), and more than double the rate of any lifetime anxiety disorder (41.2% vs. 18.6%), while those who identified as bisexual had a slightly lower prevalence of mood disorders (36.9%) and anxiety disorders (38.7%) than gay men. When looking at sexual attraction or behavior for men, those who reported sexual attraction to "mostly males" or sexual behavior with "both females and males" had the highest prevalence of lifetime mood disorders and anxiety disorders compared to other groups, while those reporting exclusively heterosexual attraction or behavior had the lowest prevalence of any group.

Other studies have found that non-heterosexual populations are at a higher risk of physical health problems in addition to mental health problems. A 2007 study by UCLA professor of epidemiology Susan Cochran and colleagues examined data from the California Quality of Life Survey of 2,272 adults to assess links between sexual orientation and self-reported physical health status, health conditions, and disability, as well as psychological distress among lesbians, gay men, bisexuals, and those they classified as "homosexually experienced heterosexual individuals."[12] While the study, like most, was limited by the use of self-reporting of health conditions, it had several strengths: it studied a population-based sample; it separately measured identity and behavioral dimensions of sexual orientation; and it controlled for race (ethnicity), education, relationship status, and family income, among other factors.

While the authors of this study found a number of health conditions that appeared to have elevated prevalence among non-heterosexuals, after adjusting for demographic factors that are potential confounders the only group with significantly greater prevalence of non-HIV physical health conditions was bisexual women, who were more likely to have health problems than heterosexual women. Consistent with the 2010 study by Bostwick and colleagues, higher rates of psychological stress were reported by lesbians, bisexual women, gay men, and homosexually experienced heterosexual men, both before and after adjusting for demographic confounding. Among men, self-identified gay and homosexually experienced heterosexual respondents reported the highest rates of several health problems.

Using the same California Quality of Life Survey, a 2009 study by UCLA professor of psychiatry and biobehavioral sciences Christine Grella and colleagues (including Cochran) examined the relationship between sexual orientation and receiving treatment for substance use or mental disorders.[13] They used a population-based sample, with sexual minorities oversampled to provide more statistical power to detect group differences. The usage of treatment was classified according to whether or not respondents reported receiving treatment in the preceding twelve months for "emotional, mental health, alcohol or other drug problems." Sexual orientation was operationalized by a combination of behavioral history and self-identification. For example, they grouped together as "gay/bisexual" or "lesbian/bisexual" both those who identified as gay, lesbian, or bisexual, and those who had reported same-sex sexual behaviors. They found that women who were lesbian or bisexual were most likely to have received treatment, followed by men who were gay or bisexual, then heterosexual women, with heterosexual men being the least likely group to have reported receiving treatment. Overall, more than twice as many LGB individuals, compared to heterosexuals, had reported receiving treatment in the past twelve months (48.5% compared to 22.5%). The pattern was similar for men and women; 42.5% of homosexual men, compared to 17.1% of heterosexual men, had reported receiving treatment, while 55.3% of lesbian and bisexual women and 27.1% of heterosexual women reported receiving treatment. (Bostwick and colleagues had found that women with exclusively same-sex attractions and behaviors had a lower prevalence of mood and anxiety disorders compared to heterosexual women. The difference in results could be due to the fact that Grella and colleagues grouped those who identified as lesbians together with those who identified as bisexuals or who reported same-sex sexual behavior.)

A 2006 study by Columbia University psychiatry professor Theodorus Sandfort and colleagues examined a representative, population-based sample from the second Dutch National Survey of General Practice, carried out in 2001, to assess links between self-reported sexual orientation and health status among 9,511 participants, of whom 0.9% were classified as bisexual and 1.5% as gay or lesbian.[14] To operationalize sexual orientation, the researchers asked respondents about their sexual preference on a 5-point scale: exclusively women, predominantly women, equally men and women, predominantly men, and exclusively men. Only those who reported an equal preference for men and women were classified as bisexual, while men reporting predominant preferences for women, or women reporting a predominant preference for men were classified as heterosexual. They

found that gay, lesbian, and bisexual respondents reported experiencing higher numbers of acute mental health problems and reported worse general mental health than heterosexuals. The results for physical health were mixed, however: lesbian and gay respondents reported experiencing more acute physical symptoms (such as headaches, back pain, or sore throats) over the past fourteen days, though they did not report experiencing two or more such symptoms any more than heterosexuals.

Lesbian and gay respondents were more likely to report chronic health problems, though bisexual men (that is, men who reported an equal sexual preference for men and women) were less likely to report chronic health problems and bisexual women were no more likely than heterosexual women to do so. The researchers did not find a statistically significant relationship between sexual orientation and overall physical health. After controlling for the possible confounding effects of mental health problems on the reporting of physical health problems, the researchers also found that the statistical effect of reporting a gay or lesbian sexual preference on chronic and acute physical conditions disappeared, though the effect of bisexual preference remained.

The Sandfort study defined sexual orientation in terms of preference or attraction without reference to behavior or self-identification, which makes it a challenge to compare its results to the results of studies that operationalize sexual orientation differently. For example, it is difficult to compare the findings of this study regarding bisexuals (defined as men or women who report an equal sexual preference for men and women) with the findings of other studies regarding "homosexually experienced heterosexual individuals" or those who are "unsure" of their sexual identity. As in most of these types of studies, the health assessments were self-reported, which may make the results somewhat unreliable. But this study also has several strengths: it used a large and representative sample of a country's population, as opposed to the convenience samples that are sometimes used for these kinds of studies, and this sample included a sufficient number of gays and lesbians for their data to be treated in separate groups in the study's statistical analyses. Only three people in the sample reported HIV infection, so this did not appear to be a potential confounding factor, though HIV could have been underreported.

In an effort to summarize findings in this area, we can cite the 2011 report from the Institute of Medicine (IOM), *The Health of Lesbian, Gay, Bisexual, and Transgender People.*[15] This report is an extensive review of scientific literature citing hundreds of studies that examine the health status of LGBT populations. The authors are scientists who are well versed

in these issues (although we wish there had been more involvement of experts in psychiatry). The report reviews findings on physical and mental health in childhood, adolescence, early and middle adulthood, and late adulthood. Consistent with the studies cited above, this report reviews evidence showing that, compared with heterosexual youth, LGB youth are at a higher risk of depression, as well as suicide attempts and suicidal ideation. They are also more likely to experience violence and harassment and to be homeless. LGB individuals in early or middle adulthood are more prone to mood and anxiety disorders, depression, suicidal ideation, and suicide attempts.

The IOM report shows that, like LGB youth, LGB adults—and women in particular—appear to be likelier than heterosexuals to smoke, use or abuse alcohol, and abuse other drugs. The report cites a study[16] that found that self-identified non-heterosexuals used mental health services more often than heterosexuals, and another[17] that found that lesbians used mental health services at higher rates than heterosexuals.

The IOM report notes that "more research has focused on gay men and lesbians than on bisexual and transgender people."[18] The relatively few studies focusing on transgender populations show high rates of mental disorders, but the use of nonprobability samples and the lack of non-transgender controls call into question the validity of the studies.[19] Although some studies have suggested that the use of hormone treatments may be associated with negative physical health outcomes among transgender populations, the report notes that the relevant research has been "limited" and that "no clinical trials on the subject have been conducted."[20] (Health outcomes for transgender individuals will be further discussed below in this part and also in Part Three.)

The IOM report claims that the evidence that LGBT populations have worse mental and physical health outcomes is not fully conclusive. To support this claim, the IOM report cites a 2001 study[21] of mental health in 184 sister pairs in which one sister was lesbian and the other heterosexual. The study found no significant differences in rates of mental health problems, and found significantly higher self-esteem in the lesbian sisters. The IOM report also cites a 2003 study[22] that found no significant differences between heterosexual and gay or bisexual men in general happiness, perceived health, and job satisfaction. Acknowledging these caveats and the studies that do not support the general trend, the vast majority of studies cited in the report point to a generally higher risk of poor mental health status in LGBT populations compared to heterosexual populations.

Sexuality and Suicide

The association between sexual orientation and suicide has strong scientific support. This association merits particular attention, since among all the mental health risks, the increased risk of suicide is the most concerning, owing in part to the fact that the evidence is robust and consistent, and in part to the fact that suicide is so devastating and tragic for the person, family, and community. A better understanding of the risk factors for suicide could allow us, quite literally, to save lives.[23]

Sociologist and suicide researcher Ann Haas and colleagues published an extensive review article in 2011 based on the results of a 2007 conference sponsored by the Gay and Lesbian Medical Association, the American Foundation for Suicide Prevention, and the Suicide Prevention Resource Center.[24] They also examined studies reported since the 2007 conference. For the purposes of their report, the authors defined sexual orientation as "sexual self-identification, sexual behavior, and sexual attraction or fantasy."[25]

Haas and colleagues found the association between homosexual or bisexual orientation and suicide attempts to be well supported by data. They noted that population-based surveys of U.S. adolescents since the 1990s indicate that suicide attempts are two to seven times more likely in high school students who identify as LGB, with sexual orientation being a stronger predictor in males than females. They reviewed data from New Zealand that suggested that LGB individuals were six times more likely to have attempted suicide. They cited health-related surveys of U.S. men and Dutch men and women showing same-sex behavior linked to higher risk of suicide attempts. Studies cited in the report show that lesbian or bisexual women are likelier, on average, to experience suicidal ideation, that gay or bisexual men are more likely, on average, to attempt suicide, and that lifetime suicide attempts among non-heterosexuals are greater in men than in women.

Examining studies that looked at rates of mental disorders in relation to suicidal behavior, Haas and colleagues discussed a New Zealand study[26] showing that gay people reporting suicide attempts had higher rates of depression, anxiety, and conduct disorder. Large-scale health surveys suggested that rates of substance abuse are up to one third higher for the LGB subpopulation. Combined worldwide studies showed up to 50% higher rates of mental disorders and substance abuse among persons self-identifying in surveys as lesbian, gay, or bisexual. Lesbian or bisexual women showed higher levels of substance abuse, while gay or bisexual men had higher rates of depression and panic disorder.

Haas and colleagues also examined transgender populations, noting that scant information is available about transgender suicides but that the existing studies indicate a dramatic increased risk of completed suicide. (These findings are noted here but examined in more detail in Part Three.) A 1997 clinical study[27] estimated elevated risks of suicide for Dutch male-to-female transsexual individuals on hormone therapy, but found no significant differences in overall mortality. A 1998 international review of 2,000 persons receiving sex-reassignment surgery identified 16 possible suicides, an "alarmingly high rate of 800 suicides for every 100,000 post-surgery transsexuals."[28] In a 1984 study, a clinical sample of transgender individuals requesting sex-reassignment surgery showed suicide attempt rates between 19% and 25%.[29] And a large sample of 40,000 mostly U.S. volunteers completing an Internet survey in 2000 found transgender persons to report higher rates of suicide attempts than any group except lesbians.[30]

Finally, the review by Haas and colleagues suggests that it is not clear which aspects of sexuality (identity, attraction, behavior) are most closely linked with the risk of suicidal behavior. The authors cite a 2010 study[31] showing that adolescents identifying as heterosexual while reporting same-sex attraction or behavior did not have significantly higher suicide rates than other self-identified heterosexuals. They also cite the large national survey of U.S. adults conducted by Wendy Bostwick and colleagues (discussed earlier),[32] which showed mood and anxiety disorders—key risk factors for suicidal behavior—more closely related to sexual self-identity than to behavior or attraction, especially for women.

A more recent critical review of existing studies of suicide risk and sexual orientation was presented by Austrian clinical psychologist Martin Plöderl and colleagues.[33] This review rejects several hypotheses developed to account for the increased suicide risk among non-heterosexuals, including biases in self-reporting and failures to measure suicide attempts accurately. The review argues that methodological improvements in studies since 1997 have provided control groups, better representativeness of study samples, and more clarity in defining both suicide attempts and sexual orientation.

The review mentions a 2001 study[34] by Ritch Savin-Williams, a Cornell University professor of developmental psychology, that reported no statistically significant difference between heterosexual and LGB youths after eliminating false-positive reports of suicide attempts and blaming a "'suffering suicidal' script" for leading to an over-reporting of suicidal behavior among gay youths. Plöderl and colleagues argue, however, that

the Savin-Williams study's finding that there was no statistically significant difference between the suicide rates of LGB and heterosexual youths might be attributable to the small sample size, which yielded low statistical power.[35] The later work has not replicated this finding. Subsequent questionnaire or interview-based studies with stricter definitions of suicide attempts have found significantly increased rates of suicide attempts among non-heterosexuals. Several large-scale surveys of young people have found that the elevated risk of reported suicidal behavior increased with the severity of the attempts.[36] Finally, according to Plöderl and colleagues, comparing results of questionnaires with clinical interviews indicates that homosexual youth are less likely to over-report suicide attempts in surveys than heterosexual youth.

Plöderl and colleagues concluded that among psychiatric patients, homosexual or bisexual populations are over-represented in "serious suicide attempts," and that sexual orientation is one of the strongest predictors of suicide. Similarly, in nonclinical population-based studies, non-heterosexual status is found to be one of the strongest predictors of suicide attempts. The authors note:

> The most exhaustive collation of published and unpublished international studies on the association of suicide attempts and sexual orientation with different methodologies has produced a very consistent picture: nearly all studies found increased incidences of self-reported suicide attempts among sexual minorities.[37]

In acknowledging the challenges of all such research, the authors suggest that "the major problem remains as to where one draws the line between a heterosexual or non-heterosexual orientation."[38]

A 1999 study by Richard Herrell and colleagues analyzed 103 middle-aged male twin pairs from the Vietnam Era Twin Registry in Hines, Illinois, in which one twin, but not the other, reported having a male sex partner after the age of 18.[39] The study adopted several measures of suicidality and controlled for potential confounding factors such as substance abuse or depression. It found a "substantially increased lifetime prevalence of suicidal symptoms" in male twins who had sex with men compared with co-twins who did not, independent of the potential confounding effects of drug and alcohol abuse.[40] Though it is a relatively small study and relied on self-reporting for both same-sex behaviors and suicidal thoughts or behaviors, it is notable for using a probability sample (which eliminates selection bias), and for using the co-twin control method (which reduces the effects of genetics, age, race, and the like).

The study looked at middle-aged men; what the implications might be for adolescents is not clear.

In a 2011 study, Robin Mathy and colleagues analyzed the impact of sexual orientation on suicide rates in Denmark during the first twelve years after the legalization of same-sex registered domestic partnerships (RDPs) in that country, using data from death certificates issued between 1990 and 2001 as well as Danish census population estimates.[41] The researchers found that the age-adjusted suicide rate for same-sex RDP men was nearly eight times the rate for men in heterosexual marriages, and nearly twice the rate for men who had never married. For women, RDP status had a small, statistically insignificant effect on suicide mortality risk, and the authors conjectured that the impact of HIV status on the health of gay men might have contributed to this difference between the results for men and women. The study is limited by the fact that RDP status is an indirect measure of sexual orientation or behavior, and does not include those gays and lesbians who are not in a registered domestic partnership; the study also excluded individuals under the age of 18. Finally, the absolute number of individuals with current or past RDP status was relatively small, which may limit the study's conclusions.

Professor of pediatrics Gary Remafedi and colleagues published a 1991 study that looked at 137 males age 14–21 who self-identified as gay (88%) or bisexual (12%). Remafedi and colleagues attempted, with a case-controlled approach, to examine which factors for this population were most predictive of suicide.[42] Compared to those who did not attempt suicide, those who did were significantly more likely to label themselves and identify publicly as bisexual or homosexual at younger ages, report sexual abuse, and report illicit drug use. The authors noted that the likelihood of a suicide attempt "diminished with advancing age at the time of bisexual or homosexual self-labeling." Specifically, "with each year's delay in self-identification, the odds of a suicide attempt declined by more than 80%."[43] This study is limited by using a relatively small nonprobability sample, though the authors note that its result comports with their previous finding[44] of an inverse relationship between psychosocial problems and the age at which one identifies as homosexual.

In a 2010 study, Plöderl and colleagues solicited self-reported suicide attempts among 1,382 Austrian adults to confirm existing evidence that homosexual and bisexual individuals are at higher risk.[45] To sharpen the results, the authors developed more rigorous definitions of "suicide attempts" and assessed multiple dimensions of sexual orientation, distinguishing among sexual fantasies, preferred partners, self-identification,

recent sexual behavior, and lifetime sexual behavior. This study found an increased risk for suicide attempts for sexual minorities along all dimensions of sexual orientation. For women, the risk increases were largest for those with homosexual behaviors; for men, they were largest for homosexual or bisexual behavior in the previous twelve months and self-identification as homosexual or bisexual. Those reporting being unsure of their identity reported the highest percentage of suicide attempts (44%), although this group was small, comprising less than 1% of participants.

A 2016 meta-analysis by University of Toronto graduate student Travis Salway Hottes and colleagues aggregated data from thirty cross-sectional studies on suicide attempts that together included 21,201 sexual minority adults.[46] These studies used either population-based sampling or community-based sampling. Since each sampling method has its own strengths and potential biases,[47] the researchers wanted to examine any differences in the rates of attempted suicide between the two sampling types. Of the LGB respondents to population-based surveys, 11% reported having attempted suicide at least once, compared to 4% of heterosexual respondents to these surveys.[48] Of the LGB respondents to community-based surveys, 20% reported having attempted suicide.[49] Statistical analysis showed that the difference in the sampling methods accounted for 33% of the variation in the suicide figures reported by the studies.

The research on sexuality and the risk of suicide suggests that those who identify as gay, lesbian, bisexual, or transgender, or those who experience same-sex attraction or engage in same-sex sexual behavior are at substantially increased risk of suicidal ideation, suicide attempts, and completed suicide. In the section later in Part Two on the social stress model, we will examine—and raise questions about—one set of arguments put forward to explain these findings. Given the tragic consequences of inadequate or incomplete information in these matters and its effect on public policy and clinical care, more research into the reasons for elevated suicide risk among sexual minorities is desperately needed.

Sexuality and Intimate Partner Violence

Several studies have examined the differences between rates of intimate partner violence (IPV) in same-sex couples and opposite-sex couples. The research literature examines rates of IPV *victimization* (being subjected to violence by a partner) and rates of IPV *perpetration* (committing violence against a partner). In addition to physical and sexual violence, some studies also examine psychological violence, which comprises verbal attacks,

threats, and similar forms of abuse. The weight of evidence indicates that the rate of intimate partner violence is significantly higher among same-sex couples.

In 2014, London School of Hygiene and Tropical Medicine researcher Ana Buller and colleagues conducted a systematic review of 19 studies (with a meta-analysis of 17 of these studies) examining associations between intimate partner violence and health among men who have sex with men.[50] Combining the available data, they found that the pooled lifetime prevalence of any IPV was 48% (estimates from the studies were quite heterogeneous, ranging from 32% to 82%). For IPV within the previous five years, pooled prevalence was 32% (estimates ranging from 16% to 51%). IPV victimization was associated with increased rates of substance use (pooled odds ratio of 1.9), positive HIV status (pooled odds ratio of 1.5), and increased rates of depressive symptoms (pooled odds ratio of 1.5). IPV perpetration was also associated with increased rates of substance use (pooled odds ratio of 2.0). An important limitation of this meta-analysis was that the number of studies it included was relatively small. Also, the heterogeneity of the studies' results may undermine the precision of the meta-analysis. Further, most of the reviewed studies used convenience samples rather than probabilistic samples, and they used the word "partner" without distinguishing long-term relationships from casual encounters.

English psychologists Sabrina Nowinski and Erica Bowen conducted a 2012 review of 54 studies on the prevalence and correlates of intimate partner violence victimization among heterosexual and gay men.[51] The studies showed rates of IPV victimization for gay men ranging from 15% to 51%. Compared to heterosexual men, the review reports, "it appears that gay men experienced more total and sexual IPV, slightly less physical IPV, and similar levels of psychological IPV."[52] The authors also report that according to estimates of IPV prevalence over the most recent twelve months, gay men "experienced less physical, psychological and sexual IPV" than heterosexual men, though the relative lack of twelve-month estimates may make this result unreliable. The authors note that "one of the most worrying findings is the prevalence of severe sexual coercion and abuse in male same-gender relationships,"[53] citing a 2005 study[54] on IPV in HIV-positive gay men. Nowinski and Bowen found positive HIV status to be associated with IPV in both gay and heterosexual relationships. An important limitation of their review is the fact that many of the same-sex IPV studies they examined were based on small convenience samples.

Catherine Finneran and Rob Stephenson of Emory University in 2012 conducted a systematic review of 28 studies examining IPV among men

who have sex with men.[55] Every study in the review estimated rates of IPV for gay men that were similar to or higher than those for all women regardless of sexual orientation. The authors conclude that "the emergent evidence reviewed here demonstrates that IPV—psychological, physical, and sexual—occurs in male-male partnerships at alarming rates."[56] Physical IPV victimization was reported most frequently, with rates ranging from 12% to 45%.[57] The rate of sexual IPV victimization ranged from 5% to 31%, with 9 out of 19 studies reporting rates over 20%. Psychological IPV victimization was recorded in six studies, with rates ranging from 5% to 73%.[58] Perpetration of physical IPV was reported in eight studies, with rates ranging from 4% to 39%. Rates of perpetration of sexual IPV ranged from 0.7% to 28%; four of the five studies reviewed reported rates of 9% or more. Only one study measured perpetration of psychological violence, and the estimated prevalence was 78%. Lack of consistent research design among the studies examined (for example, some differences regarding the exact definition of IPV, the correlates of IPV examined, and the recall periods used to measure violence) makes it impossible to calculate a pooled prevalence estimate, which would be useful given the lack of a national probability-based sample.

A 2013 study by UCLA's Naomi Goldberg and Ilan Meyer used a large probability sample of almost 32,000 individuals from the California Health Interview Survey to assess differences in intimate partner violence between various cohorts: heterosexual; self-identified gay, lesbian, and bisexual individuals; and men who have sex with men but did not identify as gay or bisexual, and women who have sex with women but did not identify as lesbian or bisexual.[59] All three LGB groups had greater lifetime and one-year prevalence of intimate partner violence than the heterosexual group, but this difference was only statistically significant for bisexual women and gay men. Bisexual women were more likely to have experienced lifetime IPV (52% of bisexual women vs. 22% of heterosexual women and 32% of lesbians) and to have experienced IPV in the preceding year (27% of bisexuals vs. 5% of heterosexuals and 10% of lesbians). For men, all three non-heterosexual groups had higher rates of lifetime and one-year IPV, but this was only statistically significant for gay men, who were more likely to have experienced IPV over a lifetime (27% of gay men vs. 11% of heterosexual men and 19.6% of bisexual men) and over the preceding year (12% of gay men vs. 5% of heterosexual men and 9% of bisexual men). The authors also tested whether binge drinking and psychological distress could explain the higher prevalence of IPV victimization in gay men and bisexual women; controlling for these

variables revealed that they did not. This study is limited by the fact that other potentially confounding psychological variables (besides drinking and distress) were not controlled for, statistically or otherwise, and may have accounted for the findings.

To estimate the prevalence of battering victimization among gay partners, AIDS-prevention researcher Gregory Greenwood and colleagues published a 2002 study based on telephone interviews with a probability-based sample of 2,881 men who have sex with men (MSM) in four cities from 1996 to 1998.[60] Of those interviewed, 34% reported experiencing psychological or symbolic abuse, 22% reported physical abuse, and 5% reported sexual abuse. Overall, 39% reported some type of battering victimization, and 18% reported more than one type of battering in the previous five years. Men younger than 40 were significantly more likely than men over 60 to report battering violence. The authors conclude that "the prevalence of battering within the context of intimate partner relationships was very high" among their sample of men who have sex with men, and that since lifetime rates are usually higher than those for a five-year recall, "it is likely that a substantially greater number of MSM than of heterosexual men have experienced lifetime victimization."[61] The five-year prevalence of physical battering among this sample of urban MSM was also "significantly higher" than the annual rate of severe violence (3%) or total violence (12%) experienced in a representative sample of heterosexual women living with men, suggesting that the estimates of battering victimization for MSM in this study "are higher than or comparable to those reported for heterosexual women."[62] This study was limited by its use of a sample from four cities, so it is not clear how well the results generalize to non-urban settings.

Transgender Health Outcomes

The research literature for mental health outcomes in transgender individuals is more limited than the research on mental health outcomes in LGB populations. Because people identifying as transgender make up a very small proportion of the population, large population-based surveys and studies of such individuals are difficult if not impossible to conduct. Nevertheless, the limited available research strongly suggests that transgender people have increased risks of poor mental health outcomes. It appears that the rates of co-occurring substance use disorders, anxiety disorders, depression, and suicide tend to be higher for transgender people than for LGB individuals.

In 2015, Harvard pediatrics professor and epidemiologist Sari Reisner and colleagues conducted a retrospective matched-pair cohort study of mental health outcomes for 180 transgender subjects aged 12–29 years (106 female-to-male and 74 male-to-female), matched to non-transgender controls based on gender identity.[63] Transgender youth had an elevated risk of depression (50.6% vs. 20.6%)[64] and anxiety (26.7% vs. 10.0%).[65] Transgender youth also had higher risk of suicidal ideation (31.1% vs. 11.1%),[66] suicide attempts (17.2% vs. 6.1%),[67] and self-harm without lethal intent (16.7% vs. 4.4%)[68] relative to the matched controls. A significantly greater proportion of transgender youth accessed inpatient mental health care (22.8% vs. 11.1%)[69] and outpatient mental health care (45.6% vs. 16.1%)[70] services. No statistically significant differences in mental health status were observed when comparing female-to-male transgender individuals to the male-to-female transgender individuals after adjusting for age, race/ethnicity, and hormone use.

This study had the merit of including individuals who presented to a community-based health clinic, and who thus were not identified solely as meeting the diagnostic criteria for gender identity disorder in the fourth edition of the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV*), and were not selected from a population of patients presenting to a clinic for treatment of gender identity issues. However, Reisner and colleagues note that their study has the limitations typically found in the retrospective chart review study design, such as incomplete documentation and variation in the quality of information recorded by medical professionals.

A report from the American Foundation for Suicide Prevention and the Williams Institute, a think tank for LGBT issues at the UCLA School of Law, summarized findings on suicide attempts among transgender and gender-nonconforming adults from a large national sample of over 6,000 individuals.[71] This constitutes the largest study of transgender and gender-nonconforming adults to date, though it used a convenience sample rather than a population-based sample. (Large population-based samples are nearly impossible given the low overall prevalence in the general population of transgendered individuals.) Summarizing the major findings of this study, the authors write:

> The prevalence of suicide attempts among respondents to the National Transgender Discrimination Survey (NTDS), conducted by the National Gay and Lesbian Task Force and National Center for Transgender Equality, is 41 percent, which vastly exceeds the 4.6

> percent of the overall U.S. population who report a lifetime suicide attempt, and is also higher than the 10–20 percent of lesbian, gay and bisexual adults who report ever attempting suicide.[72]

The authors note that "respondents who said they had received transition-related health care or wanted to have it someday were more likely to report having attempted suicide than those who said they did not want it," however, "the survey did not provide information about the timing of reported suicide attempts in relation to receiving transition-related health care, which precluded investigation of transition-related explanations for these patterns."[73] The survey data suggested associations between suicide attempts, co-occurring mental health disorders, and experiences of discrimination or mistreatment, although the authors note some limitations of these outcomes: "The survey data did not allow us to determine a direct causal relationship between experiencing rejection, discrimination, victimization, or violence, and lifetime suicide attempts," although they did find evidence that stressors interacted with mental health factors "to produce a marked vulnerability to suicidal behavior in transgender and gender non-conforming individuals."[74]

A 2001 study by Kristen Clements-Nolle and colleagues of 392 male-to-female and 123 female-to-male transgender persons found that 62% of the male-to-female and 55% of the female-to-male transgender persons were depressed at the time of the study, and 32% of each population had attempted suicide.[75] The authors note: "The prevalence of suicide attempts among male-to-female and female-to-male transgender persons in our study was much higher than that found in US household probability samples and a population-based sample of adult men reporting same-sex partners."[76]

Explanations for the Poor Health Outcomes: The Social Stress Model

The greater prevalence of mental health problems in LGBT subpopulations is a cause for concern, and policymakers and clinicians should strive to reduce these risks. But to know what kinds of measures will help ameliorate them we must better understand their causes. At this time, the medical and social strategies for helping non-heterosexual populations in the United States are quite limited, and this may be due in part to the relatively limited explanations for the poor mental health outcomes offered by social scientists and psychologists.

Despite the limits of the scientific understanding of why non-heterosexual subpopulations are more likely to have such poor mental

health outcomes, much of the public effort to ameliorate these problems is motivated by a particular hypothesis called the *social stress model*. This model posits that discrimination, stigmatization, and other similar stresses contribute to poor mental health outcomes among sexual minorities. An implication of the social stress model is that reducing these stresses would ameliorate the mental health problems experienced by sexual minorities.

Sexual minorities face distinct social challenges such as stigma, overt discrimination and harassment, and, often, struggle with reconciling their sexual behaviors and identities with the norms of their families and communities. In addition, they tend to be subject to challenges similar to those of some other minority populations, arising from marginalization by or conflict with the larger part of society in ways that may adversely impact their health.[77] Many researchers classify these various challenges under the concept of *social stress* and believe that social stress contributes to the generally higher rates of mental health problems among LGBT subpopulations.[78]

In attempting to account for the mental health disparities between heterosexuals and non-heterosexuals, researchers occasionally refer to a social or minority stress *hypothesis*.[79] However, it is more accurate to refer to a social or minority stress *model*, because the postulated connection between social stress and mental health is more complex and less precise than anything that could be stated as a single hypothesis.[80] The term *stress* can have a number of meanings, ranging from a description of a physiological condition to a mental or emotional state of anger or anxiety to a difficult social, economic, or interpersonal situation. More questions arise when one thinks about various kinds of *stressors* that may disproportionately affect mental health in minority populations. We will discuss some of these aspects of the social stress model after a concise overview of the model as it has been presented in recent literature on LGBT mental health.

The social stress model attempts to explain why non-heterosexual people have, on average, higher incidences of poor mental health outcomes than the rest of the population. It does not put forth a complete explanation for the disparities between non-heterosexuals and heterosexuals, and it does not explain the mental health problems of a particular patient. Rather, it describes social factors that might directly or indirectly influence the health risks for LGBT people, which may only become apparent at a population level. Some of these factors may also influence heterosexuals, but LGBT people are probably disproportionately exposed to them.

In an influential 2003 article on the social stress model, psychiatric epidemiologist and sexual orientation law expert Ilan Meyer distinguished between *distal* and *proximate* minority stressors. Distal stressors do not

depend on the individual's "perceptions or appraisals," and thus "can be seen as independent of personal identification with the assigned minority status."[81] For instance, if a man who was perceived to be gay by an employer was fired on that basis, this would be a distal stressor, since the stressful event of discrimination would have had nothing to do with whether the man actually identified as gay, but only with someone else's attitude and perception. Distal stressors tend to reflect social circumstances rather than the individual's reaction to those circumstances. Proximate stressors, in contrast, are more subjective and are closely related to the individual's self-identity as lesbian, gay, bisexual, or transgender. An example of a proximate stressor would be when a young woman personally identifies as being a lesbian, and chooses to hide that identity from her family members out of fear of disapproval, or because of an internal sense of shame. The effects of proximate stressors such as this one are highly dependent on the individual's self-understanding and unique social circumstances. In this section we describe the types of stressors postulated in the social stress model, starting at the distal and proceeding to the most proximate stressors, and examine some of the empirical evidence that has been offered on the links between the stressors and mental health outcomes.

Discrimination and prejudice events. Overt acts of mistreatment, ranging from violence to harassment and discrimination, are categorized together by researchers as "prejudice events." These are thought to be significant stressors for non-heterosexual populations.[82] Surveys of LGBT subpopulations have found that they tend to experience these kinds of prejudice events more frequently than the general population.[83]

The available evidence indicates that prejudice events likely contribute to mental health problems. A 1999 study by UC Davis professor of psychology Gregory Herek and colleagues using survey data from 2,259 LGB individuals in Sacramento found that self-identified lesbians and gays who experienced a bias crime in the preceding five years—a crime, such as assault, theft, or vandalism, motivated by the actual or perceived sexual identity of the victim—reported significantly higher levels of depressive symptoms, traumatic stress symptoms, and anxiety than lesbians and gays who had not experienced a bias crime over that same period.[84] Additionally, lesbians and gays who reported being the victims of bias crimes in the last five years showed significantly higher levels of depressive and traumatic stress symptoms than individuals who experienced non-bias crimes in the same period (though the two groups did not display significant differences in anxiety). Comparable significant correlations were not found for

self-identified bisexuals, who constituted a much smaller portion of the survey respondents. The study also found that lesbians and gays subject to bias crimes were significantly more likely than other respondents to report feelings of vulnerability and a decreased sense of personal mastery or agency. Corroborating these findings on the harmful impact of bias crimes was a 2001 study by Northeastern University social scientist Jack McDevitt and colleagues that examined aggravated assaults using data from the Boston Police Department.[85] They found that bias crime victims tended to experience the effects of victimization more intensely and for a longer period of time than non-bias crime victims. (The study looked at bias-motivated assaults in general, rather than restricting its analysis to assaults motivated by LGBT bias, though a substantial portion of the subjects did experience assaults motivated by their non-heterosexual status.)

Similar patterns also appear among non-heterosexual adolescents, for whom maltreatment is particularly high.[86] In a 2011 study, University of Arizona social and behavioral scientist Stephen T. Russell and colleagues analyzed a survey of 245 young LGBT adults that retrospectively assessed school victimization due to actual or perceived LGBT status between the ages of 13 and 19. They found strong correlations between school victimization and poor mental health as young adults.[87] Victimization was assessed by asking yes-or-no questions, such as, "During my middle or high school years, while at school, I was pushed, shoved, slapped, hit, or kicked by someone who wasn't just kidding around," followed by a question of how often these events were related to the respondent's sexual identity. Respondents who reported high levels of school victimization due to their sexual identity were 2.6 times more likely to report depression as young adults and 5.6 times more likely to report that they had attempted suicide, compared to those who reported low levels of victimization. These differences were highly statistically significant, though the study is potentially limited by its use of retrospective surveys to measure incidents of victimization. A study by professor of social work Joanna Almeida and colleagues, which relied on the 2006 Boston Youth Survey (a biennial survey of high school students in Boston public schools), found that perceptions of having been victimized due to LGBT status accounted for increased symptoms of depression among LGBT students. For male LGBT students, but not females, the study also found a positive correlation between victimization and suicidal thoughts and self-harm.[88]

Differences in compensation suggest discrimination in the workplace, which can have both direct and indirect effects on mental health. M. V. Lee Badgett, a professor of economics at the University of Massachusetts,

Amherst, analyzed data collected between 1989 and 1991 in the General Social Survey and found that non-heterosexual male employees received significantly lower compensation (11% to 27%) than heterosexuals, even after controlling for experience, education, occupation, and other factors.[89] According to a 2009 review by Badgett,[90] nine studies from the 1990s and early 2000s "consistently show that gay and bisexual men earned 10% to 32% less than heterosexual men," and that differences in occupation cannot account for much of the wage disparity. Researchers have also found that non-heterosexual women earn more than heterosexual women,[91] which may suggest either that patterns of discrimination differ for men and women, or that there are other factors associated with non-heterosexual behavior and self-identification in men and women influencing their respective earnings, such as a lower rate of child-rearing or being the family primary wage earner.

There is evidence that suggests that wage disparities can help explain some population-level disparities in mental health outcomes,[92] though it is difficult to tell if differences in mental health help explain the differences in wages. A 1999 study[93] by Craig Waldo on the relationship between workplace heterosexism—defined as negative social attitudes toward non-heterosexuals—and stress-related outcomes in 287 LGB individuals found that LGB individuals who experienced heterosexism in the workplace "exhibited higher levels of psychological distress and health-related problems, as well as decreased satisfaction with several aspects of their jobs." The cross-sectional data used by many of these studies make it impossible to infer causality, though both prospective studies and qualitative analyses of the impact of unemployment on mental health suggest that at least some of the correlations are likely accounted for by the psychological and material effects of unemployment.[94]

Stigma. Sociologists have for many years documented a range of adverse effects of stigma on individuals, ranging from issues with self-esteem to academic achievement.[95] Stigma is typically regarded as an attribute attaching to a person that reduces that person's worth to others in a particular social context.[96] These negative evaluations are in many cases widely shared among a cultural group and become the basis for excluding or differentially treating stigmatized individuals. For example, mental illness can become stigmatized when it is regarded as a character flaw in mentally ill people. One reason why stigma serves an important role in the social stress model is that it can be invoked as an explanation even in the absence of particular events of discrimination or maltreatment. For

example, stigmatization of depression may take place when a depressed person conceals the depression on the expectation that friends and family members will regard it as a character flaw. Even when this concealment is successful, and there is therefore no actual discrimination or mistreatment by the individual's friends or family, anxiety over the attitudes others may have can affect the depressed person's emotional and mental well-being.

Researchers have found associations between the risk of poor mental health and stigma toward certain populations, though there has been little empirical research on the mental health effects of stigma on LGBT people in particular. Stigma is not easy to define or operationalize, making it a difficult and vague concept for empirical social scientists to study. Nevertheless, researchers have attempted to work with the concept using surveys of self-perceived devaluation by others and have found correlations between experiences of stigma and the risk of poor mental health status. One highly cited 1997 study by sociologist and epidemiologist Bruce Link and colleagues on the connection between stigma and mental health found a "strong and enduring" negative effect of stigma on the mental well-being of men who were suffering from a mental disorder and substance abuse.[97] In this study, the effects of stigma appeared to persist even after the men had received largely successful treatment for their original mental and substance abuse problems. The study found significant correlations between certain stigma variables—self-reported experiences of devaluation and rejection—and depressive symptoms before and after treatment, suggesting that the effects of stigma are relatively long-lasting. This might simply indicate that people with depressive symptoms tend to report more stigma, but if that were the case, one would have expected reports of stigma to decline over the course of the treatment program, as depression did. However, since stigma reports stayed constant, the authors concluded that stigma must have had a causal role in shaping depressive symptoms. It is worth noting that this study found stigma variables to account uniquely for around 10% or slightly more of the variance in depressive symptoms—in other words, stigma had a minor effect on depressive symptoms, though such an effect might manifest itself in significant ways on a population level. Some other researchers have suggested that the effects of stigma are usually minor and transitory; for example, Vanderbilt sociologist Walter Gove argued that for the "vast majority of cases the stigma [experienced by mental patients] appears to be transitory and does not appear to pose a severe problem."[98]

Researchers have relatively recently begun pursuing both empirical and theoretical work[99] on how stigma affects the mental health of LGBT

people, though there has been some controversy over the magnitude and duration of effects due to stigma. Some of the controversy may stem from the difficulty of defining and quantifying stigma as well as the variations in stigma across different social contexts. A 2013 study by Columbia University medical psychologist Walter Bockting and colleagues on mental health in 1,093 transgender people found a positive correlation between psychological distress and both enacted and felt stigma, which were measured using survey questions.[100] A 2003 study[101] by clinical psychologist Robin Lewis and colleagues of predictors of depressive symptoms in 201 LGB individuals found that stigma consciousness was significantly associated with depressive symptoms, where stigma consciousness was assessed using a ten-item questionnaire that assessed "the degree to which one expects to be judged on the basis of a stereotype."[102] However, depressive symptoms are often associated with negative cognition about the self, the world, and the future, and this may contribute to the subjective perception of stigmatization among individuals suffering from depression.[103] A 2011 study[104] by Bostwick that also used measures of stigma consciousness and depressive symptoms found a modest positive correlation between stigma scores and depressive symptoms in bisexual women, although the study was limited by having a relatively small sample size. However, a 2003 longitudinal study[105] of Norwegian adolescents by psychologist Lars Wichstrøm and colleague found that sexual orientation was associated with poor mental health status after accounting for a variety of psychological risk factors, including self-worth. While this study did not directly consider stigma as a risk factor, it suggests that psychological factors such as stigma consciousness alone likely cannot fully account for the disparities in mental health between heterosexuals and non-heterosexuals. Additionally, it is important to note that due to the cross-sectional design of these studies, causal inferences cannot be supported by the data—different kinds of data and more evidence would be needed to support conclusions about causal relationships. In particular, it is impossible to prove through these studies that stigma leads to poor mental health, as opposed to, for example, poor mental health leading people to report higher levels of stigma, or a third factor being responsible for both poor mental health and higher levels of stigma.

Concealment. Stigma may affect non-heterosexual individuals' decisions about whether to disclose or conceal their sexual orientation. LGBT people may decide to conceal their sexual orientation to protect themselves against possible bias or discrimination, to avoid a sense of shame, or to

avoid a potential conflict between their social role and sexual desires or behaviors.[106] Particular contexts in which LGBT people may be more likely to conceal their sexual orientation include school, work, and other places in which they feel that disclosure could negatively affect the way that people regard them.

There is a large amount of evidence from psychological research indicating that concealment of an important aspect of one's identity may have adverse mental health consequences. In general, expressing one's emotions and sharing important aspects of one's life with others play large roles in maintaining mental health.[107] Recent decades have seen a growing body of research on the relationships between concealment and disclosure and mental health in LGBT subpopulations.[108] For example, a 2007 study[109] by Belle Rose Ragins and colleagues of workplace concealment and disclosure in 534 LGB individuals found that fear of disclosing was associated with psychological strain and other outcomes such as job satisfaction. However, the study also challenged the notion that disclosure leads to positive psychological and social outcomes, since employees' disclosure was not significantly associated with most of the outcome variables. The authors interpret this result by saying that "this study suggests that concealment may be a necessary and adaptive decision in an unsupportive or hostile environment, thus underscoring the importance of social context."[110] Due to the relatively rapid changes in social acceptance of same-sex marriage and of same-sex relationships more broadly in recent decades,[111] it is possible that some of the research on the psychological effects of concealment and disclosure is outdated, because in general there may now be less pressure for those identifying as LGB to conceal their identities.

Testing the model. One of the implications of the social stress model is that reducing the amount of discrimination, prejudice, and stigmatization of sexual minorities would help reduce the rates of mental health problems for these populations. Some jurisdictions have sought to reduce these social stressors by passing anti-discrimination and hate-crime laws. If such policies are in fact successful at reducing these stressors then they could be expected to reduce the rates of mental health problems in LGB populations to the extent that the social stress model accurately accounts for the causes of these problems. So far, studies have not been designed in such a way that could allow them to test conclusively the hypothesis that social stress accounts for the high rates of poor mental health outcomes in non-heterosexual populations, but there is research that provides some data on a testable implication of the social stress model.

A 2009 study by sociomedical scientist Mark Hatzenbuehler and colleagues investigated the association between psychiatric morbidity in LGB populations and two state-level policies that pertained to these populations: hate-crime laws that did not include sexual orientation as a protected category, and laws prohibiting employment discrimination based on sexual orientation.[112] The study used data on mental health outcomes from Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), a nationally representative sample of 34,653 civilian, non-institutionalized adults, and measuring psychiatric disorders according to *DSM-IV* criteria.[113] Wave 2 of NESARC took place in 2004–2005. Of the sample, 577 respondents identified as lesbian, gay, or bisexual. The analysis of the data showed that LGB individuals living in states with no hate-crime laws and no non-discrimination laws tended to have higher odds of psychiatric morbidity (compared to LGB individuals in states with one or two protective laws), but the analysis found statistically significant correlations only for dysthymia (a less severe but more persistent form of depression), generalized anxiety disorder, and post-traumatic stress disorder, while the correlations between seven other psychiatric conditions investigated were not found to be statistically significant. No epidemiological inferences can be made due to the nature of the data, suggesting the need for more studies on this and similar topics.

Hatzenbuehler and colleagues attempted to improve on this cross-sectional study by doing a prospective study, published in 2010, this time examining changes in psychiatric morbidity over the period in which certain states passed constitutional amendments defining marriage as a union between one man and one woman—amendments that were described by the study's authors as "bans on gay marriage."[114] The authors examined differences in psychiatric morbidity between Wave 1 of NESARC, which took place in 2001–2002, and Wave 2, which coincided with the 2004 and 2005 state-constitutional amendments. They observed that the prevalence in mood disorders in LGB respondents living in states that passed marriage amendments increased by 36.6% between Waves 1 and 2. Mood disorders for LGB respondents living in states that did not pass marriage amendments decreased by 23.6%, though this change was not statistically significant. The prevalence of certain disorders increased both in states that passed such amendments and in states that did not. Generalized anxiety disorder, for example, increased in both, but by a much larger and statistically significant magnitude in states that passed marriage amendments. Hatzenbuehler and colleagues found that drug-use disorders increased more in states that did *not* pass marriage amendments,

and the increase was statistically significant only for those states. (Total substance abuse disorders increased in both cases, by a roughly similar amount.) As with the earlier cross-sectional study, for the majority of the psychiatric conditions investigated there were no significant correlations between the conditions and the social policies that were hypothesized to have an influence on mental health outcomes.

Some of the limitations of the study's findings noted by the authors include the following: healthier LGB respondents may have moved out of the states that would eventually pass marriage amendments into the states that would not; sexual orientation was only assessed during Wave 2 of NESARC, and there is some fluidity to sexual identity that may have led to misclassification of some LGB respondents; and the sample size of LGB respondents living in states that passed marriage amendments was relatively small, limiting the statistical power of the study.

One hypothesized causal mechanism for the change in mental health variables associated with the marriage amendments is that the public debate surrounding the amendments may have elevated the stress experienced by non-heterosexuals—a hypothesis that was put forward by psychologist Sharon Scales Rostosky and colleagues in a study of the attitudes of LGB adults in states that passed marriage amendments in 2006.[115] The survey data collected during this study showed that LGB respondents living in states that passed marriage amendments in 2006 had higher levels of various kinds of psychological distress, including stress and depressive symptoms. The study also found that participation in LGBT activism during the election season was associated with increased psychological distress. It may be that part of the psychological distress recorded by this survey, which included perceived stress, depressive symptoms (but not diagnoses of depressive disorders), and what the researchers called "amendment-related affect," may have simply reflected the typical feelings of advocates when they experience political defeat on an issue that they care passionately about. Other key limitations of the study were its cross-sectional design and its reliance on volunteers for the survey (in contrast to the previous study by Hatzenbuehler and colleagues). The survey methodology may also have biased the results—the researchers advertised on websites and through listserv e-mail announcements that they were looking for survey respondents for a study on "attitudes and experiences of LGB…individuals regarding the debate" over gay marriage. As with many forms of convenience sampling, individuals with strong attitudes regarding the issues under investigation in the survey may have been more likely to respond.

As for the effects of particular policies, the evidence is equivocal at best. The 2009 study by Hatzenbuehler and colleagues demonstrated significant correlations between the risk of some (though not all) mental health problems in the LGB subpopulation and state policies on hate crime and employment protections. Even for the aspects of mental health that this study found to be correlated with hate-crime or employment-protection policies, the study was unable to show an epidemiological relationship between policies and health outcomes.

Conclusion

The social stress model probably accounts for some of the poor mental health outcomes experienced by sexual minorities, though the evidence supporting the model is limited, inconsistent and incomplete. Some of the central concepts of the model, such as stigmatization, are not easily operationalized. There is evidence linking some forms of mistreatment, stigmatization, and discrimination to some of the poor mental health outcomes experienced by non-heterosexuals, but it is far from clear that these factors account for all of the disparities between the heterosexual and non-heterosexual populations. Those poor mental health outcomes may be mitigated to some extent by reducing social stressors, but this strategy is unlikely to eliminate all of the disparities in mental health status between sexual minorities and the wider population. Other factors, such as the elevated rates of sexual abuse victimization among the LGBT population discussed in Part One, may also account for some of these mental health disparities, as research has consistently shown that "survivors of childhood sexual abuse are significantly at risk of a wide range of medical, psychological, behavioral, and sexual disorders."[116]

Just as it does a disservice to non-heterosexual subpopulations to ignore or downplay the statistically higher risks of negative mental health outcomes they face, so it does them a disservice to misattribute the causes of these elevated risks, or to ignore other potential factors that may be at work. Assuming that a single model can explain all of the mental health risks faced by non-heterosexuals can mislead clinicians and therapists charged with helping this vulnerable subpopulation. The social stress model deserves further research, but should not be assumed to offer a complete explanation of the causes of mental health disparities if clinicians and policymakers want to adequately address the mental health challenges faced by the LGBT community. More research is needed to explore the causes of, and solutions to, these important public health challenges.

Part Two: Sexuality, Mental Health Outcomes, and Social Stress

1. Michael King *et al.*, "A systematic review of mental disorder, suicide, and deliberate self harm in lesbian, gay and bisexual people," *BMC Psychiatry* 8 (2008): 70, http://dx.doi.org/10.1186/1471-244X-8-70.

2. The researchers who performed this meta-analysis initially found 13,706 papers by searching academic and medical research databases, but after excluding duplicates and other spurious search results examined 476 papers. After further excluding uncontrolled studies, qualitative papers, reviews, and commentaries, the authors found 111 data-based papers, of which they excluded 87 that were not population-based studies, or that failed to employ psychiatric diagnoses, or that used poor sampling. The 28 remaining papers relied on 25 studies (some of the papers examined data from the same studies), which King and colleagues evaluated using four quality criteria: (1) whether or not random sampling was used; (2) the representativeness of the study (measured by survey response rates); (3) whether the sample was drawn from the general population or from some more limited subset, such as university students; and (4) sample size. However, only one study met all four criteria. Acknowledging the inherent limitations and inconsistencies of sexual orientation concepts, the authors included information on how those concepts were operationalized in the studies analyzed—whether in terms of same-sex attraction (four studies), same-sex behavior (thirteen studies), self-identification (fifteen studies), score above zero on the Kinsey scale (three studies), two different definitions of sexual orientation (nine studies), three different definitions (one study). Eighteen of the studies used a specific time frame for defining the sexuality of their subjects. The studies were also grouped into whether or not they focused on lifetime or twelve-month prevalence, and whether the authors analyzed outcomes for LGB populations separately or collectively.

3. 95% confidence interval: 1.87–3.28.

4. 95% confidence interval: 1.69–2.48.

5. 95% confidence interval: 1.23–1.92.

6. 95% confidence interval: 1.23–1.86.

7. 95% confidence interval: 1.97–5.92.

8. 95% confidence interval: 2.32–7.88.

9. Wendy B. Bostwick *et al.*, "Dimensions of Sexual Orientation and the Prevalence of Mood and Anxiety Disorders in the United States," *American Journal of Public Health* 100, no. 3 (2010): 468–475, http://dx.doi.org/10.2105/AJPH.2008.152942.

10. *Ibid.*, 470.

11. The difference in health outcomes between women who identify as lesbians and women who report exclusive same-sex sexual behaviors or attractions is a good illustration of how the differences between sexual identity, behavior, and attraction matter.

12. Susan D. Cochran and Vickie M. Mays, "Physical Health Complaints Among Lesbians, Gay Men, and Bisexual and Homosexually Experienced Heterosexual Individuals: Results From the California Quality of Life Survey," *American Journal of Public Health* 97, no. 11 (2007): 2048–2055, http://dx.doi.org/10.2105/AJPH.2006.087254.

13. Christine E. Grella *et al.*, "Influence of gender, sexual orientation, and need on treatment utilization for substance use and mental disorders: Findings from the California Quality of Life Survey," *BMC Psychiatry* 9, no. 1 (2009): 52, http://dx.doi.org/10.1186/1471-244X-9-52.

14. Theo G. M. Sandfort *et al.*, "Sexual Orientation and Mental and Physical Health Status: Findings from a Dutch Population Survey," *American Journal of Public Health* 96, (2006): 1119–1125, http://dx.doi.org/10.2105%2FAJPH.2004.058891.

15. Robert Graham *et al.*, Committee on Lesbian, Gay, Bisexual, and Transgender Health Issues and Research Gaps and Opportunities, Institute of Medicine, *The Health of Lesbian, Gay, Bisexual, and Transgender People: Building a Foundation for Better Understanding* (Washington, D.C.: The National Academies Press, 2011), http://dx.doi.org/10.17226/13128.

16. Susan D. Cochran, J. Greer Sullivan, and Vickie M. Mays, "Prevalence of Mental Disorders, Psychological Distress, and Mental Health Services Use Among Lesbian, Gay, and Bisexual Adults in the United States," *Journal of Consulting and Clinical Psychology* 71, no. 1 (2007): 53–61, http://dx.doi.org/10.1037/0022-006X.71.1.53.

17. Lisa A. Razzano, Alicia Matthews, and Tonda L. Hughes, "Utilization of Mental Health Services: A Comparison of Lesbian and Heterosexual Women," *Journal of Gay & Lesbian Social Services* 14, no. 1 (2002): 51–66, http://dx.doi.org/10.1300/J041v14n01_03.

18. Robert Graham *et al.*, *The Health of Lesbian, Gay, Bisexual, and Transgender People*, 4.

19. *Ibid.*, 190, see also 258–259.

20. *Ibid.*, 211.

21. Esther D. Rothblum and Rhonda Factor, "Lesbians and Their Sisters as a Control Group: Demographic and Mental Health Factors," *Psychological Science* 12, no. 1 (2001): 63–69, http://dx.doi.org/10.1111/1467-9280.00311.

22. Stephen M. Horowitz, David L. Weis, and Molly T. Laflin, "Bisexuality, Quality of Life, Lifestyle, and Health Indicators," *Journal of Bisexuality* 3, no. 2 (2003): 5–28, http://dx.doi.org/10.1300/J159v03n02_02.

23. By way of context, it may be worth noting that in the United States, the overall suicide rate has risen in recent years: "From 1999 through 2014, the age-adjusted suicide rate in the United States increased 24%, from 10.5 to 13.0 per 100,000 population, with the pace of increase greater after 2006." Sally C. Curtin, Margaret Warner, and Holly Hedegaard, "Increase in suicide in the United States, 1999–2014," National Center for

Health Statistics, NCHS data brief no. 241 (April 22, 2016), http://www.cdc.gov/nchs/products/databriefs/db241.htm.

24. Ann P. Haas *et al.*, "Suicide and Suicide Risk in Lesbian, Gay, Bisexual, and Transgender Populations: Review and Recommendations," *Journal of Homosexuality* 58, no. 1 (2010): 10–51, http://dx.doi.org/10.1080/00918369.2011.534038.

25. *Ibid.*, 13.

26. David M. Fergusson, L. John Horwood, and Annette L. Beautrais, "Is Sexual Orientation Related to Mental Health Problems and Suicidality in Young People?," *Archives of General Psychiatry* 56, no. 10 (1999): 876–880, http://dx.doi.org/10.1001/archpsyc.56.10.876.

27. Paul J. M. Van Kesteren *et al.*, "Mortality and morbidity in transsexual subjects treated with cross-sex hormones," *Clinical Endocrinology* 47, no. 3 (1997): 337–343, http://dx.doi.org/10.1046/j.1365-2265.1997.2601068.x.

28. Friedemann Pfäfflin and Astrid Junge, *Sex Reassignment: Thirty Years of International Follow-Up Studies After Sex Reassignment Surgery: A Comprehensive Review, 1961–1991*, Roberta B. Jacobson and Alf B. Meier, trans. (Düsseldorf: Symposion Publishing, 1998), https://web.archive.org/web/20070503090247/http://www.symposion.com/ijt/pfaefflin/1000.htm.

29. Jean M. Dixen *et al.*, "Psychosocial characteristics of applicants evaluated for surgical gender reassignment," *Archives of Sexual Behavior* 13, no. 3 (1984): 269–276, http://dx.doi.org/10.1007/BF01541653.

30. Robin M. Mathy, "Transgender Identity and Suicidality in a Nonclinical Sample: Sexual Orientation, Psychiatric History, and Compulsive Behaviors," *Journal of Psychology & Human Sexuality* 14, no. 4 (2003): 47–65, http://dx.doi.org/10.1300/J056v14n04_03.

31. Yue Zhao *et al.*, "Suicidal Ideation and Attempt Among Adolescents Reporting 'Unsure' Sexual Identity or Heterosexual Identity Plus Same-Sex Attraction or Behavior: Forgotten Groups?," *Journal of the American Academy of Child & Adolescent Psychiatry* 49, no. 2 (2010): 104–113, http://dx.doi.org/10.1016/j.jaac.2009.11.003.

32. Wendy B. Bostwick *et al.*, "Dimensions of Sexual Orientation and the Prevalence of Mood and Anxiety Disorders in the United States."

33. Martin Plöderl *et al.*, "Suicide Risk and Sexual Orientation: A Critical Review," *Archives of Sexual Behavior* 42, no. 5 (2013): 715–727, http://dx.doi.org/10.1007/s10508-012-0056-y.

34. Ritch C. Savin-Williams, "Suicide Attempts Among Sexual-Minority Youths: Population and Measurement Issues," *Journal of Consulting and Clinical Psychology* 69, no. 6 (2001): 983–991, http://dx.doi.org/10.1037/0022-006X.69.6.983.

35. For females in this study, eliminating false positive attempts substantially decreased the difference between orientations. For males, the "true suicide attempts" difference approached statistical significance: 2% of heterosexual males (1 of 61) and 9% of homosexual males (5 of 53) attempted suicide, resulting in an odds ratio of 6.2.

36. Martin Plöderl *et al.*, "Suicide Risk and Sexual Orientation," 716–717.

37. *Ibid.*, 723.

38. *Ibid.*

39. Richard Herrell *et al.*, "Sexual Orientation and Suicidality: A Co-twin Control Study in Adult Men," *Archives of General Psychiatry* 56, no. 10 (1999): 867–874, http://dx.doi.org/10.1001/archpsyc.56.10.867.

40. *Ibid.*, 872.

41. Robin M. Mathy *et al.*, "The association between relationship markers of sexual orientation and suicide: Denmark, 1990–2001," *Social Psychiatry and Psychiatric Epidemiology* 46, no. 2 (2011): 111–117, http://dx.doi.org/10.1007/s00127-009-0177-3.

42. Gary Remafedi, James A. Farrow, and Robert W. Deisher, "Risk Factors for Attempted Suicide in Gay and Bisexual Youth," *Pediatrics* 87, no. 6 (1991): 869–875, http://pediatrics.aappublications.org/content/87/6/869.

43. *Ibid.*, 873.

44. Gary Remafedi, "Adolescent Homosexuality: Psychosocial and Medical Implications," *Pediatrics* 79, no. 3 (1987): 331–337, http://pediatrics.aappublications.org/content/79/3/331.

45. Martin Plöderl, Karl Kralovec, and Reinhold Fartacek, "The Relation Between Sexual Orientation and Suicide Attempts in Austria," *Archives of Sexual Behavior* 39, no. 6 (2010): 1403–1414, http://dx.doi.org/10.1007/s10508-009-9597-0.

46. Travis Salway Hottes *et al.*, "Lifetime Prevalence of Suicide Attempts Among Sexual Minority Adults by Study Sampling Strategies: A Systematic Review and Meta-Analysis," *American Journal of Public Health* 106, no. 5 (2016): e1–e12, http://dx.doi.org/10.2105/AJPH.2016.303088.

47. For a brief explanation of the strengths and limitations of population- and community-based sampling, see Hottes *et al.*, e2.

48. 95% confidence intervals: 8–15% and 3–5%, respectively.

49. 95% confidence interval: 18–22%.

50. Ana Maria Buller *et al.*, "Associations between Intimate Partner Violence and Health among Men Who Have Sex with Men: A Systematic Review and Meta-Analysis," *PLOS Medicine* 11, no. 3 (2014): e1001609, http://dx.doi.org/10.1371/journal.pmed.1001609.

51. Sabrina N. Nowinski and Erica Bowen, "Partner violence against heterosexual and gay men: Prevalence and correlates," *Aggression and Violent Behavior* 17, no. 1 (2012): 36–52, http://dx.doi.org/10.1016/j.avb.2011.09.005. It is worth noting that the 54 studies that Nowinski and Bowen consider operationalize heterosexuality and homosexuality in various ways.

52. *Ibid.*, 39.

53. *Ibid.*, 50.

54. Shonda M. Craft and Julianne M. Serovich, "Family-of-Origin Factors and Partner Violence in the Intimate Relationships of Gay Men Who Are HIV Positive," *Journal of Interpersonal Violence* 20, no. 7 (2005): 777–791, http://dx.doi.org/10.1177/0886260505277101.

55. Catherine Finneran and Rob Stephenson, "Intimate Partner Violence Among Men Who Have Sex With Men: A Systematic Review," *Trauma, Violence, & Abuse* 14, no. 2 (2013): 168–185, http://dx.doi.org/10.1177/1524838012470034.

56. *Ibid.*, 180.

57. Although one study reported just 12%, the majority of studies (17 out of 24) showed that physical IPV was at least 22%, with nine studies recording rates of 31% or more.

58. Although Finneran and Stephenson say this measure was recorded in only six studies, the table they provide lists eight studies as measuring psychological violence, with seven of these showing rates 33% or higher, including five reporting rates of 45% or higher.

59. Naomi G. Goldberg and Ilan H. Meyer, "Sexual Orientation Disparities in History of Intimate Partner Violence: Results From the California Health Interview Survey," *Journal of Interpersonal Violence* 28, no. 5 (2013): 1109–1118, http://dx.doi.org/10.1177/0886260512459384.

60. Gregory L. Greenwood *et al.*, "Battering Victimization Among a Probability-Based Sample of Men Who Have Sex With Men," *American Journal of Public Health* 92, no. 12 (2002): 1964–1969, http://dx.doi.org/10.2105/AJPH.92.12.1964.

61. *Ibid.*, 1967.

62. *Ibid.*

63. Sari L. Reisner *et al.*, "Mental Health of Transgender Youth in Care at an Adolescent Urban Community Health Center: A Matched Retrospective Cohort Study," *Journal of Adolescent Health* 56, no. 3 (2015): 274–279, http://dx.doi.org/10.1016/j.jadohealth.2014.10.264.

64. Relative risk: 3.95.

65. Relative risk: 3.27.

66. Relative risk: 3.61.

67. Relative risk: 3.20.

68. Relative risk: 4.30.

69. Relative risk: 2.36.

70. Relative risk: 4.36.

71. Anne P. Haas, Philip L. Rodgers, and Jody Herman, "Suicide Attempts Among Transgender and Gender Non-Conforming Adults: Findings of the National Transgender Discrimination Survey," Williams Institute, UCLA School of Law, January 2014, http://williamsinstitute.law.ucla.edu/wp-content/uploads/AFSP-Williams-Suicide-Report-

Final.pdf.

72. *Ibid.*, 2.

73. *Ibid.*, 8.

74. *Ibid.*, 13.

75. Kristen Clements-Nolle *et al.*, "HIV Prevalence, Risk Behaviors, Health Care Use, and Mental Health Status of Transgender Persons: Implications for Public Health Intervention," *American Journal of Public Health* 91, no. 6 (2001): 915–921, http://dx.doi.org/10.2105/AJPH.91.6.915.

76. *Ibid.*, 919.

77. See, for example, Ilan H. Meyer, "Minority Stress and Mental Health in Gay Men," *Journal of Health and Social Behavior* 36 (1995): 38–56, http://dx.doi.org/10.2307/2137286; Bruce P. Dohrenwend, "Social Status and Psychological Disorder: An Issue of Substance and an Issue of Method," *American Sociological Review* 31, no. 1 (1966): 14–34, http://www.jstor.org/stable/2091276.

78. For overviews of the social stress model and mental health patterns among LGBT populations, see Ilan H. Meyer, "Prejudice, Social Stress, and Mental Health in Lesbian, Gay, and Bisexual Populations: Conceptual Issues and Research Evidence," *Psychological Bulletin* 129, no. 5 (2003): 674–697, http://dx.doi.org/10.1037/0033-2909.129.5.674; Robert Graham *et al.*, *The Health of Lesbian, Gay, Bisexual, and Transgender People*, *op. cit*; Gregory M. Herek and Linda D. Garnets, "Sexual Orientation and Mental Health," *Annual Review of Clinical Psychology* 3 (2007): 353–375, http://dx.doi.org/10.1146/annurev.clinpsy.3.022806.091510; Mark L. Hatzenbuehler, "How Does Sexual Minority Stigma 'Get Under the Skin'? A Psychological Mediation Framework," *Psychological Bulletin* 135, no. 5 (2009): 707–730, http://dx.doi.org/10.1037/a0016441.

79. See, for instance, Ilan H. Meyer, "The Right Comparisons in Testing the Minority Stress Hypothesis: Comment on Savin-Williams, Cohen, Joyner, and Rieger (2010)," *Archives of Sexual Behavior* 39, no. 6 (2010): 1217–1219.

80. This should not be taken to suggest that social stress is too vague a concept for empirical social science; the social stress model may certainly produce quantitative empirical hypotheses, such as hypotheses about correlations between stressors and specific mental health outcomes. In this context, the term "model" does not refer to a statistical model of the kind often used in social science research—the social stress model is a "model" in a metaphorical sense.

81. Meyer, "Prejudice, Social Stress, and Mental Health in Lesbian, Gay, and Bisexual Populations," 676.

82. Meyer, "Prejudice, Social Stress, and Mental Health in Lesbian, Gay, and Bisexual Populations," 680; Gregory M. Herek, J. Roy Gillis, and Jeanine C. Cogan, "Psychological Sequelae of Hate-Crime Victimization Among Lesbian, Gay, and Bisexual Adults," *Journal of Consulting and Clinical Psychology* 67, no. 6 (1999): 945–951, http://dx.doi.org/10.1037/0022-006X.67.6.945; Allegra R. Gordon and Ilan H. Meyer, "Gender Nonconformity as a Target of Prejudice, Discrimination, and Violence Against LGB

Individuals," *Journal of LGBT Health Research* 3, no. 3 (2008): 55–71, http://dx.doi.org/10.1080/15574090802093562; David M. Huebner, Gregory M. Rebchook, and Susan M. Kegeles, "Experiences of Harassment, Discrimination, and Physical Violence Among Young Gay and Bisexual Men," *American Journal of Public Health* 94, no. 7 (2004): 1200–1203, http://dx.doi.org/10.2105/AJPH.94.7.1200; Rebecca L Stotzer, "Violence against transgender people: A review of United States data," *Aggression and Violent Behavior* 14, no. 3 (2009): 170–179, http://dx.doi.org/10.1016/j.avb.2009.01.006; Rebecca L. Stotzer, "Gender identity and hate crimes: Violence against transgender people in Los Angeles County," *Sexuality Research and Social Policy* 5, no. 1 (2008): 43–52, http://dx.doi.org/10.1525/srsp.2008.5.1.43.

83. Stotzer, "Gender identity and hate crimes," 43–52; Emilia L. Lombardi *et al.*, "Gender Violence: Transgender Experiences with Violence and Discrimination," *Journal of Homosexuality* 42, no. 1 (2002): 89–101, http://dx.doi.org/10.1300/J082v42n01_05; Herek, Gillis, and Cogan, "Psychological Sequelae of Hate-Crime Victimization Among Lesbian, Gay, and Bisexual Adults," 945–951; Huebner, Rebchook, and Kegeles, "Experiences of Harassment, Discrimination, and Physical Violence Among Young Gay and Bisexual Men," 1200–1203; Anne H. Faulkner and Kevin Cranston, "Correlates of same-sex sexual behavior in a random sample of Massachusetts high school students," *American Journal of Public Health* 88, no. 2 (1998): 262–266, http://dx.doi.org/10.2105/AJPH.88.2.262.

84. Herek, Gillis, and Cogan, "Psychological Sequelae of Hate-Crime Victimization Among Lesbian, Gay, and Bisexual Adults," 945–951.

85. Jack McDevitt *et al.*, "Consequences for Victims: A Comparison of Bias- and Non-Bias-Motivated Assaults," *American Behavioral Scientist* 45, no. 4 (2001): 697–713, http://dx.doi.org/10.1177/0002764201045004010.

86. Caitlin Ryan and Ian Rivers, "Lesbian, gay, bisexual and transgender youth: Victimization and its correlates in the USA and UK," *Culture, Health & Sexuality* 5, no. 2 (2003): 103–119, http://dx.doi.org/10.1080/1369105011000012883; Elise D. Berlan *et al.*, "Sexual Orientation and Bullying Among Adolescents in the Growing Up Today Study," *Journal of Adolescent Health* 46, no. 4 (2010): 366–371, http://dx.doi.org/10.1016/j.jadohealth.2009.10.015; Ritch C. Savin-Williams, "Verbal and Physical Abuse as Stressors in the Lives of Lesbian, Gay Male, and Bisexual Youths: Associations With School Problems, Running Away, Substance Abuse, Prostitution, and Suicide," *Journal of Consulting and Clinical Psychology* 62, no. 2 (1994): 261–269, http://dx.doi.org/10.1037/0022-006X.62.2.261.

87. Stephen T. Russell *et al.*, "Lesbian, Gay, Bisexual, and Transgender Adolescent School Victimization: Implications for Young Adult Health and Adjustment," *Journal of School Health* 81, no. 5 (2011): 223–230, http://dx.doi.org/10.1111/j.1746-1561.2011.00583.x.

88. Joanna Almeida *et al.*, "Emotional Distress Among LGBT Youth: The Influence of Perceived Discrimination Based on Sexual Orientation," *Journal of Youth and Adolescence* 38, no. 7 (2009): 1001–1014, http://dx.doi.org/10.1007/s10964-009-9397-9.

89. M. V. Lee Badgett, "The Wage Effects of Sexual Orientation Discrimination," *Industrial and Labor Relations Review* 48, no. 4 (1995): 726–739, http://dx.doi.org/10.1177/

001979399504800408.

90. M. V. Lee Badgett, "Bias in the Workplace: Consistent Evidence of Sexual Orientation and Gender Identity Discrimination 1998–2008," *Chicago-Kent Law Review* 84, no. 2 (2009): 559–595, http://scholarship.kentlaw.iit.edu/cklawreview/vol84/iss2/7.

91. Marieka Klawitter, "Meta-Analysis of the Effects of Sexual Orientation on Earning," *Industrial Relations* 54, no. 1 (2015): 4–32, http://dx.doi.org/10.1111/irel.12075.

92. Jonathan Platt *et al.*, "Unequal depression for equal work? How the wage gap explains gendered disparities in mood disorders," *Social Science & Medicine* 149 (2016): 1–8, http://dx.doi.org/10.1016/j.socscimed.2015.11.056.

93. Craig R. Waldo, "Working in a majority context: A structural model of heterosexism as minority stress in the workplace," *Journal of Counseling Psychology* 46, no. 2 (1999): 218–232, http://dx.doi.org/10.1037/0022-0167.46.2.218.

94. M. W. Linn, Richard Sandifer, and Shayna Stein, "Effects of unemployment on mental and physical health," *American Journal of Public Health* 75, no. 5 (1985): 502–506, http://dx.doi.org/10.2105/AJPH.75.5.502; Jennie E. Brand, "The far-reaching impact of job loss and unemployment," *Annual Review of Sociology* 41 (2015): 359–375, http://dx.doi.org/10.1146/annurev-soc-071913-043237; Marie Conroy, "A Qualitative Study of the Psychological Impact of Unemployment on individuals," (master's dissertation, Dublin Institute of Technology, September 2010), http://arrow.dit.ie/aaschssldis/50/.

95. Irving Goffman, *Stigma: Notes on the Management of Spoiled Identity* (New York: Simon & Schuster, 1963); Brenda Major and Laurie T. O'Brien, "The Social Psychology of Stigma," *Annual Review of Psychology*, 56 (2005): 393–421, http://dx.doi.org/10.1146/annurev.psych.56.091103.070137.

96. Major and O'Brien, "The Social Psychology of Stigma," 395.

97. Bruce G. Link *et al.*, "On Stigma and Its Consequences: Evidence from a Longitudinal Study of Men with Dual Diagnoses of Mental Illness and Substance Abuse," *Journal of Health and Social Behavior* 38, no. (1997): 177–190, http://dx.doi.org/10.2307/2955424.

98. Walter R. Gove, "The Current Status of the Labeling Theory of Mental Illness," in *Deviance and Mental Illness*, ed. Walter R. Gove (Beverly Hills, Calif.: Sage, 1982), 290.

99. A highly cited piece of theoretical research on stigma processes is Hatzenbuehler, "How Does Sexual Minority Stigma 'Get Under the Skin'?," *op. cit.*, http://dx.doi.org/10.1037/a0016441.

100. Walter O. Bockting *et al.*, "Stigma, Mental Health, and Resilience in an Online Sample of the US Transgender Population," *American Journal of Public Health* 103, no. 5 (2013): 943–951, http://dx.doi.org/10.2105/AJPH.2013.301241.

101. Robin J. Lewis *et al.*, "Stressors for Gay Men and Lesbians: Life Stress, Gay-Related Stress, Stigma Consciousness, and Depressive Symptoms," *Journal of Social and Clinical Psychology* 22, no. 6 (2003): 716–729, http://dx.doi.org/10.1521/jscp.22.6.716.22932.

102. *Ibid.*, 721.

103. Aaron T. Beck *et al.*, *Cognitive Therapy of Depression* (New York: Guilford Press,

1979).

104. Wendy Bostwick, "Assessing Bisexual Stigma and Mental Health Status: A Brief Report," *Journal of Bisexuality* 12, no. 2 (2012): 214–222, http://dx.doi.org/10.1080/15299716.2012.674860.

105. Lars Wichstrøm and Kristinn Hegna, "Sexual Orientation and Suicide Attempt: A Longitudinal Study of the General Norwegian Adolescent Population," *Journal of Abnormal Psychology* 112, no. 1 (2003): 144–151, http://dx.doi.org/10.1037/0021-843X.112.1.144.

106. Anthony R. D'Augelli and Arnold H. Grossman, "Disclosure of Sexual Orientation, Victimization, and Mental Health Among Lesbian, Gay, and Bisexual Older Adults," *Journal of Interpersonal Violence* 16, no. 10 (2001): 1008–1027, http://dx.doi.org/10.1177/088626001016010003; Eric R. Wright and Brea L. Perry, "Sexual Identity Distress, Social Support, and the Health of Gay, Lesbian, and Bisexual Youth," *Journal of Homosexuality* 51, no. 1 (2006): 81–110, http://dx.doi.org/10.1300/J082v51n01_05; Judith A. Clair, Joy E. Beatty, and Tammy L. MacLean, "Out of Sight But Not Out of Mind: Managing Invisible Social Identities in the Workplace," *Academy of Management Review* 30, no. 1 (2005): 78–95, http://dx.doi.org/10.5465/AMR.2005.15281431.

107. For example, see *Emotion, Disclosure, and Health* (Washington, D.C.: American Psychological Association, 2002), ed. James W. Pennebaker; Joanne Frattaroli, "Experimental Disclosure and Its Moderators: A Meta-Analysis," *Psychological Bulletin* 132, no. 6 (2006): 823–865, http://dx.doi.org/10.1037/0033-2909.132.6.823.

108. See, for example, James M. Croteau, "Research on the Work Experiences of Lesbian, Gay, and Bisexual People: An Integrative Review of Methodology and Findings," *Journal of Vocational Behavior* 48, no. 2 (1996): 195–209, http://dx.doi.org/10.1006/jvbe.1996.0018; Anthony R. D'Augelli, Scott L. Hershberger, and Neil W. Pilkington, "Lesbian, Gay, and Bisexual Youth and Their Families: Disclosure of Sexual Orientation and Its Consequences," *American Journal of Orthopsychiatry* 68, no. 3 (1998): 361–371, http://dx.doi.org/10.1037/h0080345; Margaret Rosario, Eric W. Schrimshaw, and Joyce Hunter, "Disclosure of Sexual Orientation and Subsequent Substance Use and Abuse Among Lesbian, Gay, and Bisexual Youths: Critical Role of Disclosure Reactions," *Psychology of Addictive Behaviors* 23, no. 1 (2009): 175–184, http://dx.doi.org/10.1037/a0014284; D'Augelli and Grossman, "Disclosure of Sexual Orientation, Victimization, and Mental Health Among Lesbian, Gay, and Bisexual Older Adults," 1008–1027; Belle Rose Ragins, "Disclosure Disconnects: Antecedents and Consequences of Disclosing Invisible Stigmas across Life Domains," *Academy of Management Review* 33, no. 1 (2008): 194–215, http://dx.doi.org/10.5465/AMR.2008.27752724; Nicole Legate, Richard M. Ryan, and Netta Weinstein, "Is Coming Out Always a 'Good Thing'? Exploring the Relations of Autonomy Support, Outness, and Wellness for Lesbian, Gay, and Bisexual Individuals," *Social Psychological and Personality Science* 3, no. 2 (2012): 145–152, http://dx.doi.org/10.1177/1948550611411929.

109. Belle Rose Ragins, Romila Singh, and John M. Cornwell, "Making the Invisible Visible: Fear and Disclosure of Sexual Orientation at Work," *Journal of Applied Psychology* 92, no. 4 (2007): 1103–1118, http://dx.doi.org/10.1037/0021-9010.92.4.1103.

110. *Ibid.*, 1114.

111. Dawn Michelle Baunach, "Changing Same-Sex Marriage Attitudes in America from 1988 Through 2010," *Public Opinion Quarterly* 76, no. 2 (2012): 364–378, http://dx.doi.org/10.1093/poq/nfs022; Pew Research Center, "Changing Attitudes on Gay Marriage" (online publication), July 29, 2015, http://www.pewforum.org/2015/07/29/graphics-slideshow-changing-attitudes-on-gay-marriage/; Bruce Drake, Pew Research Center, "How LGBT adults see society and how the public sees them" (online publication), June 25, 2013, http://www.pewresearch.org/fact-tank/2013/06/25/how-lgbt-adults-see-society-and-how-the-public-sees-them/.

112. Mark L. Hatzenbuehler, Katherine M. Keyes, and Deborah S. Hasin, "State-Level Policies and Psychiatric Morbidity In Lesbian, Gay, and Bisexual Populations," *American Journal of Public Health* 99, no. 12 (2009): 2275–2281, http://dx.doi.org/10.2105/AJPH.2008.153510.

113. Deborah S. Hasin and Bridget F. Grant, "The National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) Waves 1 and 2: review and summary of findings," *Social Psychiatry and Psychiatric Epidemiology* 50, no. 11 (2015): 1609–1640, http://dx.doi.org/10.1007/s00127-015-1088-0.

114. Mark L. Hatzenbuehler *et al.*, "The Impact of Institutional Discrimination on Psychiatric Disorders in Lesbian, Gay, and Bisexual Populations: A Prospective Study," *American Journal of Public Health* 100, no. 3 (2010): 452–459, http://dx.doi.org/10.2105/AJPH.2009.168815.

115. Sharon Scales Rostosky *et al.*, "Marriage Amendments and Psychological Distress in Lesbian, Gay, and Bisexual (LGB) Adults," *Journal of Counseling Psychology* 56, no. 1 (2009): 56–66, http://dx.doi.org/10.1037/a0013609.

116. Roberto Maniglio, "The impact of child sexual abuse on health: A systematic review of reviews," *Clinical Psychology Review* 29 (2009): 647, http://dx.doi.org/10.1016/j.cpr.2009.08.003.

The New Atlantis
A Journal of Technology & Society

Part Three

Gender Identity

The concept of biological sex is well defined, based on the binary roles that males and females play in reproduction. By contrast, the concept of gender is not well defined. It is generally taken to refer to behaviors and psychological attributes that tend to be typical of a given sex. Some individuals identify as a gender that does not correspond to their biological sex. The causes of such cross-gender identification remain poorly understood. Research investigating whether these transgender individuals have certain physiological features or experiences in common with the opposite sex, such as brain structures or atypical prenatal hormone exposures, has so far been inconclusive. Gender dysphoria—a sense of incongruence between one's biological sex and one's gender, accompanied by clinically significant distress or impairment—is sometimes treated in adults by hormones or surgery, but there is little scientific evidence that these therapeutic interventions have psychological benefits. Science has shown that gender identity issues in children usually do not persist into adolescence or adulthood, and there is little scientific evidence for the therapeutic value of puberty-delaying treatments. We are concerned by the increasing tendency toward encouraging children with gender identity issues to transition to their preferred gender through medical and then surgical procedures. There is a clear need for more research in these areas.

As described in Part One, there is a widely held belief that *sexual orientation* is a well-defined concept, and that it is innate and fixed in each person—as it is often put, gay people are "born that way." Another emerging and related view is that *gender identity*—the subjective, internal sense of being a man or a woman (or some other gender category)—is also fixed at birth or at a very early age and can diverge from a person's biological sex. In the case of children, this is sometimes articulated by saying that a little boy may be trapped in a little girl's body, or vice versa.

In Part One we argued that scientific research does not give much support to the hypothesis that sexual orientation is innate and fixed. We will argue here, similarly, that there is little scientific evidence that gender identity is fixed at birth or at an early age. Though biological sex is innate, and gender identity and biological sex are related in complex ways, they

are not identical; gender is sometimes defined or expressed in ways that have little or no biological basis.

Key Concepts and Their Origins

To clarify what is meant by "gender" and "sex," we begin with a widely used definition, here quoted from a pamphlet published by the American Psychological Association (APA):

> *Sex* is assigned at birth, refers to one's biological status as either male or female, and is associated primarily with physical attributes such as chromosomes, hormone prevalence, and external and internal anatomy. *Gender* refers to the socially constructed roles, behaviors, activities, and attributes that a given society considers appropriate for boys and men or girls and women. These influence the ways that people act, interact, and feel about themselves. While aspects of biological sex are similar across different cultures, aspects of gender may differ.[1]

This definition points to the obvious fact that there are social norms for men and women, norms that vary across different cultures and that are not simply determined by biology. But it goes further in holding that gender is wholly "socially constructed"—that it is detached from biological sex. This idea has been an important part of a feminist movement to reform or eliminate traditional gender roles. In the classic feminist book *The Second Sex* (1949), Simone de Beauvoir wrote that "one is not born, but becomes a woman."[2] This notion is an early version of the now familiar distinction between sex as a biological designation and gender as a cultural construct: though one is born, as the APA explains, with the "chromosomes, hormone prevalence, and external and internal anatomy" of a female, one is socially conditioned to take on the "roles, behaviors, activities, and attributes" of a woman.

Developments in feminist theory in the second half of the twentieth century further solidified the position that gender is socially constructed. One of the first to use the term "gender" as distinct from sex in the social-science literature was Ann Oakley in her 1972 book, *Sex, Gender and Society*.[3] In the 1978 book *Gender: An Ethnomethodological Approach*, psychology professors Suzanne Kessler and Wendy McKenna argued that "gender is a social construction, that a world of two 'sexes' is a result of the socially shared, taken for granted methods which members use to construct reality."[4]

Anthropologist Gayle Rubin expresses a similar view, writing in 1975 that "Gender is a socially imposed division of the sexes. It is a product of

the social relations of sexuality."[5] According to her argument, if it were not for this social imposition, we would still have males and females but not "men" and "women." Furthermore, Rubin argues, if traditional gender roles are socially constructed, then they can also be *de*constructed, and we can eliminate "obligatory sexualities and sex roles" and create "an androgynous and genderless (though not sexless) society, in which one's sexual anatomy is irrelevant to who one is, what one does, and with whom one makes love."[6]

The relationship between gender theory and the deconstruction or overthrowing of traditional gender roles is made even clearer in the works of the influential feminist theorist Judith Butler. In works such as *Gender Trouble: Feminism and the Subversion of Identity* (1990)[7] and *Undoing Gender* (2004)[8] Butler advances what she describes as "performativity theory," according to which being a woman or man is not something that one *is* but something that one *does*. "Gender is neither the causal result of sex nor as seemingly fixed as sex," as she put it.[9] Rather, gender is a constructed status radically independent from biology or bodily traits, "a free floating artifice, with the consequence that *man* and *masculine* might just as easily signify a female body as a male one, and *woman* and *feminine* a male body as easily as a female one."[10]

This view, that gender and thus gender identity are fluid and plastic, and not necessarily binary, has recently become more prominent in popular culture. An example is Facebook's move in 2014 to include 56 new ways for users to describe their gender, in addition to the options of male and female. As Facebook explains, the new options allow the user to "feel comfortable being your true, authentic self," an important part of which is "the expression of gender."[11] Options include *agender*, several *cis-* and *trans-* variants, *gender fluid*, *gender questioning*, *neither*, *other*, *pangender*, and *two-spirit*.[12]

Whether or not Judith Butler was correct in describing traditional gender roles of men and women as "performative," her theory of gender as a "free-floating artifice" does seem to describe this new taxonomy of gender. As these terms multiply and their meanings become more individualized, we lose any common set of criteria for defining what gender distinctions mean. If gender is entirely detached from the binary of biological sex, gender could come to refer to any distinctions in behavior, biological attributes, or psychological traits, and each person could have a gender defined by the unique combination of characteristics the person possesses. This *reductio ad absurdum* is offered to present the possibility that defining gender too broadly could lead to a definition that has little meaning.

Alternatively, gender identity could be defined in terms of sex-typical traits and behaviors, so that being a boy means behaving in the ways boys typically behave—such as engaging in rough-and-tumble play and expressing an interest in sports and liking toy guns more than dolls. But this would imply that a boy who plays with dolls, hates guns, and refrains from sports or rough-and-tumble play might be considered to be a girl, rather than simply a boy who represents an exception to the typical patterns of male behavior. The ability to recognize exceptions to sex-typical behavior relies on an understanding of maleness and femaleness that is independent of these stereotypical sex-appropriate behaviors. The underlying basis of maleness and femaleness is the distinction between the reproductive roles of the sexes; in mammals such as humans, the female gestates offspring and the male impregnates the female. More universally, the male of the species fertilizes the egg cells provided by the female of the species. This conceptual basis for sex roles is binary and stable, and allows us to distinguish males from females on the grounds of their reproductive systems, even when these individuals exhibit behaviors that are not typical of males or females.

To illustrate how reproductive roles define the differences between the sexes even when behavior appears to be atypical for the particular sex, consider two examples, one from the diversity of the animal kingdom, and one from the diversity of human behavior. First, we look at the emperor penguin. Male emperor penguins provide more care for eggs than do females, and in this sense, the male emperor penguin could be described as more maternal than the female.[13] However, we recognize that the male emperor penguin is not in fact female but rather that the species represents an exception to the general, but not universal, tendency among animals for females to provide more care than males for offspring. We recognize this because sex-typical behaviors like parental care do not define the sexes; the individual's role in sexual reproduction does.

Even other sex-typical biological traits, such as chromosomes, are not necessarily helpful for defining sex in a universal way, as the penguin example further illustrates. As with other birds, the genetics of sex determination in the emperor penguin is different than the genetics of sex determination in mammals and many other animals. In humans, males have XY chromosomes and females have XX chromosomes; that is, males have a unique sex-determining chromosome that they do not share with females, while females have two copies of a chromosome that they share with males. But in birds, it is females, not males, that have and pass on the sex-specific chromosome.[14] Just as the observation that

male emperor penguins nurture their offspring more than their partners did not lead zoologists to conclude that the egg-laying member of the emperor penguin species was in fact the male, the discovery of the ZW sex-determination system in birds did not lead geneticists to challenge the age-old recognition that hens are females and roosters are males. The only variable that serves as the fundamental and reliable basis for biologists to distinguish the sexes of animals is their role in reproduction, not some other behavioral or biological trait.

Another example that, in this case, only appears to be non-sex-typical behavior is that of Thomas Beatie, who made headlines as a man who gave birth to three children between 2008 and 2010.[15] Thomas Beatie was born a woman, Tracy Lehuanani LaGondino, and underwent a surgical and legal transition to living as a man before deciding to have children. Because the medical procedures he underwent did not involve the removal of his ovaries or uterus, Beatie was capable of bearing children. The state of Arizona recognizes Thomas Beatie as the father of his three children, even though, biologically, he is their mother. Unlike the case of the male emperor penguin's ostensibly maternal, "feminine" parenting behavior, Beatie's ability to have children does not represent an exception to the normal inability of males to bear children. The labeling of Beatie as a man despite his being biologically female is a personal, social, and legal decision that was made without any basis in biology; nothing whatsoever in biology suggests Thomas Beatie is a male.

In biology, an organism is male or female if it is structured to perform one of the respective roles in reproduction. This definition does not require any arbitrary measurable or quantifiable physical characteristics or behaviors; it requires understanding the reproductive system and the reproduction process. Different animals have different reproductive systems, but sexual reproduction occurs when the sex cells from the male and female of the species come together to form newly fertilized embryos. It is these reproductive roles that provide the conceptual basis for the differentiation of animals into the biological categories of male and female. There is no other widely accepted biological classification for the sexes.

But this definition of the biological category of sex is not universally accepted. For example, philosopher and legal scholar Edward Stein maintains that infertility poses a crucial problem for defining sex in terms of reproductive roles, writing that defining sex in terms of these roles would define "infertile males as females."[16] Since an infertile male cannot play the reproductive role for which males are structured, and an infertile

female cannot play the reproductive role for which females are structured, according to this line of thinking, defining sex in terms of reproductive roles would not be appropriate, as infertile males would be classified as females, and infertile females as males. Nevertheless, while a reproductive system structured to serve a particular reproductive role may be impaired in such a way that it cannot perform its function, the system is still recognizably structured for that role, so that biological sex can still be defined strictly in terms of the structure of reproductive systems. A similar point can be made about heterosexual couples who choose not to reproduce for any of a variety of reasons. The male and female reproductive systems are generally clearly recognizable, regardless of whether or not they are being used for purposes of reproduction.

The following analogy illustrates how a system can be recognized as having a particular purpose, even when that system is dysfunctional in a way that renders it incapable of carrying out its purpose: Eyes are complex organs that function as processors of vision. However, there are numerous conditions affecting the eye that can impair vision, resulting in blindness. The eyes of the blind are still recognizably organs structured for the function of sight. Any impairments that result in blindness do not affect the purpose of the eye—any more than wearing a blindfold—but only its function. The same is true for the reproductive system. Infertility can be caused by many problems. However, the reproductive system continues to exist for the purpose of begetting children.

There are individuals, however, who are biologically "intersex," meaning that their sexual anatomy is ambiguous, usually for reasons of genetic abnormalities. For example, the clitoris and penis are derived from the same embryonic structures. A baby may display an abnormally large clitoris or an abnormally small penis, causing its biological sex to be difficult to determine long after birth.

The first academic article to use the term "gender" appears to be the 1955 paper by the psychiatry professor John Money of Johns Hopkins on the treatment of "intersex" children (the term then used was "hermaphrodites").[17] Money posited that gender identity, at least for these children, was fluid and that it could be constructed. In his mind, making a child identify with a gender only required constructing sex-typical genitalia and creating a gender-appropriate environment for the child. The chosen gender for these children was often female—a decision that was not based on genetics or biology, nor on the belief that these children were "really" girls, but, in part, on the fact that at the time it was easier surgically to construct a vagina then it was to construct a penis.

The most widely known patient of Dr. Money was David Reimer, a boy who was not born with an intersex condition but whose penis was damaged during circumcision as an infant.[18] David was raised by his parents as a girl named Brenda, and provided with both surgical and hormonal interventions to ensure that he would develop female-typical sex characteristics. However, the attempt to conceal from the child what had happened to him was not successful—he self-identified as a boy, and eventually, at the age of 14, his psychiatrist recommended to his parents that they tell him the truth. David then began the difficult process of reversing the hormonal and surgical interventions that had been performed to feminize his body. But he continued to be tormented by his childhood ordeal, and took his own life in 2004, at the age of 38.

David Reimer is just one example of the harm wrought by theories that gender identity can socially and medically be reassigned in children. In a 2004 paper, William G. Reiner, a pediatric urologist and child and adolescent psychiatrist, and John P. Gearhart, a professor of pediatric urology, followed up on the sexual identities of 16 genetic males affected by cloacal exstrophy—a condition involving a badly deformed bladder and genitals. Of the 16 subjects, 14 were assigned female sex at birth, receiving surgical interventions to construct female genitalia, and were raised as girls by their parents; 6 of these 14 later chose to identify as males, while 5 continued to identify as females and 2 declared themselves males at a young age but continued to be raised as females because their parents rejected the children's declarations. The remaining subject, who had been told at age 12 that he was born male, refused to discuss sexual identity.[19] So the assignment of female sex persisted in only 5 of the 13 cases with known results.

This lack of persistence is some evidence that the assignment of sex through genital construction at birth with immersion into a "gender-appropriate" environment is not likely to be a successful option for managing the rare problem of genital ambiguity from birth defects. It is important to note that the ages of these individuals at last follow-up ranged from 9 to 19, so it is possible that some of them may have subsequently changed their gender identities.

Reiner and Gearhart's research indicates that gender is not arbitrary; it suggests that a biological male (or female) will probably not come to identify as the opposite gender after having been altered physically and immersed into the corresponding gender-typical environment. The plasticity of gender appears to have a limit.

What is clear is that biological sex is not a concept that can be reduced to, or artificially assigned on the basis of, the type of external genitalia

alone. Surgeons are becoming more capable of constructing artificial genitalia, but these "add-ons" do not change the biological sex of the recipients, who are no more capable of playing the reproductive roles of the opposite biological sex than they were without the surgery. Nor does biological sex change as a function of the environment provided for the child. No degree of supporting a little boy in converting to be considered, by himself and others, to be a little girl makes him biologically a little girl. The scientific definition of biological sex is, for almost all human beings, clear, binary, and stable, reflecting an underlying biological reality that is not contradicted by exceptions to sex-typical behavior, and cannot be altered by surgery or social conditioning.

In a 2004 article summarizing the results of research related to intersex conditions, Paul McHugh, the former chief of psychiatry at Johns Hopkins Hospital (and the coauthor of this report), suggested:

> We in the Johns Hopkins Psychiatry Department eventually concluded that human sexual identity is mostly built into our constitution by the genes we inherit and the embryogenesis we undergo. Male hormones sexualize the brain and the mind. Sexual dysphoria—a sense of disquiet in one's sexual role—naturally occurs amongst those rare males who are raised as females in an effort to correct an infantile genital structural problem.[20]

We now turn our attention to transgender individuals—children and adults—who choose to identify as a gender different from their biological sex, and explore the meaning of gender identity in this context and what the scientific literature tells us about its development.

Gender Dysphoria

While biological sex is, with very few exceptions, a well-defined, binary trait (male versus female) corresponding to how the body is organized for reproduction, *gender identity* is a more subjective attribute. For most people, their own gender identity is probably not a significant concern; most biological males identify as boys or men, and most biological females identify as girls or women. But some individuals experience an incongruence between their biological sex and their gender identity. If this struggle causes them to seek professional help, then the problem is classified as "gender dysphoria."

Some male children raised as females, as described in Reiner and colleagues' 2004 study, came to experience problems with their gender

identity when their subjective sense of being boys conflicted with being identified and treated as girls by their parents and doctors. The biological sex of the boys was not in question (they had an XY genotype), and the cause of gender dysphoria lay in the fact that they were genetically male, came to identify as male, but had been assigned female gender identities. This suggests that gender identity can be a complex and burdensome issue for those who choose (or have others choose for them) a gender identity opposite their biological sex.

But the cases of gender dysphoria that are the subject of much public debate are those in which individuals come to identify as genders different from those based on their biological sex. These people are usually identified, and describe themselves, as "transgender."*

According to the fifth edition of the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-5*), gender dysphoria is marked by "incongruence between one's experienced/expressed gender and assigned gender," as well as "clinically significant distress or impairment in social, occupational, or other important areas of functioning."[21]

It is important to clarify that gender dysphoria is not the same as gender nonconformity or gender identity disorder. Gender nonconformity describes an individual who behaves in a manner contrary to the gender-specific norms of his or her biological sex. As the *DSM-5* notes, most transvestites, for instance, are not transgender—men who dress as women typically do not identify themselves as women.[22] (However, certain forms of transvestitism can be associated with late-onset gender dysphoria.[23])

Gender identity disorder, an obsolete term from an earlier version of the *DSM* that was removed in its fifth edition, was used as a psychiatric diagnosis. If we compare the diagnostic criteria for gender dysphoria (the current term) and gender identity disorder (the former term), we see that both require the patient to display "a marked incongruence between one's

* A note on terminology: In this report, we generally use the term *transgender* to refer to persons for whom there is an incongruity between the gender identity they understand themselves to possess and their biological sex. We use the term *transsexual* to refer to individuals who have undergone medical interventions to transform their appearance to better correspond with that of their preferred gender. The most familiar colloquial term used to describe the medical interventions that transform the appearance of transgender individuals may be "sex change" (or, in the case of surgery, "sex-change operation"), but this is not commonly used in the scientific and medical literature today. While no simple terms for these procedures are completely satisfactory, in this report we employ the commonly used terms *sex reassignment* and *sex-reassignment surgery*, except when quoting a source that uses "gender reassignment" or some other term.

experienced/expressed gender and assigned gender."[24] The key difference is that a diagnosis of gender dysphoria requires the patient additionally to experience a "clinically significant distress or impairment in social, occupational, or other important areas of functioning" associated with these incongruent feelings.[25] Thus the major set of diagnostic criteria used in contemporary psychiatry does not designate all transgender individuals as having a psychiatric disorder. For example, a biological male who identifies himself as a female is not considered to have a psychiatric disorder unless the individual is experiencing significant psychosocial distress at the incongruence. A diagnosis of gender dysphoria may be part of the criteria used to justify sex-reassignment surgery or other clinical interventions. Furthermore, a patient who has had medical or surgical modifications to express his or her gender identity may still suffer from gender dysphoria. It is the nature of the struggle that defines the disorder, not the fact that the expressed gender differs from the biological sex.

There is no scientific evidence that all transgender people have gender dysphoria, or that they are all struggling with their gender identities. Some individuals who are not transgender—that is, who do not identify as a gender that does not correspond with their biological sex—might nonetheless struggle with their gender identity; for example, girls who behave in some male-typical ways might experience various forms of distress without ever coming to identify as boys. Conversely, individuals who do identify as a gender that does not correspond with their biological sex may not experience clinically significant distress related to their gender identity. Even if only, say, 40% of individuals who identify as a gender that does not correspond with their biological sex experience significant distress related to their gender identity, this would constitute a public health issue requiring clinicians and others to act to support those with gender dysphoria, and hopefully, to reduce the rate of gender dysphoria in the population. There is no evidence to suggest that the other 60% in this hypothetical—that is, the individuals who identify as a gender that does not correspond with their biological sex but who do not experience significant distress—would require clinical treatment.

The *DSM*'s concept of subjectively "experiencing" one's gender as incongruent from one's biological sex may require more critical scrutiny and possibly modification. The exact definition of gender dysphoria, however well-intentioned, is somewhat vague and confusing. It does not account for individuals who self-identify as transgender but do not experience dysphoria associated with their gender identity and who seek psychiatric care for functional impairment for problems unrelated to their

gender identity, such as anxiety or depression. They may then be mislabeled as having gender dysphoria simply because they have a desire to be identified as a member of the opposite gender, when they have come to a satisfactory resolution, subjectively, with this incongruence and may be depressed for reasons having nothing to do with their gender identity.

The *DSM-5* criteria for a diagnosis of gender dysphoria in children are defined in a "more concrete, behavioral manner than those for adolescents and adults."[26] This is to say that some of the diagnostic criteria for gender dysphoria in children refer to behaviors that are stereotypically associated with the opposite gender. Clinically significant distress is still necessary for a diagnosis of gender dysphoria in children, but some of the other diagnostic criteria include, for instance, a "strong preference for the toys, games, or activities stereotypically used or engaged in by the other gender."[27] What of girls who are "tomboys" or boys who are not oriented toward violence and guns, who prefer quieter play? Should parents worry that their tomboy daughter is really a boy stuck in a girl's body? There is no scientific basis for believing that playing with toys typical of boys defines a child as a boy, or that playing with toys typical of girls defines a child as a girl. The *DSM-5* criterion for diagnosing gender dysphoria by reference to gender-typical toys is unsound; it appears to ignore the fact that a child could display an *expressed* gender—manifested by social or behavioral traits—incongruent with the child's biological sex but without *identifying* as the opposite gender. Furthermore, even for children who do identify as a gender opposite their biological sex, diagnoses of gender dysphoria are simply unreliable. The reality is that they may have psychological difficulties in accepting their biological sex as their gender. Children can have difficulty with the expectations associated with those gender roles. Traumatic experiences can also cause a child to express distress with the gender associated with his or her biological sex.

Gender identity problems can also arise with intersex conditions (the presence of ambiguous genitalia due to genetic abnormalities), which we discussed earlier. These disorders of sex development, while rare, can contribute to gender dysphoria in some cases.[28] Some of these conditions include complete androgen insensitivity syndrome, where individuals with XY (male) chromosomes lack receptors for male sex hormones, leading them to develop the secondary sex characteristics of females, rather than males (though they lack ovaries, do not menstruate, and are consequently sterile).[29] Another hormonal disorder of sex development that can lead to individuals developing in ways that are not typical of their genetic sex include congenital adrenal hyperplasia, a condition that can

masculinize XX (female) fetuses.[30] Other rare phenomena such as genetic mosaicism[31] or chimerism,[32] where some cells in the individual's bodies contain XX chromosomes and others contain XY chromosomes, can lead to considerable ambiguity in sex characteristics, including individuals who possess both male and female gonads and sex organs.

While there are many cases of gender dysphoria that are not associated with these identifiable intersex conditions, gender dysphoria may still represent a different type of intersex condition in which the primary sex characteristics such as genitalia develop normally while secondary sex characteristics associated with the brain develop along the lines of the opposite sex. Controversy exists over influences determining the nature of neurological, psychological, and behavioral sex differences. The emerging consensus is that there may be some differences in patterns of neurological development in- and ex-utero for men and women.[33] Therefore, in theory, transgender individuals could be subject to conditions allowing a more female-type brain to develop within a genetic male (having the XY chromosomal patterns), and vice versa. However, as we will show in the next section, the research supporting this idea is quite minimal.

As a way of surveying the biological and social science research on gender dysphoria, we can list some of the important questions. Are there biological factors that influence the development of a gender identity that does not correspond with one's biological sex? Are some individuals born with a gender identity different from their biological sex? Is gender identity shaped by environmental or nurturing conditions? How stable are choices of gender identity? How common is gender dysphoria? Is it persistent across the lifespan? Can a little boy who thinks he is a little girl change over the course of his life to regard himself as male? If so, how often can such people change their gender identities? How would someone's gender identity be measured scientifically? Does self-understanding suffice? Does a biological girl become a gender boy by believing, or at least stating, she is a little boy? Do people's struggles with a sense of incongruity between their gender identity and biological sex persist over the life course? Does gender dysphoria respond to psychiatric interventions? Should those interventions focus on affirming the gender identity of the patient or take a more neutral stance? Do efforts to hormonally or surgically modify an individual's primary or secondary sex characteristics help resolve gender dysphoria? Does modification create further psychiatric problems for some of those diagnosed with gender dysphoria, or does it typically resolve existing psychiatric problems? We broach a few of these critical questions in the following sections.

Gender and Physiology

Robert Sapolsky, a Stanford professor of biology who has done extensive neuroimaging research, suggested a possible neurobiological explanation for cross-gender identification in a 2013 *Wall Street Journal* article, "Caught Between Male and Female." He asserted that recent neuroimaging studies of the brains of transgender adults suggest that they may have brain structures more similar to their gender identity than to their biological sex.[34] Sapolsky bases this assertion on the fact that there are differences between male and female brains, and while the differences are "small and variable," they "probably contribute to the sex differences in learning, emotion and socialization."[35] He concludes: "The issue isn't that sometimes people believe they are of a different gender than they actually are. Remarkably, instead, it's that sometimes people are born with bodies whose gender is different from what they actually are."[36] In other words, he claims that some people can have a female-type brain in a male body, or vice versa.

While this kind of neurobiological theory of cross-gender identification remains outside of the scientific mainstream, it has recently received scientific and popular attention. It provides a potentially attractive explanation for cross-gender identification, especially for individuals who are not affected by any known genetic, hormonal, or psychosocial abnormalities.[37] However, while Sapolsky may be right, there is fairly little support in the scientific literature for his contention. His neurological explanation for differences between male and female brains and those differences' possible relevance to cross-gender identification warrant further scientific consideration.

There are many small studies that attempt to define causal factors of the experience of incongruence between one's biological sex and felt gender. These studies are described in the following pages, each pointing to an influence that may contribute to the explanation for cross-gender identification.

Nancy Segal, a psychologist and geneticist, researched two case studies of identical twins discordant for female-to-male (FtM) transsexualism.[38] Segal notes that, according to another, earlier study that conducted nonclinical interviews with 45 FtM transsexuals, 60% suffered some form of childhood abuse, with 31% experiencing sexual abuse, 29% experiencing emotional abuse, and 38% physical abuse.[39] However, this earlier study did not include a control group and was limited by its small sample size, making it difficult to extract significant interactions, or generalizations, from the data.

Segal's own first case study was of a 34-year-old FtM twin, whose identical twin sister was married and the mother of seven children.[40] Several stressful events had occurred during the twins' mother's pregnancy, and they were born five weeks prematurely. When they were eight years old, their parents divorced. The FtM twin exhibited gender-nonconforming behavior early and it persisted throughout childhood. She became attracted to other girls in junior high school and as a teenager attempted suicide several times. She reported physical abuse and emotional abuse at the hand of her mother. The twins were raised in a Mormon household, in which transsexuality was not tolerated.[41] The twin sister had never questioned her gender identity but did experience some depression. For Segal, the FtM twin's gender nonconformity and abuse in childhood were factors that contributed to gender dysphoria; the other twin was not subject to the same stressors in childhood, and did not develop issues around her gender identity. Segal's second case study also concerned identical twins with one twin transitioning from female to male.[42] This FtM twin had early-onset nonconforming behaviors and attempted suicide as a young adult. At age 29 she underwent reassignment surgery, was well supported by family, met a woman, and married. As in the first case, the other twin was reportedly always secure in her female gender identity.

Segal speculates that each set of twins may have had uneven prenatal androgen exposures (though her study did not offer evidence to support this)[43] and concludes that "Transsexualism is unlikely to be associated with a major gene, but is likely to be associated with multiple genetic, epigenetic, developmental and experiential influences."[44] Segal is critical of the notion that the maternal abuse experienced by the FtM twin in her first case study may have played a causal role in the twin's "atypical gender identification" since the abuse "apparently *followed*" the twin's gender-atypical behaviors—though Segal acknowledges "it is possible that this abuse reinforced his already atypical gender identification."[45] These case studies, while informative, are not scientifically strong, and do not provide direct evidence for any causal hypotheses about the origins of atypical gender identification.

A source of more information—but also inadequate to make direct causal inferences—is a case analysis by Mayo Clinic psychiatrists J. Michael Bostwick and Kari A. Martin of an intersex individual born with ambiguous genitalia who was operated on and raised as a female.[46] By way of offering some background, the authors draw a distinction between gender identity disorder (an "inconsistency between perceived gender identity and phenotypic sex" that generally involves "no discernible neuroendocri-

nological abnormality"[47]), and intersexuality (a condition in which biological features of both sexes are present). They also provide a summary and classification scheme of the various types of intersex disorders. After a thorough discussion of the various intersex developmental issues that can lead to a disjunction between the brain and body, the authors acknowledge that "Some adult patients with severe dysphoria—transsexuals—have neither history nor objective findings supporting a known biological cause of brain-body disjunction."[48] These patients require thorough medical and psychiatric attention to avoid gender dysphoria.

After this helpful summary, the authors state that "Absent psychosis or severe character pathology, patients' subjective assertions are presently the most reliable standards for delineating core gender identity."[49] But it is not clear how we could consider subjective assertions more reliable in establishing gender identity, unless gender identity is defined as a completely subjective phenomenon. The bulk of the article is devoted to describing the various objectively discernible and identifiable ways in which one's identity as a male or female is imprinted on the nervous and endocrine system. Even when something goes wrong with the development of external genitalia, individuals are more likely to act in accordance with their chromosomal and hormonal makeup.[50]

In 2011, Giuseppina Rametti and colleagues from various research centers in Spain used MRI to study the brain structures of 18 FtM transsexuals who exhibited gender nonconformity early in life and experienced sexual attraction to females prior to hormone treatment.[51] The goal was to learn whether their brain features corresponded more to their biological sex or to their sense of gender identity. The control group consisted of 24 male and 19 female heterosexuals with gender identities conforming to their biological sex. Differences were noted in the white matter microstructure of specific brain areas. In untreated FtM transsexuals, that structure was more similar to that of heterosexual males than to that of heterosexual females in three of four brain areas.[52] In a complementary study, Rametti and colleagues compared 18 MtF transsexuals to 19 female and 19 male heterosexual controls.[53] These MtF transsexuals had white matter tract averages in several brain areas that fell between the averages of the control males and the control females. The values, however, were typically closer to the males (that is, to those that shared their biological sex) than to the females in most areas.[54] In controls the authors found that, as expected, the males had greater amounts of gray and white matter and higher volumes of cerebrospinal fluid than control females. The MtF transsexual brain volumes

were all similar to those of male controls and significantly different from those of females.[55]

Overall, the findings of these studies by Rametti and colleagues do not sufficiently support the notion that transgender individuals have brains more similar to their preferred gender than to the gender corresponding with their biological sex. Both studies are limited by small sample sizes and lack of a prospective hypothesis—both analyzed the MRI data to find the gender differences and then looked to see where the data from transgender subjects fit.

Whereas both of these MRI studies looked at brain *structure*, a functional MRI study by Emiliano Santarnecchi and colleagues from the University of Siena and the University of Florence looked at brain *function*, examining gender-related differences in spontaneous brain activity during the resting state.[56] The researchers compared a single FtM individual (declared cross-gender since childhood), and control groups of 25 males and 25 females, with regard to spontaneous brain activity. The FtM individual demonstrated a "brain activity profile more close to his biological sex than to his desired one," and based in part on this result the authors concluded that "untreated FtM transsexuals show a functional connectivity profile comparable to female control subjects."[57] With a sample size of one, this study's statistical power is virtually zero.

In 2013, Hsaio-Lun Ku and colleagues from various medical centers and research institutes in Taiwan also conducted functional brain imaging studies. They compared the brain activity of 41 transsexuals (21 FtMs, 20 MtFs) and 38 matched heterosexual controls (19 males and 19 females).[58] Arousal response of each cohort while viewing neutral as compared to erotic films was compared between groups. All of the transsexuals in the study reported sexual attractions to members of their natal, biological sex, and exhibited more sexual arousal than heterosexual controls when viewing erotic films that depicted sexual activity between subjects sharing their biological sex. A "selfness" score was also incorporated into the study, in which the researchers asked participants to "rate the degree to which you identify yourself as the male or female in the film."[59] The transsexuals in the study identified with those of their preferred gender more than the controls identified with those of their biological gender, in both erotic films and neutral films. The heterosexual controls did not identify themselves with either males or females in either of the film types. Ku and colleagues claim to have demonstrated characteristic brain patterns for sexual attraction as related to biological sex but did not make meaningful neurobiological gender-identity comparisons among the three cohorts. In

addition, they reported findings that transsexuals demonstrated psychosocial maladaptive defensive styles.

A 2008 study by Hans Berglund and colleagues from Sweden's Karolinska Institute and Stockholm Brain Institute used PET and fMRI scans to compare brain-area activation patterns in 12 MtF transgendered individuals who were sexually attracted to women with those of 12 heterosexual women and 12 heterosexual men.[60] The first set of subjects took no hormones and had not undergone sex-reassignment surgery. The experiment involved smelling odorous steroids thought to be female pheromones, and other sexually neutral odors such as lavender oil, cedar oil, eugenol, butanol, and odorless air. The results were varied and mixed between the groups for the various odors, which should not be surprising, since *post hoc* analyses usually lead to contradictory findings.

In summary, the studies presented above show inconclusive evidence and mixed findings regarding the brains of transgender adults. Brain-activation patterns in these studies do not offer sufficient evidence for drawing sound conclusions about possible associations between brain activation and sexual identity or arousal. The results are conflicting and confusing. Since the data by Ku and colleagues on brain-activation patterns are not universally associated with a particular sex, it remains unclear whether and to what extent neurobiological findings say anything meaningful about gender identity. It is important to note that regardless of their findings, studies of this kind cannot support any conclusion that individuals come to identify as a gender that does not correspond to their biological sex because of an innate, biological condition of the brain.

The question is not simply whether there are differences between the brains of transgender individuals and people identifying with the gender corresponding to their biological sex, but whether gender identity is a fixed, innate, and biological trait, even when it does not correspond to biological sex, or whether environmental or psychological causes contribute to the development of a sense of gender identity in such cases. Neurological differences in transgender adults might be the consequence of biological factors such as genes or prenatal hormone exposure, or of psychological and environmental factors such as childhood abuse, or they could result from some combination of the two. There are no serial, longitudinal, or prospective studies looking at the brains of cross-gender identifying children who develop to later identify as transgender adults. Lack of this research severely limits our ability to understand causal relationships between brain morphology, or functional activity, and the later development of gender identity different from biological sex.

More generally, it is now widely recognized among psychiatrists and neuroscientists who engage in brain imaging research that there are inherent and ineradicable methodological limitations of *any* neuroimaging study that simply associates a particular trait, such as a certain behavior, with a particular brain morphology.[61] (And when the trait in question is not a concrete behavior but something as elusive and vague as "gender identity," these methodological problems are even more serious.) These studies cannot provide statistical evidence nor show a plausible biological mechanism strong enough to support *causal connections* between a brain feature and the trait, behavior, or symptom in question. To support a conclusion of causality, even epidemiological causality, we need to conduct prospective longitudinal panel studies of a fixed set of individuals across the course of sexual development if not their lifespan.

Studies like these would use serial brain images at birth, in childhood, and at other points along the developmental continuum, to see whether brain morphology findings were there from the beginning. Otherwise, we cannot establish whether certain brain features caused a trait, or whether the trait is innate and perhaps fixed. Studies like those discussed above of individuals who already exhibit the trait are incapable of distinguishing between *causes* and *consequences* of the trait. In most cases transgender individuals have been acting and thinking for years in ways that, through learned behavior and associated neuroplasticity, may have produced brain changes that could differentiate them from other members of their biological or natal sex. The only definitive way to establish epidemiological causality between a brain feature and a trait (especially one as complex as gender identity) is to conduct prospective, longitudinal, preferably randomly sampled and population-based studies.

In the absence of such prospective longitudinal studies, large representative population-based samples with adequate statistical controls for confounding factors may help narrow the possible causes of a behavioral trait and thereby increase the probability of identifying a neurological cause.[62] However, because the studies conducted thus far use small convenience samples, none of them is especially helpful for narrowing down the options for causality. To obtain a better study sample, we would need to include neuroimaging in large-scale epidemiological studies. In fact, given the small number of transgender individuals in the general population,[63] the studies would need to be prohibitively large to attain findings that would reach statistical significance.

Moreover, if a study found significant differences between these groups—that is, a number of differences higher than what would be

expected by chance alone—these differences would refer to the average in a population of each group. Even if these two *groups* differed significantly for all 100 measurements, it would not necessarily indicate a biological difference among *individuals* at the extremes of the distribution. Thus, a randomly selected transgender individual and a randomly selected non-transgender individual might not differ on any of these 100 measurements. Additionally, since the probability that a randomly selected person from the general population will be transgender is quite small, statistically significant differences in the sample means are not sufficient evidence to conclude that a particular measurement is predictive of whether the person is transgender or not. If we measured the brain of an infant, toddler, or adolescent and found this individual to be closer to one cohort than another on these measures, it would not imply that this individual would grow up to identify as a member of that cohort. It may be helpful to keep this caveat in mind when interpreting research on transgender individuals.

In this context, it is important to note that there are no studies that demonstrate that any of the biological differences being examined have predictive power, and so all interpretations, usually in popular outlets, claiming or suggesting that a statistically significant difference between the brains of people who are transgender and those who are not is the cause of being transgendered or not—that is to say, that the biological differences determine the differences in gender identity—are unwarranted.

In short, the current studies on associations between brain structure and transgender identity are small, methodologically limited, inconclusive, and sometimes contradictory. Even if they were more methodologically reliable, they would be insufficient to demonstrate that brain structure is a cause, rather than an effect, of the gender-identity behavior. They would likewise lack predictive power, the real challenge for any theory in science.

For a simple example to illustrate this point, suppose we had a room with 100 people in it. Two of them are transgender and all others are not. I pick someone at random and ask you to guess the person's gender identity. If you know that 98 out of 100 of the individuals are not transgender, the safest bet would be to guess that the individual is not transgender, since that answer will be correct 98% of the time. Suppose, then, that you have the opportunity to ask questions about the neurobiology and about the natal sex of the person. Knowing the biology only helps in predicting whether the individual is transgender if it can improve on the original guess that the person is not transgender. So if knowing a characteristic of the individual's brain does not improve the ability to predict what group the patient belongs to, then the fact that the two groups differ at the mean is almost irrelevant.

Improving on the original prediction is very difficult for a rare trait such as being transgender, because the probability of that prediction being correct is already very high. If there really were a clear difference between the brains of transgender and non-transgender individuals, akin to the biological differences between the sexes, then improving on the original guess would be relatively easy. Unlike the differences between the sexes, however, there are no biological features that can reliably identify transgender individuals as different from others.

The consensus of scientific evidence overwhelmingly supports the proposition that a physically and developmentally normal boy or girl is indeed what he or she appears to be at birth. The available evidence from brain imaging and genetics does not demonstrate that the development of gender identity as different from biological sex is innate. Because scientists have not established a solid framework for understanding the causes of cross-gender identification, ongoing research should be open to psychological and social causes, as well as biological ones.

Transgender Identity in Children

In 2012, the *Washington Post* featured a story by Petula Dvorak, "Transgender at five,"[64] about a girl who at the age of 2 years began insisting that she was a boy. The story recounts her mother's interpretation of this behavior: "Her little girl's brain was different. Jean [her mother] could tell. She had heard about transgender people, those who are one gender physically but the other gender mentally." The story recounts this mother's distressed experiences as she began researching gender identity problems in children and came to understand other parents' experiences:

> Many talked about their painful decision to allow their children to publicly transition to the opposite gender—a much tougher process for boys who wanted to be girls. Some of what Jean heard was reassuring: Parents who took the plunge said their children's behavior problems largely disappeared, schoolwork improved, happy kid smiles returned. But some of what she heard was scary: children taking puberty blockers in elementary school and teens embarking on hormone therapy before they'd even finished high school.[65]

The story goes on to describe how the sister, Moyin, of the transgender child Tyler (formerly Kathryn) made sense of her sibling's identity:

> Tyler's sister, who's 8, was much more casual about describing her transgender sibling. "It's just a boy mind in a girl body," Moyin

> explained matter-of-factly to her second-grade classmates at her private school, which will allow Tyler to start kindergarten as a boy, with no mention of Kathryn.[66]

The remarks from the child's sister encapsulate the popular notion regarding gender identity: transgender individuals, or children who meet the diagnostic criteria for gender dysphoria, are simply "a boy mind in a girl body," or vice versa. This view implies that gender identity is a persistent and innate feature of human psychology, and it has inspired a gender-affirming approach to children who experience gender identity issues at an early age.

As we have seen above in the overview of the neurobiological and genetic research on the origins of gender identity, there is little evidence that the phenomenon of transgender identity has a biological basis. There is also little evidence that gender identity issues have a high rate of persistence in children. According to the *DSM-5*, "In natal [biological] males, persistence [of gender dysphoria] has ranged from 2.2% to 30%. In natal females, persistence has ranged from 12% to 50%."[67] Scientific data on persistence of gender dysphoria remains sparse due to the very low prevalence of the disorder in the general population, but the wide range of findings in the literature suggests that there is still much that we do not know about why gender dysphoria persists or desists in children. As the *DSM-5* entry goes on to note, "It is unclear if children 'encouraged' or supported to live socially in the desired gender will show higher rates of persistence, since such children have not yet been followed longitudinally in a systematic manner."[68] There is a clear need for more research in these areas, and for parents and therapists to acknowledge the great uncertainty regarding how to interpret the behavior of these children.

Therapeutic Interventions in Children

With the uncertainty surrounding the diagnosis of and prognosis for gender dysphoria in children, therapeutic decisions are particularly complex and difficult. Therapeutic interventions for children must take into account the probability that the children may outgrow cross-gender identification. University of Toronto researcher and therapist Kenneth Zucker believes that family and peer dynamics can play a significant role in the development and persistence of gender-nonconforming behavior, writing that

> it is important to consider both predisposing and perpetuating factors that might inform a clinical formulation and the development of

> a therapeutic plan: the role of temperament, parental reinforcement of cross-gender behavior during the sensitive period of gender identity formation, family dynamics, parental psychopathology, peer relationships and the multiple meanings that might underlie the child's fantasy of becoming a member of the opposite sex.[69]

Zucker worked for years with children experiencing feelings of gender incongruence, offering psychosocial treatments to help them embrace the gender corresponding with their biological sex—for instance, talk therapy, parent-arranged play dates with same-sex peers, therapy for co-occurring psychopathological issues such as autism spectrum disorder, and parent counseling.[70]

In a follow-up study by Zucker and colleagues of children treated by them over the course of thirty years at the Center for Mental Health and Addiction in Toronto, they found that gender identity disorder persisted in only 3 of the 25 girls they had treated.[71] (Zucker's clinic was closed by the Canadian government in 2015.[72])

An alternative to Zucker's approach that emphasizes affirming the child's preferred gender identity has become more common among therapists.[73] This approach involves helping the children to self-identify even more with the gender label they prefer at the time. One component of the gender-affirming approach has been the use of hormone treatments for adolescents in order to delay the onset of sex-typical characteristics during puberty and alleviate the feelings of dysphoria the adolescents will experience as their bodies develop sex-typical characteristics that are at odds with the gender with which they identify. There is relatively little evidence for the therapeutic value of these kinds of puberty-delaying treatments, but they are currently the subject of a large clinical study sponsored by the National Institutes of Health.[74]

While epidemiological data on the outcomes of medically delayed puberty is quite limited, referrals for sex-reassignment hormones and surgical procedures appear to be on the rise, and there is a push among many advocates to proceed with sex reassignment at younger ages. According to a 2013 article in *The Times* of London, the United Kingdom saw a 50% increase in the number of children referred to gender dysphoria clinics from 2011 to 2012, and a nearly 50% increase in referrals among adults from 2010 to 2012.[75] Whether this increase can be attributed to rising rates of gender confusion, rising sensitivity to gender issues, growing acceptance of therapy as an option, or other factors, the increase itself is concerning, and merits further scientific inquiry into the family dynamics

and other potential problems, such as social rejection or developmental issues, that may be taken as signs of childhood gender dysphoria.

A study of psychological outcomes following puberty suppression and sex-reassignment surgery, published in the journal *Pediatrics* in 2014 by child and adolescent psychiatrist Annelou L. C. de Vries and colleagues, suggested improved outcomes for individuals after receiving these interventions, with well-being improving to a level similar to that of young adults from the general population.[76] This study looked at 55 transgender adolescents and young adults (22 MtF and 33 FtM) from a Dutch clinic who were assessed three times: before the start of puberty suppression (mean age: 13.6 years), when cross-sex hormones were introduced (mean age: 16.7 years), and at least one year after sex-reassignment surgery (mean age: 20.7 years). The study did not provide a matched group for comparison—that is, a group of transgender adolescents who did not receive puberty-blocking hormones, cross-sex hormones, and/or sex-reassignment surgery—which makes comparisons of outcomes more difficult.

In the study cohort, gender dysphoria improved over time, body image improved on some measures, and overall functioning improved modestly. Due to the lack of a matched control group it is unclear whether these changes are attributable to the procedures or would have occurred in this cohort without the medical and surgical interventions. Measures of anxiety, depression, and anger showed some improvements over time, but these findings did not reach statistical significance. While this study suggested some improvements over time in this cohort, particularly the reported subjective satisfaction with the procedures, detecting significant differences would require the study to be replicated with a matched control group and a larger sample size. The interventions also included care from a multidisciplinary team of medical professionals, which could have had a beneficial effect. Future studies of this kind would ideally include long-term follow-ups that assess outcomes and functioning beyond the late teens or early twenties.

Therapeutic Interventions in Adults

The potential that patients undergoing medical and surgical sex reassignment may want to return to a gender identity consistent with their biological sex suggests that reassignment carries considerable psychological and physical risk, especially when performed in childhood, but also in adulthood. It suggests that the patients' pre-treatment beliefs about an ideal post-treatment life may sometimes go unrealized.

In 2004, Birmingham University's Aggressive Research Intelligence Facility (Arif) assessed the findings of more than one hundred follow-up studies of post-operative transsexuals.[77] An article in *The Guardian* summarized the findings:

> Arif…concludes that none of the studies provides conclusive evidence that gender reassignment is beneficial for patients. It found that most research was poorly designed, which skewed the results in favour of physically changing sex. There was no evaluation of whether other treatments, such as long-term counselling, might help transsexuals, or whether their gender confusion might lessen over time. Arif says the findings of the few studies that have tracked significant numbers of patients over several years were flawed because the researchers lost track of at least half of the participants. The potential complications of hormones and genital surgery, which include deep vein thrombosis and incontinence respectively, have not been thoroughly investigated, either. "There is huge uncertainty over whether changing someone's sex is a good or a bad thing," says Dr Chris Hyde, director of Arif. "While no doubt great care is taken to ensure that appropriate patients undergo gender reassignment, there's still a large number of people who have the surgery but remain traumatized—often to the point of committing suicide."[78]

The high level of uncertainty regarding various outcomes after sex-reassignment surgery makes it difficult to find clear answers about the effects on patients of reassignment surgery. Since 2004, there have been other studies on the efficacy of sex-reassignment surgery, using larger sample sizes and better methodologies. We will now examine some of the more informative and reliable studies on outcomes for individuals receiving sex-reassignment surgery.

As far back as 1979, Jon K. Meyer and Donna J. Reter published a longitudinal follow-up study on the overall well-being of adults who underwent sex-reassignment surgery.[79] The study compared the outcomes of 15 people who received surgery with those of 35 people who requested but did not receive surgery (14 of these individuals eventually received surgery later, resulting in three cohorts of comparison: operated, not-operated, and operated later). Well-being was quantified using a scoring system that assessed psychiatric, economic, legal, and relationship outcome variables. Scores were determined by the researchers after performing interviews with the subjects. Average follow-up time was approximately five years for subjects who had sex change surgery, and about two years for those subjects who did not.

Compared to their condition before surgery, the individuals who had undergone surgery appeared to show some improvement in well-being, though the results had a fairly low level of statistical significance. Individuals who had no surgical intervention did display a statistically significant improvement at follow-up. However, there was no statistically significant difference between the two groups' scores of well-being at follow-up. The authors concluded that "sex reassignment surgery confers no objective advantage in terms of social rehabilitation, although it remains subjectively satisfying to those who have rigorously pursued a trial period and who have undergone it."[80] This study led the psychiatry department at Johns Hopkins Medical Center (JHMC) to discontinue surgical interventions for sex changes for adults.[81]

However, the study has important limitations. Selection bias was introduced in the study population, because the subjects were drawn from those individuals who sought sex-reassignment surgery at JHMC. In addition, the sample size was small. Also, the individuals who did not undergo sex-reassignment surgery but presented to JHMC for it did not represent a true control group. Random assignment of the surgical procedure was not possible. Large differences in the average follow-up time between those who underwent surgery and those who did not further reduces any capacity to draw valid comparisons between the two groups. Additionally, the study's methodology was also criticized for the somewhat arbitrary and idiosyncratic way it measured the well-being of its subjects. Cohabitation or any form of contact with psychiatric services were scored as equally negative factors as having been arrested.[82]

In 2011, Cecilia Dhejne and colleagues from the Karolinska Institute and Gothenburg University in Sweden published one of the more robust and well-designed studies to examine outcomes for persons who underwent sex-reassignment surgery. Focusing on mortality, morbidity, and criminality rates, the matched cohort study compared a total of 324 transsexual persons (191 MtFs, 133 FtMs) who underwent sex reassignment between 1973 and 2003 to two age-matched controls: people of the same sex as the transsexual person at birth, and people of the sex to which the individual had been reassigned.[83]

Given the relatively low number of transsexual persons in the general population, the size of this study is impressive. Unlike Meyer and Reter, Dhejne and colleagues did not seek to evaluate the patient satisfaction after sex-reassignment surgery, which would have required a control group of transgender persons who desired to have sex-reassignment surgery but did not receive it. Also, the study did not compare outcome

variables before and after sex-reassignment surgery; only outcomes after surgery were evaluated. We need to keep these caveats in mind as we look at what this study found.

Dhejne and colleagues found statistically significant differences between the two cohorts on several of the studied rates. For example, the postoperative transsexual individuals had an approximately three times higher risk for psychiatric hospitalization than the control groups, even after adjusting for prior psychiatric treatment.[84] (However, the risk of being hospitalized for substance abuse was not significantly higher after adjusting for prior psychiatric treatment, as well as other covariates.) Sex-reassigned individuals had nearly a three times higher risk of all-cause mortality after adjusting for covariates, although the elevated risk was significant only for the time period of 1973–1988.[85] Those undergoing surgery during this period were also at increased risk of being convicted of a crime.[86] Most alarmingly, sex-reassigned individuals were 4.9 times more likely to attempt suicide and 19.1 times more likely to die by suicide compared to controls.[87] "Mortality from suicide was strikingly high among sex-reassigned persons, including after adjustment for prior psychiatric morbidity."[88]

The study design precludes drawing inferences "as to the effectiveness of sex reassignment as a treatment for transsexualism," although Dhejne and colleagues state that it is possible that "things might have been even worse without sex reassignment."[89] Overall, post-surgical mental health was quite poor, as indicated especially by the high rate of suicide attempts and all-cause mortality in the 1973–1988 group. (It is worth noting that for the transsexuals in the study who underwent sex reassignment from 1989 to 2003, there were of course fewer years of data available at the time the study was conducted than for those transsexuals from the earlier period. The rates of mortality, morbidity, and criminality in the later group may in time come to resemble the elevated risks of the earlier group.) In summary, this study suggests that sex-reassignment surgery may not rectify the comparatively poor health outcomes associated with transgender populations in general. Still, because of the limitations of this study mentioned above, the results also cannot establish that sex-reassignment surgery causes poor health outcomes.

In 2009, Annette Kuhn and colleagues from the University Hospital and University of Bern in Switzerland examined post-surgery quality of life in 52 MtF and 3 FtM transsexuals fifteen years after sex-reassignment surgery.[90] This study found considerably lower general life satisfaction in post-surgical transsexuals as compared with females who had at least one

pelvic surgery in the past. The postoperative transsexuals reported lower satisfaction with their general quality of health and with some of the personal, physical, and social limitations they experienced with incontinence that resulted as a side effect of the surgery. Again, inferences cannot be drawn from this study regarding the efficacy of sex-reassignment surgery due to the lack of a control group of transgender individuals who did not receive sex-reassignment surgery.

In 2010, Mohammad Hassan Murad and colleagues from the Mayo Clinic published a systematic review of studies on the outcomes of hormonal therapies used in sex-reassignment procedures, finding that there was "very low quality evidence" that sex reassignment via hormonal interventions "likely improves gender dysphoria, psychological functioning and comorbidities, sexual function and overall quality of life."[91] The authors identified 28 studies that together examined 1,833 patients who underwent sex-reassignment procedures that included hormonal interventions (1,093 male-to-female, 801 female-to-male).[92] Pooling data across studies showed that, after receiving sex-reassignment procedures, 80% of patients reported improvement in gender dysphoria, 78% reported improvement in psychological symptoms, and 80% reported improvement in quality of life.[93] None of the studies included the bias-limiting measure of randomization (that is, in none of the studies were sex-reassignment procedures assigned randomly to some patients but not to others), and only three of the studies included control groups (that is, patients who were not provided the treatment to serve as comparison cases for those who did).[94] Most of the studies examined in Murad and colleagues' review reported improvements in psychiatric comorbidities and quality of life, though notably suicide rates remained higher for individuals who had received hormone treatments than for the general population, despite reductions in suicide rates following the treatments.[95] The authors also found that there were some exceptions to reports of improvements in mental health and satisfaction with sex-reassignment procedures; in one study, 3 of 17 individuals regretted the procedure with 2 of these 3 seeking reversal procedures,[96] and four of the studies reviewed reported worsening quality of life, including continuing social isolation, lack of improvement in social relationships, and dependence on government welfare programs.[97]

The scientific evidence summarized suggests we take a skeptical view toward the claim that sex-reassignment procedures provide the hoped-for benefits or resolve the underlying issues that contribute to elevated mental health risks among the transgender population. While we work to stop maltreatment and misunderstanding, we should also work to study

and understand whatever factors may contribute to the high rates of suicide and other psychological and behavioral health problems among the transgender population, and to think more clearly about the treatment options that are available.

Part Three: Gender Identity

1. American Psychological Association, "Answers to Your Questions About Transgender People, Gender Identity and Gender Expression" (pamphlet), http://www.apa.org/topics/lgbt/transgender.pdf.

2. Simone de Beauvoir, *The Second Sex* (New York: Vintage, 2011 [orig. 1949]), 283.

3. Ann Oakley, *Sex, Gender and Society* (London: Maurice Temple Smith, 1972).

4. Suzanne J. Kessler and Wendy McKenna, *Gender: An Ethnomethodological Approach* (New York: John Wiley & Sons, 1978), vii.

5. Gayle Rubin, "The Traffic in Women: Notes on the 'Political Economy' of Sex," in *Toward an Anthropology of Women*, ed. Rayna R. Reiter (New York and London: Monthly Review Press, 1975), 179.

6. *Ibid.*, 204.

7. Judith Butler, *Gender Trouble: Feminism and the Subversion of Identity* (London: Routledge, 1990).

8. Judith Butler, *Undoing Gender* (New York: Routledge, 2004).

9. Butler, *Gender Trouble*, 7.

10. *Ibid.*, 6.

11. "Facebook Diversity" (web page), https://www.facebook.com/facebookdiversity/photos/a.196865713743272.42938.105225179573993/567587973337709/.

12. Will Oremus, "Here Are All the Different Genders You Can Be on Facebook," *Slate*, February 13, 2014, http://www.slate.com/blogs/future_tense/2014/02/13/facebook_custom_gender_options_here_are_all_56_custom_options.html.

13. André Ancel, Michaël Beaulieu, and Caroline Gilbert, "The different breeding strategies of penguins: a review," *Comptes Rendus Biologies* 336, no. 1 (2013): 6–7, http://dx.doi.org/10.1016/j.crvi.2013.02.002. Generally, male emperor penguins do the work of incubating the eggs and then caring for the chicks for several days after hatching. After that point, males and females take turns caring for the chicks.

14. Jennifer A. Marshall Graves and Swathi Shetty, "Sex from W to Z: Evolution of Vertebrate Sex Chromosomes and Sex Determining Genes," *Journal of Experimental Zoology* 290 (2001): 449–462, http://dx.doi.org/10.1002/jez.1088.

15. For an overview of Thomas Beatie's story, see his book, *Labor of Love: The Story of One Man's Extraordinary Pregnancy* (Berkeley: Seal Press, 2008).

16. Edward Stein, *The Mismeasure of Desire: The Science, Theory, and Ethics of Sexual Orientation* (New York: Oxford University Press, 1999), 31.

17. John Money, "Hermaphroditism, gender and precocity in hyperadrenocorticism: psychologic findings," *Bulletin of the John Hopkins Hospital* 95, no. 6 (1955): 253–264, http://www.ncbi.nlm.nih.gov/pubmed/14378807.

18. An account of the David Reimer story can be found in John Colapinto, *As Nature Made Him: The Boy Who Was Raised as a Girl* (New York: Harper Collins, 2000).

19. William G. Reiner and John P. Gearhart, "Discordant Sexual Identity in Some Genetic Males with Cloacal Exstrophy Assigned to Female Sex at Birth," *New England Journal of Medicine*, 350 (January 2004): 333–341, http://dx.doi.org/10.1056/NEJMoa022236.

20. Paul R. McHugh, "Surgical Sex: Why We Stopped Doing Sex Change Operations," *First Things* (November 2004), http://www.firstthings.com/article/2004/11/surgical-sex.

21. American Psychiatric Association, "Gender Dysphoria," *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* [hereafter *DSM-5*] (Arlington, Va.: American Psychiatric Publishing, 2013), 452, http://dx.doi.org/10.1176/appi.books.9780890425596.dsm14.

22. *Ibid.*, 458.

23. *Ibid.*

24. *Ibid.*, 452.

25. *Ibid.*

26. *Ibid.*, 454–455.

27. *Ibid.*, 452.

28. *Ibid.*, 457.

29. Angeliki Galani *et al.*, "Androgen insensitivity syndrome: clinical features and molecular defects," *Hormones* 7, no. 3 (2008): 217–229, https://dx.doi.org/10.14310%2Fhorm.2002.1201.

30. Perrin C. White and Phyllis W. Speiser, "Congenital Adrenal Hyperplasia due to 21-Hydroxylase Deficiency," *Endocrine Reviews* 21, no. 3 (2000): 245–219, http://dx.doi.org/10.1210/edrv.21.3.0398.

31. Alexandre Serra *et al.*, "Uniparental Disomy in Somatic Mosaicism 45,X/46,XY/46,XX Associated with Ambiguous Genitalia," *Sexual Development* 9 (2015): 136–143, http://dx.doi.org/10.1159/000430897.

32. Marion S. Verp *et al.*, "Chimerism as the etiology of a 46,XX/46,XY fertile true hermaphrodite," *Fertility and Sterility* 57, no 2 (1992): 346–349, http://dx.doi.org/10.1016/S0015-0282(16)54843-2.

33. For one recent review of the science of neurological sex differences, see Amber N. V. Ruigrok *et al.*, "A meta-analysis of sex differences in human brain structure," *Neuroscience Biobehavioral Review* 39 (2014): 34–50, http://dx.doi.org/10.1016%2Fj.neubiorev.2013.12.004.

34. Robert Sapolsky, "Caught Between Male and Female," *Wall Street Journal*, December 6, 2013, http://www.wsj.com/articles/SB10001424052702304854804579234030532617704.

35. *Ibid.*

36. *Ibid.*

37. For some examples of popular interest in this view, see Francine Russo, "Transgender Kids," *Scientific American Mind* 27, no. 1 (2016): 26–35, http://dx.doi.org/10.1038/scientificamericanmind0116-26; Jessica Hamzelou, "Transsexual differences caught on brain scan," *New Scientist* 209, no. 2796 (2011): 1, https://www.newscientist.com/article/dn20032-transsexual-differences-caught-on-brain-scan/; Brynn Tannehill, "Do Your Homework, Dr. Ablow," The Huffington Post, January 17, 2014, http://www.huffingtonpost.com/brynn-tannehill/how-much-evidence-does-it_b_4616722.html.

38. Nancy Segal, "Two Monozygotic Twin Pairs Discordant for Female-to-Male Transsexualism," *Archives of Sexual Behavior* 35, no. 3 (2006): 347–358, http://dx.doi.org/10.1007/s10508-006-9037-3.

39. Holly Devor, "Transsexualism, Dissociation, and Child Abuse: An Initial Discussion Based on Nonclinical Data," *Journal of Psychology and Human Sexuality*, 6 no. 3 (1994): 49–72, http://dx.doi.org/10.1300/J056v06n03_04.

40. Segal, "Two Monozygotic Twin Pairs Discordant for Female-to-Male Transsexualism," 350.

41. *Ibid.*, 351.

42. *Ibid.*, 353–354.

43. *Ibid.*, 354.

44. *Ibid.*, 356.

45. *Ibid.*, 355. Emphasis in original.

46. J. Michael Bostwick and Kari A. Martin, "A Man's Brain in an Ambiguous Body: A Case of Mistaken Gender Identity," *American Journal of Psychiatry*, 164 no. 10 (2007): 1499–1505, http://dx.doi.org/10.1176/appi.ajp.2007.07040587.

47. *Ibid.*, 1500.

48. *Ibid.*, 1504.

49. *Ibid.*

50. *Ibid.*, 1503–1504.

51. Giuseppina Rametti *et al.*, "White matter microstructure in female to male transsexuals before cross-sex hormonal treatment. A diffusion tensor imaging study," *Journal of Psychiatric Research* 45, no. 2 (2011): 199–204, http://dx.doi.org/10.1016/j.jpsychires.2010.05.006.

52. *Ibid.*, 202.

53. Giuseppina Rametti *et al.*, "The microstructure of white matter in male to female transsexuals before cross-sex hormonal treatment. A DTI study," *Journal of Psychiatric Research* 45, no. 7 (2011): 949–954, http://dx.doi.org/10.1016/j.jpsychires.2010.11.007.

54. *Ibid.*, 952.

55. *Ibid.*, 951.

56. Emiliano Santarnecchi *et al.*, "Intrinsic Cerebral Connectivity Analysis in an Untreated Female-to-Male Transsexual Subject: A First Attempt Using Resting-State fMRI," *Neuroendocrinology* 96, no. 3 (2012): 188–193, http://dx.doi.org/10.1159/000342001.

57. *Ibid.*, 188.

58. Hsaio-Lun Ku *et al.*, "Brain Signature Characterizing the Body-Brain-Mind Axis of Transsexuals," *PLOS ONE* 8, no. 7 (2013): e70808, http://dx.doi.org/10.1371/journal.pone.0070808.

59. *Ibid.*, 2.

60. Hans Berglund *et al.*, "Male-to-Female Transsexuals Show Sex-Atypical Hypothalamus Activation When Smelling Odorous Steroids, *Cerebral Cortex* 18, no. 8 (2008): 1900–1908, http://dx.doi.org/10.1093/cercor/bhm216.

61. See, for example, Sally Satel and Scott D. Lilenfeld, *Brainwashed: The Seductive Appeal*

of Mindless Neuroscience, (New York: Basic Books, 2013).

62. An additional clarification may be helpful with regard to research studies of this kind. Significant differences in the means of sample populations do not entail predictive power of any consequence. Suppose that we made 100 different types of brain measurements in cohorts of transgender and non-transgender individuals, and then calculated the means of each of those 100 variables for both cohorts. Statistical theory tells us that, due to mere chance, we can (on average) expect the two cohorts to differ significantly in the means of 5 of those 100 variables. This implies that if the significant differences are about 5 or fewer out of 100, these differences could easily be by chance and therefore we should not ignore the fact that 95 other measurements failed to find significant differences.

63. One recent paper estimates that 0.6% of the adult U.S. population is transgender. See Andrew R. Flores *et al.*, "How Many Adults Identify as Transgender in the United States?" (white paper), Williams Institute, UCLA School of Law, June 30, 2016, http://williamsinstitute.law.ucla.edu/wp-content/uploads/How-Many-Adults-Identify-as-Transgender-in-the-United-States.pdf.

64. Petula Dvorak, "Transgender at five," *Washington Post*, May 19, 2012, https://www.washingtonpost.com/local/transgender-at-five/2012/05/19/gIQABfFkbU_story.html.

65. *Ibid.*

66. *Ibid.*

67. American Psychiatric Association, "Gender Dysphoria," *DSM-5*, 455. Note: Although the quotation comes from the *DSM-5* entry for "gender dysphoria" and implies that the listed persistence rates apply to that precise diagnosis, the diagnosis of gender dysphoria was formalized by the *DSM-5*, so some of the studies from which the persistence rates were drawn may have employed earlier diagnostic criteria.

68. *Ibid.*, 455.

69. Kenneth J. Zucker, "Children with gender identity disorder: Is there a best practice?," *Neuropsychiatrie de l'Enfance et de l'Adolescence* 56, no. 6 (2008): 363, http://dx.doi.org/10.1016/j.neurenf.2008.06.003.

70. Kenneth J. Zucker *et al.*, "A Developmental, Biopsychosocial Model for the Treatment of Children with Gender Identity Disorder," *Journal of Homosexuality* 59, no. 2 (2012), http://dx.doi.org/10.1080/00918369.2012.653309. For an accessible summary of Zucker's approach to treating gender dysphoria in children, see J. Michael Bailey, *The Man Who Would Be Queen: The Science of Gender-Bending and Transsexualism* (Washington, D.C.: Joseph Henry Press, 2003), 31–32.

71. Kelley D. Drummond *et al.*, "A follow-up study of girls with gender identity disorder," *Developmental Psychology* 44, no. 1 (2008): 34–45, http://dx.doi.org/10.1037/0012-1649.44.1.34.

72. Jesse Singal, "How the Fight Over Transgender Kids Got a Leading Sex Researcher Fired," *New York Magazine*, February 7, 2016, http://nymag.com/scienceofus/2016/02/fight-over-trans-kids-got-a-researcher-fired.html.

73. See, for example, American Psychological Association, "Guidelines for Psychological Practice with Transgender and Gender Nonconforming People," *American Psychologist* 70 no. 9, (2015): 832–864, http://dx.doi.org/10.1037/a0039906; and Marco A. Hidalgo *et al.*, "The Gender Affirmative Model: What We Know and What We Aim to Learn," *Human Development* 56 (2013): 285–290, http://dx.doi.org/10.1159/000355235.

74. Sara Reardon, "Largest ever study of transgender teenagers set to kick off," *Nature* 531, no. 7596 (2016): 560, http://dx.doi.org/10.1038/531560a.

75. Chris Smyth, "Better help urged for children with signs of gender dysphoria," *The Times* (London), October 25, 2013, http://www.thetimes.co.uk/tto/health/news/article3903783.ece. According to the article, in 2012 "1,296 adults were referred to specialist gender dysphoria clinics, up from 879 in 2010. There are now [in 2013] 18,000 people in treatment, compared with 4,000 15 years ago. [In 2012] 208 children were referred, up from 139 the year before and 64 in 2008."

76. Annelou L. C. de Vries *et al.*, "Young Adult Psychological Outcome After Puberty Suppression and Gender Reassignment," *Pediatrics* 134, no. 4 (2014): 696–704, http://dx.doi.org/10.1542/peds.2013-2958d.

77. David Batty, "Mistaken identity," *The Guardian*, July 30, 2004, http://www.theguardian.com/society/2004/jul/31/health.socialcare.

78. *Ibid.*

79. Jon K. Meyer and Donna J. Reter, "Sex Reassignment: Follow-up," *Archives of General Psychiatry* 36, no. 9 (1979): 1010–1015, http://dx.doi.org/10.1001/archpsyc.1979.01780090096010.

80. *Ibid.*, 1015.

81. See, for instance, Paul R. McHugh, "Surgical Sex," *First Things* (November 2004), http://www.firstthings.com/article/2004/11/surgical-sex.

82. Michael Fleming, Carol Steinman, and Gene Bocknek, "Methodological Problems in Assessing Sex-Reassignment Surgery: A Reply to Meyer and Reter," *Archives of Sexual Behavior* 9, no. 5 (1980): 451–456, http://dx.doi.org/10.1007/BF02115944.

83. Cecilia Dhejne *et al.*, "Long-term follow-up of transsexual persons undergoing sex reassignment surgery: cohort study in Sweden," *PLOS ONE* 6, no. 2 (2011): e16885, http://dx.doi.org/10.1371/journal.pone.0016885.

84. 95% confidence interval: 2.0–3.9.

85. 95% confidence interval: 1.8–4.3.

86. MtF transsexuals in the study's 1973–1988 period showed a higher risk of crime compared to the female controls, suggesting that they maintain a male pattern for criminality. That study period's FtM transsexuals, however, did show a higher risk of crime compared to the female controls, perhaps related to the effects of exogenous testosterone administration.

87. 95% confidence intervals: 2.9–8.5 and 5.8–62.9, respectively.

88. *Ibid.*, 6.

89. *Ibid.*, 7.

90. Annette Kuhn *et al.*, "Quality of life 15 years after sex reassignment surgery for transsexualism," *Fertility and Sterility* 92, no. 5 (2009): 1685–1689, http://dx.doi.org/10.1016/j.fertnstert.2008.08.126.

91. Mohammad Hassan Murad *et al.*, "Hormonal therapy and sex reassignment: a systematic review and meta-analysis of quality of life and psychosocial outcomes," *Clinical Endocrinology* 72 (2010): 214–231, http://dx.doi.org/10.1111/j.1365-2265.2009.03625.x.

92. *Ibid.*, 215.

93. 95% confidence intervals: 68–89%, 56–94%, and 72–88%, respectively.

94. *Ibid.*

95. *Ibid.*, 216.

96. *Ibid.*

97. *Ibid.*, 228.

The New Atlantis
A Journal of Technology & Society

Conclusion

Accurate, replicable scientific research results can and do influence our personal decisions and self-understanding, and can contribute to the public discourse, including cultural and political debates. When the research touches on controversial themes, it is particularly important to be clear about precisely what science has and has not shown. For complex, complicated questions concerning the nature of human sexuality, there exists at best provisional scientific consensus; much remains unknown, as sexuality is an immensely complex part of human life that defies our attempts at defining all its aspects and studying them with precision.

For questions that are easier to study empirically, however, such as those concerning the rates of mental health outcomes for identifiable subpopulations of sexual minorities, the research does offer some clear answers: these subpopulations show higher rates of depression, anxiety, substance abuse, and suicide compared to the general population. One hypothesis, the social stress model—which posits that stigma, prejudice, and discrimination are the primary causes of higher rates of poor mental health outcomes for these subpopulations—is frequently cited as a way to explain this disparity. While non-heterosexual and transgender individuals are often subject to social stressors and discrimination, science has not shown that these factors alone account for the entirety, or even a majority, of the health disparity between non-heterosexual and transgender subpopulations and the general population. There is a need for extensive research in this area to test the social stress hypothesis and other potential explanations for the health disparities, and to help identify ways of addressing the health concerns present in these subpopulations.

Some of the most widely held views about sexual orientation, such as the "born that way" hypothesis, simply are not supported by science. The literature in this area does describe a small ensemble of biological differences between non-heterosexuals and heterosexuals, but those biological differences are not sufficient to predict sexual orientation, the ultimate test of any scientific finding. The strongest statement that science offers to explain sexual orientation is that some biological factors appear, to an unknown extent, to predispose some individuals to a non-heterosexual orientation.

The suggestion that we are "born that way" is more complex in the case of gender identity. In one sense, the evidence that we are born with

a given gender seems well supported by direct observation: males overwhelmingly identify as men and females as women. The fact that children are (with a few exceptions of intersex individuals) born either biologically male or female is beyond debate. The biological sexes play complementary roles in reproduction, and there are a number of population-level average physiological and psychological differences between the sexes. However, while biological sex is an innate feature of human beings, gender identity is a more elusive concept.

In reviewing the scientific literature, we find that almost nothing is well understood when we seek biological explanations for what causes some individuals to state that their gender does not match their biological sex. The findings that do exist often have sample-selection problems, and they lack longitudinal perspective and explanatory power. Better research is needed, both to identify ways by which we can help to lower the rates of poor mental health outcomes and to make possible more informed discussion about some of the nuances present in this field.

Yet despite the scientific uncertainty, drastic interventions are prescribed and delivered to patients identifying, or identified, as transgender. This is especially troubling when the patients receiving these interventions are children. We read popular reports about plans for medical and surgical interventions for many prepubescent children, some as young as six, and other therapeutic approaches undertaken for children as young as two. We suggest that no one can determine the gender identity of a two-year-old. We have reservations about how well scientists understand what it even means for a child to have a developed sense of his or her gender, but notwithstanding that issue, we are deeply alarmed that these therapies, treatments, and surgeries seem disproportionate to the severity of the distress being experienced by these young people, and are at any rate premature since the majority of children who identify as the gender opposite their biological sex will not continue to do so as adults. Moreover, there is a lack of reliable studies on the long-term effects of these interventions. We strongly urge caution in this regard.

We have sought in this report to present a complex body of research in a way that will be intelligible to a wide audience of both experts and lay readers alike. Everyone—scientists and physicians, parents and teachers, lawmakers and activists—deserves access to accurate information about sexual orientation and gender identity. While there is much controversy surrounding how our society treats its LGBT members, no political

or cultural views should discourage us from understanding the related clinical and public health issues and helping people suffering from mental health problems that may be connected to their sexuality.

Our work suggests some avenues for future research in the biological, psychological, and social sciences. More research is needed to uncover the causes of the increased rates of mental health problems in the LGBT subpopulations. The social stress model that dominates research on this issue requires improvement, and most likely needs to be supplemented by other hypotheses. Additionally, the ways in which sexual desires develop and change across one's lifespan remain, for the most part, inadequately understood. Empirical research may help us to better understand relationships, sexual health, and mental health.

Critiquing and challenging both parts of the "born that way" paradigm—both the notion that sexual orientation is biologically determined and fixed, and the related notion that there is a fixed gender independent of biological sex—enables us to ask important questions about sexuality, sexual behaviors, gender, and individual and social goods in a different light. Some of these questions lie outside the scope of this work, but those that we have examined suggest that there is a great chasm between much of the public discourse and what science has shown.

Thoughtful scientific research and careful, circumspect interpretation of its results can advance our understanding of sexual orientation and gender identity. There is still much work to be done and many unanswered questions. We have attempted to synthesize and describe a complex body of scientific research related to some of these themes. We hope that this report contributes to the ongoing public conversation regarding human sexuality and identity. We anticipate that this report may elicit spirited responses, and we welcome them.

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF WISCONSIN

ALINA BOYDEN and
SHANNON ANDREWS,

Plaintiffs,

v. Case No. 17-CV-264

STATE OF WISCONSIN DEPARTMENT
OF EMPLOYEE TRUST FUNDS, et al.,

Defendants.

EXPERT REPORT OF DAVID V. WILLIAMS
SUBMITTED ON BEHALF OF THE STATE DEFENDANTS

EXPERT REPORT

Gender Reassignment Benefits

19 April 2018

David V. Williams, Consultant


Milliman

Table of Contents

I have reviewed the civil rights complaint for sex discrimination filed in United States District Court, W.D. Wisconsin No.: 17-cv-264; Alina Boyden, and Shannon Andrews Plaintiffs vs State of Wisconsin Department of Employee Trust Funds, State of Wisconsin Group Insurance Board, Robert Conlin (Secretary of the Department of Employee Trust Funds), Board of Regents of the University of Wisconsin System, Raymond Cross (President of the UW System), Rebecca Blank (Chancellor of UW – Madison), Robert Golden (Dean of the UW School of Medicine and Public Health), and Dean Health Plan, defendants. This report contains my opinions with respect to healthcare costs for surgical procedures, services and supplies related to surgery and hormone therapy associated with gender reassignment.

Professional Qualifications

I am a Healthcare Consultant working in the Hartford, Connecticut office of Milliman, the largest independent actuarial consulting firm in the United States with offices worldwide. I have 30 years' experience in areas related to medical economics including director positions at two health plans. I hold a degree in Economics from Brigham Young University and have completed graduate course work in statistics, data mining, public health, and software development.

My employment as a Milliman Healthcare Consultant began in 1997. Milliman Healthcare Consultants consist of actuaries, medical professionals, information technology experts, and other professionals who serve clients that include health plans, insurance companies, healthcare providers, employers, governments, pharmaceutical companies, medical device manufacturers and others. Milliman qualifies consultants through a rigorous evaluation process that designates a consultant as an approved professional, which means the consultant is approved to work directly with clients, and/or has signature authority, which means the consultant may sign reports and approve other professional's work products: I am both an approved professional and have signature authority. My professional responsibilities include provider contracting, pricing, insurance premium rate-setting, return on investment analysis for wellness programs and medical devices, value-based insurance design, forecasting and budgeting of health plans, and medical claims data warehousing.

As a result of my technical experience in medical economics, benefit pricing, and data analysis, I have developed an understanding of benefit pricing techniques and approaches used in the healthcare industry.

I have previously serviced, and continue to work as an expert witness for Reasonable Fee Methodologies, particularly for fees paid by automobile related medical claims where there is no contract between the insurer and provider of care. I have developed an understanding of medical provider billing patterns across the healthcare industry.

The opinions set forth in this report are based on my education, training and experience including my knowledge of medical insurance, benefit design and benefit pricing as commonly used by employers in the U.S. market.

My practice is being compensated $390 per hour for my services as an expert witness. I may use charts or tables attached to or included in the body of this report as demonstrative exhibits if I testify in this matter. I understand that the parties may obtain further information relating to the matters addressed in this report and that I may be asked to review further information. I reserve

the right to review, modify, or expand upon my opinions based on any further information provided to me. I may also develop additional charts or other exhibits to use in my testimony.

Publications

Milliman Reasonable Fee Methodology on behalf of United Services Automobile Association (USAA), 2012

Analysis of Medical Bill Audit Services prepared on behalf of United Services Automobile Association (USAA), June 21, 2004

Frykberg, RG., Williams DV., Negative-Pressure Wound Therapy and Diabetic Foot Amputations: A retrospective study of Payer Claims Data. J. Am Podiatr Med Assoc. Sept/Oct 97(5)2008, P. 351-9.

Prior Expert Litigation Work

Expert Report: 2012-02016-PAB-MJW; Lindsey Parks, representative of a class of injured persons insured with USAA, plaintiff, vs. USAA and AUTO INJURY SOLUTIONS, (AIS), defendants.

Deposition: MySpine, PS Plaintiff v USAA Casualty Insurance Company, et al. Defendant, Civil Action No. C12-1973RAJ

Summary of Opinions

1. Examining retrospective claims data is the preferred starting point for pricing healthcare benefits for procedures, services, and supplies related to surgery and hormones therapy associated with gender reassignment. For purposes of this analysis, I used retrospective claims data from January 1, 2016 through December 31, 2016, from the Truven MarketScan® commercial research dataset.
2. In a population of 20,037,382 persons who likely had health insurance coverage for treatment associated with gender dysphoria, I identified 8200 persons, or 0.041% of the population, who had healthcare claims for treatments associated with gender dysphoria.
3. These real world data show a wide range of costs associated with gender dysphoria treatments among patients—from $0 to $311,000. The average cost of treatment per patient with gender dysphoria-related treatment is $2,974. Using the same data, the average real world costs for persons who undergo gender reassignment surgery is $21,302.
4. Because the real world data is only recently available and is limited to one year's claims experience, I blended the results with the cost information from Segal's January 23, 2017, report to Lisa Ellinger of the Wisconsin Department of Employee Trust Funds to arrive at an average cost per individual for individuals who had gender dysphoria-related surgical treatment to be $35,000.
5. Given the relatively small proportion of members obtaining gender dysphoria treatments in the 2016 dataset and the widely varied costs associated with those treatments, I would expect volatile pricing for gender reassignment benefits from year to year. Therefore, it is fiscally prudent to add a risk margin to the final calculated benefit to account for the volatility in expected cost.
6. In my professional opinion, adding a risk margin of 50% for both the expected utilization of services and the average cost per person would be a reasonable way to price this risk margin. This results in total expected yearly cost of roughly $301,600 and a per-member per-month ("PMPM") cost of $0.15.

Group Benefit Pricing Approach

Insurers typically price health plan benefits using historical data that includes an insured population and their historical medical claims. Health plans calculate the expected premium they charge to fully insured employers using these basic steps. Self-insured employers follow a similar process when setting budgets for health care benefit expenditures. In the absence of historical claims data, other published sources are sought.

Regardless of who takes the risk, new health plan benefits impose a cost that the employer pays, either through an increased premium that reflects the health plans' increased claims risk (for fully-insured employers) or through medical claims expenses directly imposed on the employer (for self-insured employers).

The following steps are used to estimate the cost of a benefit[1]:

1. Define the benefit by stating what services can be included and what services are excluded.
2. Gather enrollment data, also known as exposure data. This would be the number of covered employees and their dependents for an employer.
3. Calculate the average cost of the benefit, per patient, using historical base claim data for the covered services.
4. Estimate the number of the relevant healthcare services using a) how many individuals have the medical disorder at issue (here, gender dysphoria); b) how many of these individuals might seek covered treatments (here, procedures, services, and supplies related to surgery and sex hormones associated with gender reassignment); and c) for individuals who seek that treatment, the average cost of the treatment.
5. Add a reasonable risk margin based on uncertainties associated with the number of members who will seek the relevant treatments and the expected costs of those treatments.

Define the Benefit

The 2017 and 2018 Uniform Benefits for Wisconsin state employees who receive health care coverage through their employment with the State contains the following coverage exclusion (hereafter, the "Exclusion"):

> "Surgical Services: Procedures, services, and supplies related to surgery and sex hormones associated with gender reassignment."

I used a broad definition of gender reassignment surgery for this analysis that includes individuals with a diagnosis of gender dysphoria and services that may be related to gender reassignment surgery, both in preparation for surgery or post-surgical treatment. The following

[1] For a more detailed description, see Group Insurance Chapter 33.

describes the basis for identifying, in the historical medical claims database[2] used here, individuals who submitted relevant claims.

Because the medical claims database used in this analysis contains claims associated with specific procedures, services, and supplies, I must determine which procedures, services, and supplies fall under the coverage exclusion described above. To do so, I reviewed benefit descriptions and medical policies for several health plans including:

- WPS Health Insurance Medical Affairs Policy. Service: Treatment of Gender Dysphoria. PUM 250-0039-1706. Medical Policy Committee approval 06/16/17; Effective Date: 08/21/17; Prior Authorization Needed: Yes.
- Blue Cross Blue Shield of Massachusetts: Medical Policy Transgender Services; Policy Number 189 updated effective 12/2017.
- Dean HealthPlan: Sex transformation Surgery (market-based) MP9465; October 31, 2016 Published/Effective 01/01/2017.
- Dean HealthPlan: Sex Transformation Surgery (standard) MP9469; Originated October 31, 2016; Revised April 19, 2017; Published/Effective 05/01/2017.

I used the Blue Cross Blue Shield of Massachusetts ("BCBSMA") Medical Policy for selecting specific services related to surgery. The BCBSMA policy includes the most specific coding for gender reassignment surgical services of the policies I reviewed and it is consistent in its general descriptions with the WPS and Dean medical policy descriptions. The procedures listed on BCBSMA medical policy refer to those items that are subject to prior authorization, and when billed, the claim must include a diagnosis code associated with gender dysphoria.[3]

But the BCBSMA medical policy also indicates that other coded procedures may also relate to gender dysphoria treatments; when referring to the listed gender dysphoria codes, it states that "[t]he following codes are included below for information purposes only; this is not an all - inclusive list." Likewise, the WPS medical policy states:

> "Unless otherwise specified in the health plan, if a plan covers treatment for gender dysphoria, medically necessary services may include diagnostic evaluation, assessment, and treatment planning; psychotherapy; cross-sex hormone therapy; puberty suppressing medications; laboratory testing to monitor the safety of hormone therapy; and certain surgical treatments as listed in the Indications of Coverage section below, the Omnibus Pharmacy Policy for Treatments Reviewed by Medical Affairs, and Specialty Drug guidelines (Diplomat)"

To capture all surgically related services as described in these medical policies, including those not specified with lists of procedure codes, I have 1) created a "surgical bundle", and 2) listed other related services in the 'other' category.

As for the first described method, the combination of surgical procedures listed in the policy and the associated medically necessary services may be combined to form a surgical bundle. For purposes of this report, I define a surgical bundle as all related services incurred 7 days prior to

[2] 2016 Truven Health MarketScan® Publication and Trademark Guidelines, commercial database. These data contain inpatient, outpatient and pharmacy claims and enrollment from large U.S. employers and health plans. (Hereafter, the "Database.")

[3] These codes include ICD-10 codes F64.0 – F64.9 (DSM-5 codes 302.6 and 302.85).

the surgical procedure and 60 days after the medical procedure. CMS uses a similar method to calculate costs associated with a surgical procedure.[4]

As for the second described method, the "other" category includes services such as lab tests and office visits related to the surgical procedures and treatment for hormonal therapy. This category also captures surgical procedures not otherwise specifically listed in the BCBSMA medial policy.

The Exclusion also specifically applies to "sex hormones associated with gender reassignment."[5] I identify hormone therapy related to gender reassignment surgery by first identifying individuals with a gender dysphoria diagnosis, and then querying the pharmacy table for their associated prescriptions of the following therapeutic classes[6] of drugs:[7]

- 165: Hormones and Synthetics Substitutes. NEC.
- 167: Androgens and Combinations. NEC
- 170: Estrogens and Combinations. NEC
- 177: Progestins, NEC
- 246: Goandotrop Related Hormone Antagonist
- 262: Hormone-Modifying Therapy

Gather Enrollment, or Exposure Data

The Database was queried to find 8,200 de-identified individuals with a gender dysphoria diagnosis, to which I will refer to as the "Study Population."

The next step is to determine the total members covered by relevant group health insurance plans that provide the defined benefit at issue. Because this analysis is meant to calculate the cost incurred by group health insurance plans that cover procedures, services, and supplies related to surgery and sex hormones associated with gender reassignment, members of plans that do not cover these treatments should be excluded from the total member population. Some individuals in the Database were presumably covered by plans that do not provide benefits for these treatments. However, the Database does not identify how many, if any, of the health plans or large employers exclude these benefits from their plan.

Therefore, I assume that if an individual's claim was paid that included a gender dysphoria diagnosis, then that individual was covered by a plan that provides benefits for gender dysphoria treatments. Using a data field that allows me to calculate the number of all members of plans that presumably provide these benefits, I summed the enrollment for plans that included at least one individual in the Study Population; this resulted in a total population of 20,037,382.

[4] *Available at* https://innovation.cms.gov/initiatives/Bundled-Payments/learning-area.html (last accessed April 19, 2018).

[5] I understand, however, that the Exclusion is not applied to claims for sex hormones when those hormones are not associated with gender reassignment surgery.

[6] Based on the AHFS Pharmacologic-Therapeutic Classification System as supplied by MarketScan.

[7] These correspond to the WPATH regimens at pp. 47-50.

The percentage of individuals who were identified in The Database as having sought medical treatment and having a diagnosis related to gender dysphoria is then:

8,200 / 20,037,382 = 0.041%

The Study Population ages range from 8 to 65 with a median of 23 and an average of 36.8.

29% of individuals in The Study Population were under age 18.

Estimate Average Cost

Costs described here are the amounts allowed by contract between insurers and providers. I have included inpatient costs, outpatient costs and pharmacy costs in this estimate.

Selecting all 8,200 members with a gender dysphoria diagnosis yields a average cost of $2,974 per member with a gender dysphoria diagnosis and a median of $527; actual per-member costs for those with gender dysphoria range from $0.00 to $311,000.

TABLE 1A[8]
SUMMARY OF COSTS OF STANDARD POPULATION BY CATEGORY

	Individuals	Total Cost	Cost per Person
Counseling	4,519	$ 7,836,633	$ 1,734
Hormone Therapy	4,489	$ 2,947,095	$ 657
Reassignment Surgery	469	$ 7,257,523	$ 15,474
Other	6,973	$ 6,349,588	$ 911
Total	8,200	$ 24,390,839	$ 2,974

The resulting PMPM cost is calculated as the percentage of the population who are likely to receive health care services times the average cost of the service provided divided by twelve months, or 8,200/20,037,282 x $2,974 / 12 = $0.10

The data lacks sufficient detail to determine which patients who have had counseling and hormone therapy are planning to or have had gender reassignment surgical procedures. I understand that counseling and hormone therapy would be covered under the Uniform Benefits at issue, if those services are unrelated to gender reassignment surgery. To address this uncertainty, table 1B isolates services for patients who are known to have had a surgical procedure.

[8] Note that individuals may fall into several categories of services.

TABLE 1B
SUMMARY OF COSTS FOR SURGICAL PATIENTS

	Individuals	Total Cost	Average Cost
Counseling	259	$ 424,909	$ 1,641
Hormone Therapy	417	$ 229,705	$ 551
Reassignment Surgery	469	$ 7,318,440	$ 15,604
Other	458	$ 2,017,564	$ 4,405
Total	469	$ 9,990,618	$ 21,302

The resulting PMPM (per member per month) cost is calculated as the percentage of the population who are likely to receive health care services times the average cost of the service provided divided by twelve months, or 469/20,037,282 x 21,302/12 = $0.04

As discussed further below, the "true" PMPM figure based on this data is somewhere between $0.04 and $0.10, since each set of calculations does not precisely track the coverage exclusion at issue.

The distribution of costs for surgical patients is as follows:

TABLE 1C
RANGE OF CLAIMS COSTS FOR SURGICAL PATIENTS
WITH A DIAGNOSIS OF GENDER DYSPHORIA/ GID

Cost Range	Percent of Individuals	Percent of Dollars
$ 250	2.3%	0.0%
$ 1,000	7.0%	0.2%
$ 2,500	9.2%	0.7%
$ 5,000	11.5%	2.0%
$ 15,000	29.0%	13.8%
$ 30,000	24.1%	24.4%
$ 75,000	11.3%	24.8%
$ 150,000	4.3%	21.7%
$ 300,000	1.1%	9.2%
$ 500,000	0.2%	3.1%

Further details regarding details of surgical costs and the age of the study population are provided in Tables 2 and 3, below.

TABLE 2
SUMMARY SURGICAL PROCEDURE DETAILS

Surgical Procedure Details	Individuals	Total Costs
MTF	119	$ 930,822
FTM	349	$ 2,797,955
Both	123	$ 478,604
Face	19	$ 238,436
Other	26	$ 114,239
Additional 'Bundled' Services		$ 1,542,811
Facility Costs when Inpatient	39	$ 1,154,655

TABLE 3
SUMMARY OF STUDY POPULATION BY AGE

Age	Pct of Individuals
<18	29%
18-40	56%
40-65	16%

Estimate the Number of Expected Services

My review of prior studies of gender dysphoria prevalence and expected benefit utilization showed wide differences. These differences combine to produce uncertainty when attempting to calculate the expected healthcare costs for gender reassignment surgery and related services. Below I review prior studies to demonstrate the nature of the uncertainty.

SELF-REPORTING SURVEYS

The Centers for Disease Control and Prevention (CDC) 2014 Behavioral Risk Factor Surveillance System (BRFSS) estimated a prevalence rate of 0.6% as of 2011. The survey asked respondents whether they considered themselves to be transgender, and if yes, whether male-to-female, female-to-male, or gender nonconforming. This estimate was about twice that of a prior estimate of 0.3% from similar 2011 survey.

The DSM-5 manual describes the prevalence of gender dysphoria as follows:

- Natal adult males: 0.005% to 0.014%
- Natal adult females: 0.002% to 0.003%

The DSM-5 also opines that, “since not all adults seeking hormone treatment and surgical reassignment attend specialty clinics, these rates are likely modest underestimates.”[9]

[9] DSM Manual at p. 454.

Zuker (2017) pointed out the inaccuracies of self-reported studies to determine incidence of gender dysphoria. He states:

> The "recent studies suggest that the prevalence of a self-reported transgender identity in children, adolescents and adults ranges from 0 to 1.3%, markedly higher than prevalence rates based on clinic-referred samples of adults. The stability of a self-reported transgender identity or a gender identity that departs from the traditional male-female binary among non-clinic based populations remains unknown and requires further study."

Identifying as gender dysmorphic does not necessarily mean the individual will seek related healthcare services or undergo gender transformation. Olyslager and Conway (2007) provide a useful framework to understand data available in claims based data sources:

P(TS) = the prevalence of transsexualism
P(SH) = the prevalence of transsexual people who have sought help from a healthcare provider
P(HT) = the prevalence of those on hormone therapy
P(ST) = the prevalence of those who have socially transitioned, and
P(SRS) = the prevalence of those who have undergone gender (sex) reassignment surgery

P(TS) > P(SH) > P(HT) > P(ST) > P(SRS)[10].

A retrospective claims based data analysis for pricing will include individuals who have sought help from a healthcare provider (P(SH)), who are on hormone therapy (P(HT)), and who have undergone gender reassignment surgery (P(SRS)). The data will not identify individuals who have socially transitioned (P(ST)) but not sought help from a healthcare provider nor will it identify individuals who may identify as transgender or nongender conforming but have not sought help from a healthcare provider.

It should also be noted that the epidemiology definitions of prevalence and incidence may not be accurately reflected in a retrospective claims dataset consisting of one year's of incurred claims. There may be individuals who identify as transgender or nongender conforming who are included in the enrollment data who have not sought care from a healthcare provider as part of their health benefit.

CLAIMS BASED ANALYSIS

Naugle (2015) searched a 2012 medical claims dataset which found 0.004% of members had an insurance claim related to gender dysphoria. This analysis likely underestimates the true rate of gender dysphoria-related claims. In recent years many health plans and employers have begun to remove exclusions for gender reassignment benefits, which prompts another look at using health insurance claims data as a reliable source for estimating claims costs.

My analysis presents a more accurate picture of the true rate of gender dysphoria-related claims. This is because the Database used for this study represents an early look at the expected utilization of procedures, services, and supplies related to surgery and hormone therapy associated with gender reassignment and represents the first full year ICD-10

[10] The authors point out that these ratios will be factors of many local conditions.

diagnosis codes are used after being first implemented in October 2015. Again, as calculated above, the 2016 medical claims dataset found 0.041% of members had an insurance claim with a diagnosis of gender dysphoria.

While the annual utilization figure found in The Database remains lower than the prevalence rates from the self-reported sources discussed above, the 0.041% utilization rate comes closer to describing the expected medical utilization for gender reassignment benefits than self-reported prevalence studies.

However, as discussed further below, recent movement to remove gender reassignment benefit exclusions and the relatively low prevalence of gender dysphoria, suggests continued caution when applying utilization estimates for pricing purposes. Accordingly, considerations for addressing the risk of underestimating the utilization rate are discussed below as a potential adjustment to the PMPM figures calculated above.

JANUARY 23, 2017, SEGAL REPORT FROM KIRSTEN R. SCHATTEN, ASA AND KENNETH C. VIEIRA, FSA TO LISA ELLINGER RE: TRANSGENDER COST ESTIMATE

Schatten and Viera state that there is a lack of information and data to provide specific information on estimated cost to the Plan. Schatten and Viera provide an estimated PMPM cost range of $0.05 to $0.13. The pricing formula and approach used in this report[11] is consistent with pricing principles.

However, there is no mention of the definition of the benefit or any adverse outcomes or comorbidities that may be associated with the procedures. The latter omission could cause the Segal report to underestimate the true costs of providing coverage for gender reassignment surgery.

Summary & Risk Margin Discussion

As stated above, the expected utilization rate for surgical procedures, services and supplies related to surgery and hormone therapy associated with gender reassignment is a relatively small fraction of the total insured population. Additionally, there is a wide variance per individual cost (see table 1C). In an insured population of 167,543, the estimated number of individuals who obtain the more expensive gender reassignment surgery is between 3-4 individuals—although this estimate may vary from year to year.

From the summary above, the expected number of individuals obtaining gender dysphoria-related treatment in a population of roughly 167,500 would be:

[11] I independently calculated a PMPM of $0.084 using the information available in the report.

TABLE 5
EXPECTED NUMBER OF GENDER DYSPHORIC INDIVIDUALS OBTAINING CARE IN A POPULATION OF 167,500

36	Counseling
36	Hormone Therapy
4	Reassignment Surgery
55	Other
65	Total

Individuals have complex health care needs and recommended treatment approaches and health care delivery will vary depending on patient complexity and preferences. Moreover, individuals may experience unforeseen complications resulting from gender reassignment procedures; any resulting complications will add to the costs of care for these particular patients.

Based on the claims analysis presented above, I observed that the expected average cost was for all individuals with a gender dysphoria diagnosis was $2,974 with ranges from $0.00 to $311,000 and a median of $527. The average cost for those who underwent gender reassignment surgery was $21,302 per individual.

The implication of this wide range of average costs is that the expected total costs for a population of around 167,500 is highly variable. Considering the range of costs, it is plausible that in any given year, ETF and participating health plans could experience an adverse year of claims experience with more individuals seeking surgery than predicted who have higher than average surgical costs. Likewise, it would only take one individual with a catastrophic claim to significantly raise average and total costs.

Some of the reasons for this variability include:

1) Variability in the level of reconstruction: FTM surgical procedures may include mastectomy, male chest construction, hysterectomy and oophorectomy (removal of ovaries), urethraplasty, vaginectomy, scrotoplasty, and/or implantation of prostheses. MTF surgical procedures may include breast autmentation, penectomy, orchiectomy, vaginplasty, clitoraplasty, and vulvoplasty. These procedures may be one in combination (in one surgical episode) or individually over time, and may or may not include the full suite of possible reconstructions.
2) Complications: These procedures are not risk free and could result in complications related to surgery or treatment that require further expensive treatment.
3) Location: Procedures performed in an ambulatory care setting or surgical center are less expensive than done in an inpatient setting.

For example, it is possible that, in a given year in ETF's population of around 167,500, eight individuals might submit claims for gender reassignment surgery (rather than three to four) at an average cost of $100,000 (rather than the calculated average cost of around $21,000). This would result in a total cost of $800,000 in claims, a six fold increase from the average calculated above. In my professional experience, this would not be an unusual variance, and it therefore it must be acknowledged when pricing the benefit at issue.

I calculated above a range of PMPM costs from $0.04 to $0.10 using medical claims data from 2016, depending on the scope of services counted in the calculation. Based on these

calculations, I expect the value to be in-between $0.04 and $0.10 and therefore I use a midpoint of $0.07.

The PMPM calculated above is $0.07. $0.07 x 167,543 x 12 = $140,736 of expected cost to the Employee Trust Fund which is .01% of total premium based on Segal's report that the Wisconsin Department of Employee Trust Funds expended $1.3 billion of non-Medicare premiums for 2017.

I observed that the average cost from the Database of those undergoing surgery of $21,302 is lower than the values presented in the Segal study which were $41,600 for MTF surgeries and $64,200 for FTM surgeries.

Confident use of medical claims data for benefit pricing presumes several years of available data. Given that 2016 is the first year that a medical claims database contains sufficient claims for pricing gender reassignment benefits, it is prudent to blend it with other available data such as the pricing sources used in the Segal report.

I blend the average cost from the Database, $21,302, with the weighted average[12] of Segal's cost estimates (0.66 x 41,600 + 0.34 x 64200 = $49,284) by rounding the midpoint to the nearest thousand to obtain a blended cost estimate of $35,000 for gender reassignment surgery and related services and supplies resulting in a PMPM of $0.07.

In my professional opinion and given all the factors discussed in this section, adding a risk margin of 50% for both the expected utilization of services and the average cost per person would be a reasonable way to price a risk margin for these services.

The resulting PMPM would be $0.15 ($35,000 x 1.5 x .0023%[13] x 1.5 / 12). The expected yearly cost to ETF and participating health plans with this added contingency would be $0.15 x 12 x 167,543 = $301,577.

This approach would cover most contingencies of high claim costs associated with a gender reassignment benefit, but it would result in excess revenue during an average or below average utilization year. The risk margin would be reviewed and adjusted annually based on the financial position of the plan at the time and additional, future claims data.

Other Considerations

The 2016 study population from the Database used for my analysis has the following limitations:

1. It is possible there was pent up demand, meaning individuals who had not previously had access to transgender benefits through their employer decides to undergo transgender transformation with the first year of the exclusion removal. This would suggest a spike in utilization that would subside over time.

[12] 34% of the individuals who had surgery in the Database were male.
[13] 469 / 20,0323,282

2. The treatment period is limited to one year, whereas treatment for gender reassignment surgery, including counseling and hormone treatment may be on-going. Therefore long term costs are not yet understood through the claims data.
3. If considering claims costs for surgical bundles that span 60 days, the annual costs and accompanying prevalence are limited to ten months from the first date of the procedure.

Review of other estimates

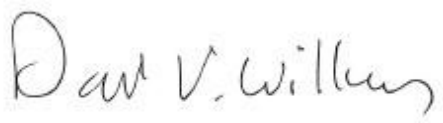
EXPERT WITNESS REPORT OF STEPHANIE BUDGE, PH.D.

I reviewed the Cost of Transition-Related Care section in the Expert Witness Report of Stephanie Budge, Ph.D. found on page 22. The report relies on a cost effectiveness study for insurance companies to cover transition-related care. Padula, et al. (2016). The statistical analysis performed in the Padula study was a Quality of Life Year Cost-Effectiveness analysis using a Markov model based on a transgender discrimination survey, standard utility scores, and costs from disparate sources over different time periods.

These types of studies are not used in the actuarial sciences for benefit pricing purposes. They lack sufficiently detailed information to match the costs with the associated benefit descriptions for a specific time period.

The measured outcome in the Padula study is a Quality Adjusted Life Year at 5 year and 10 year horizons, which are too far out for benefit pricing purposes. The estimated costs are derived from an ad hoc survey[14], and procedures were weighted in an undisclosed fashion by procedure prevalence[15] with a publication reference of 2007. Inputs with attached costs also include measures not included in standard health benefits including cost utilities for items such as job loss, depression, and attempted suicide. None of these study design elements would be used in a current pricing of medical benefits.

Respectfully Submitted



David V. Williams

Date: 19 April 2018

[14] Padula, et al. (2016) at p.100.
[15] Paudla, et al. (2016) at p. 96.

Bibliography

American Psychiatric Association. Diagnostic and statistical manual of mental disorders (5th Edition). Washington DC; American Psychiatric Association; 2013

Bernstein, GR., Brandel, SS.. Chapter 33: Estimating Medical Claims Costs. Group Insurance. Skwire DD. Principal Editor. ACTEX Publications, New Hartford, CT. 2016

Grant, Jaime M., Lisa A. Mottet, Justin Tanis, Jack Harrison, Jody L. Herman, and Mara Keisling. Injustice at Every Turn: A Report of the National Transgender.Discrimination Survey. Washington: National Center for Transgender Equality and National Gay and Lesbian Task Force, 2011.

Naugle AL. Phillip S. Transgender healthcare coverage: Prevalence, recent trends, and considerations for payers. Milliman Insight, 2016

Padula, WV. Heru, S., Campbell, JD. Societal Implications of Health Insurance coverage for Medically Necessary Services in the U.S. Transgender Population: A Cost-Effectiveness Analysis. J Gen Intern Med 31(4): 394-401; doi: 10.1007/s11606-015-3529-6. 2015.

Olyslager, F., Conway L., On the Calculation of Prevalence of Transsexualism. Presented at WPATH 20th International Symposium, Chicago, IL. September 5-8, 2007.

Schatten, KR., Vieira, KC., Transgender Cost Estimate. Letter to Lisa Ellinger. January 23, 2017

Standards of Care for the Health of Transsexual, Transgender, and Gender nonconforming People. The World Professional Association for Transgender Health. 7th Edition. 2011.

Stephanie Budge, PhD. Expert Witness Report. 2/19/2018

Zuker, ZJ., Epidemiology of gender dysphoria and transgender identify, Sexual Health 2017; 14, 404-411. doi: 10.1071/SHI7067.

Exhibit A

CURRICULUM VITA

David Williams
Senior Healthcare Consultant

Milliman Inc.
80 Lamberton, Road
Windsor, CT 06095
860-687-0120 / 860-882-3700
david.williams@milliman.com

WORK HISTORY AND EXPERIENCE

Milliman, Windsor, CT
Senior Healthcare Consultant (1999 – present)

- Consultant to medical device manufacturers seeking economic studies in support of FDA approval, pricing, and market potential. Ongoing
- Lead hospital contracting support for health plans. Ongoing
- Expert witness for UCR related medical billing disputes. Ongoing
- Consultant for risk bearing provider organizations and accountable care organizations. Ongoing
- Lead consultant for State of Connecticut employee benefits managing $1.4 billion in medical claims.2006-2015
- Creator of CTHEP.COM, an employee internet portal that captures employee adherence to an innovative Value Based Insurance Design (VBI-D), 2012
- Developer of physician payment system for automobile related claims, 2009
- Project Manager GASBHelp.com, a sophisticated on-line reporting system to meet phase III GASB 45 requirements. 2008
- Office technology committee chair and HIPAA compliance officer.

MedSpan, Inc. Hartford CT
Director, Quality Management/Risk Share Arrangements (1994 – 1999)

- Executed and managed Medicare risk share agreements with ten physician hospital organizations.
- Responsible for Total Quality Management that resulted in NCQA accreditation. This was NCQA's first Physician Hospital Organization accreditation.
- Built a network of 23 hospitals with over 5,500 physicians for a newly created Health Maintenance Organization.
- Researched and implemented clinical guidelines and utilization management policies and procedures

Kaiser Permanente
Director, Medical Economics, Southern California and Northeast Regions, (1987-1994)

EDUCATION

BA, Economics – Brigham Young University, Provo, UT
Masters courses, Managerial Economics; quantitative emphasis, BYU, Provo, UT
Database Administration: Microsoft Professional Development Course
Master Classes, Data Mining – Central Connecticut State University, on-line
Master Classes, Public Health – UMASS, Amherst, on-line
Predictive Modeling and Data Science using R – Coursera

PROFESSIONAL PUBLICATIONS

Expert Report: Lyndsey Parks plaintiff vs. USAA and Auto Injury Solutions (AIS) defendants. 2013

Negative-Pressure Wound Therapy and Diabetic Foot Amputations: A retrospective study of Payer Claims Data. Journal of the American Podiatric Medical Association, Sept/Oct 2007. P. 351

Demystifying the Medical Underwriting Cycle. Kaiser Foundation, 1990, unpublished manuscript.

SPEAKING ENGAGEMENTS

2018 MassMedic: Using Real World Data for Medical Device FDA Approval
2017 Milliman Forum: Tiered Network Analysis
2017 Milliman Forum: Advances and ROI in Wellness Programs and Wearables
2013 Milliman Forum: Big Data
2013 Milliman Forum: Value Based Insurance Design
2013 Milliman Forum: Advances in Wellness Programs
2012 Causality Actuarial Society Issues in Auto Injury Medical Reimbursement
2012 Milliman Forum: Value Based Insurance Design at the State of Connecticut
2010 Milliman Forum: Innovations in Physician Fee Schedules
2009 Milliman Forum: Wellness Programs
2005 Milliman Forum: Milliman Data Sources
2005 Florida HMO Association: Data Warehouse Basics
2005 KCI National Sales Conference: The Economic Value of the V.A.C. System
2004 National Pressure Ulcer Conference: Comorbid Conditions in Pressure Ulcers
2004 ISPOR: Avoiding Amputations using the V.A.C. System
2004 Milliman Forum: Milliman Data Sources
2002 Society of Actuaries: Advances in Data Warehousing
2002 Milliman Forum: Medical Device Economic Modeling
2001 Society of Actuaries: Issues in Healthcare Data Quality
2001 Milliman Forum: Auditing Using Claims Data
2000 Milliman Forum: Medical Data Warehousing
1995 New England HEDIS Coalition: Issues in HEDIS Reporting

ASSOCIATIONS AND VOLUNTEER WORK

Board of Directors: Farmington Valley Symphony Orchestra
Friends of Music, Farmington Connecticut School District
International Society for Pharmacoeconomics and Outcomes Research (ISPOR)
MassMedic

LANGUAGES

Chinese Cantonese– conversationally fluent
Chinese Mandarin – early intermediate level

Exhibit B

Medical Affairs Policy

Service: Treatment of Gender Dysphoria
PUM 250-0039-1706

Medical Policy Committee Approval	06/16/17
Effective Date	08/21/17
Prior Authorization Needed	Yes

Disclaimer: This policy is for informational purposes only and does not constitute medical advice, plan authorization, an explanation of benefits, or a guarantee of payment. Benefit plans vary in coverage and some plans may not provide coverage for all services listed in this policy. Coverage decisions are subject to all terms and conditions of the applicable benefit plan, including specific exclusions and limitations, and to applicable state and federal law. Some benefit plans administered by the organization may not utilize Medical Affairs medical policy in all their coverage determinations. Contact customer services as listed on the member card for specific plan, benefit, and network status information.

Medical policies are based on constantly changing medical science and are reviewed annually and subject to change. The organization uses tools developed by third parties, such as the evidence-based clinical guidelines developed by MCG to assist in administering health benefits. This medical policy and MCG guidelines are intended to be used in conjunction with the independent professional medical judgment of a qualified health care provider. To obtain additional information about MCG, email medical.policies@wpsic.com.

Description:

Gender dysphoria is a condition in which there is a marked incongruence (discrepancy) between an individual's experienced/expressed gender and the assigned gender (biologic sex assigned at birth) and the associated gender role and/or primary and secondary sex characteristics.

Unless otherwise specified in the health plan, if a plan covers treatment for gender dysphoria, medically necessary services may include diagnostic evaluation, assessment, and treatment planning; psychotherapy; cross-sex hormone therapy; puberty suppressing medications; laboratory testing to monitor the safety of hormone therapy; and certain surgical treatments as listed in the Indications of Coverage section below, the Omnibus Pharmacy Policy for Treatments Reviewed by Medical Affairs, and Specialty Drug guidelines (Diplomat).

This policy is based on the World Professional Association for Transgender Health (WPATH) Standards of Care for the Health of Transsexual, Transgender, and Gender Nonconforming People, 7th version, Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5), American Psychiatric Association recommendations as well as other evidence based publications.

WPATH describes the transition from one gender to another in three stages:

1. Living in the gender role consistent with gender identity
2. The use of cross-sex hormone therapy after living in the new gender role for a least three months

3. Gender-affirmation surgery after living in the new gender role and using hormonal therapy for at least 12 months.

Clinical evidence for many of these services is limited and lacks long term safety data. Statistically robust randomized controlled trials are needed to address benefits versus clinical risks and long-term health outcomes. Expert consensus recommendations include that diagnosis be made by mental health professionals and that care is coordinated between the behavioral health professional, endocrinologists, and experienced surgeons.

This medical policy does not apply to individuals with ambiguous genitalia or disorders of sexual development, unless there is concurrent / concomitant diagnosed gender dysphoria.

Indications of Coverage:

When criteria below are met, the following gender reassignment surgical procedures may be considered medically necessary:

Note: In the absence of health plan limits, more than one gender transformation reassignment (which may include several staged surgeries) per lifetime will be considered experimental investigational and unproven

Female-to-Male (FtM)

1. Bilateral mastectomy or breast reduction
2. Hysterectomy (removal of uterus)
3. Metoidioplasty (creation of penis, using clitoris)
4. Penile prosthesis
5. Phalloplasty (creation of penis)
6. Salpingo-oophorectomy (removal of fallopian tubes and ovaries)
7. Scrotoplasty (creation of scrotum)
8. Testicular prostheses
9. Urethroplasty (reconstruction of male urethra)
10. Vaginectomy (removal of vagina)
11. Vulvectomy (removal of vulva)

12. Bilateral mastectomy or breast reduction may be done as a stand-alone procedure, without having genital reconstruction procedures. In those cases, the individual does not need to complete hormone therapy prior to procedure.

Male-to-Female (MtF)

1. Clitoroplasty (creation of clitoris)
2. Labiaplasty (creation of labia)
3. Orchiectomy (removal of testicles)
4. Penectomy (removal of penis)
5. Urethroplasty (reconstruction of female urethra)
6. Vaginoplasty (creation of vagina)

A. Mastectomy for Female-to-Male (FtM) Patients

1. Single letter of referral from a qualified mental health professional; **and**
2. Persistent, well-documented gender dysphoria; **and**
3. Capacity to make a fully informed decision and to consent for treatment; **and**
4. Age of majority (18 years of age or older); **and**
5. If significant medical or mental health concerns are present, they must be reasonably well controlled

➢ Note: A trial of hormone therapy is not a pre-requisite to qualifying for a mastectomy

B. Requirements for gonadectomy (hysterectomy and oophorectomy in female-to-male and orchiectomy in male-to-female)

1. Two referral letters from qualified mental health professionals, one in a purely evaluative role; **and**
2. Persistent, well-documented gender dysphoria; **and**
3. Capacity to make a fully informed decision and to consent for treatment; **and**
4. Age of majority (18 years or older); **and**

5. If significant medical or mental health concerns are present, they must be reasonably well controlled; **and**

6. Twelve months of continuous hormone therapy as appropriate to the member's gender goals (unless the member has a medical contraindication or is otherwise unable or unwilling to take hormones)

C. Genital reconstructive surgery

1. Two referral letters from qualified mental health professionals, one in a purely evaluative role; **and**

2. Persistent, well-documented gender dysphoria; **and**

3. Capacity to make a fully informed decision and to consent for treatment; **and**

4. Age of majority (age 18 years and older); **and**

5. If significant medical or mental health concerns are present, they must be reasonably well controlled; **and**

6. Twelve months of continuous hormone therapy as appropriate to the member's gender goals (unless the member has a medical contraindication or is otherwise unable or unwilling to take hormones); **and**

7. Twelve months of living in a gender role that is congruent with their gender identity (real life experience)

- Note: Blepharoplasty, body contouring (liposuction of the waist), breast enlargement procedures such as augmentation mammoplasty and implants, face-lifting, facial bone reduction, feminization of torso, hair removal, lip enhancement, reduction thyroid chondroplasty, rhinoplasty, skin resurfacing (dermabrasion, chemical peel), and voice modification surgery (laryngoplasty, cricothyroid approximation or shortening of the vocal cords), which have been used in feminization, are considered cosmetic. Similarly, chin implants, lip reduction, masculinization of torso, and nose implants, which have been used to assist masculinization, are considered cosmetic.

*****Requirements for a Qualified Mental Health Professional:

1. Master's degree or equivalent in a clinical behavioral science field granted by an institution accredited by the appropriate national accrediting board. The professional should also have documented credentials from the relevant licensing board or equivalent; **and**

2. Competence in using the Diagnostic Statistical Manual of Mental Disorders and/or the International Classification of Disease for diagnostic purposes; **and**

3. Ability to recognize and diagnose co-existing mental health concerns and to distinguish these from gender dysphoria; **and**

4. Knowledgeable about gender nonconforming identities and expressions; and the assessment and treatment of gender dysphoria; **and**

5. 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.

Limitations of Coverage:

A. Review health plan and endorsements for exclusions and prior authorization or benefit requirements.

B. If used for a condition/diagnosis other than is listed in the Indications of Coverage, deny as experimental, investigational, and unproven to affect health outcomes.

C. If used for a condition/diagnosis that is listed in the Indications of Coverage, but the criteria are not met, deny as not medically necessary.

D. **Certain ancillary procedures, including but not limited to the following, are exclusions of the health plan for all individuals or are considered cosmetic, when performed as part of gender reassignment**:

1. Abdominoplasty
2. Blepharoplasty
3. Body contouring (e.g., fat transfer, lipoplasty, panniculectomy)
4. Breast enlargement, including augmentation mammaplasty and breast implants
5. Brow lift
6. Calf implants
7. Cheek, chin and nose implants
8. Injection of fillers or neurotoxins

9. Face/forehead lift and/or neck tightening
10. Facial bone remodeling for facial feminization
11. Hair removal (e.g., electrolysis or laser)
12. Hair transplantation
13. Lip augmentation
14. Lip reduction
15. Liposuction (suction-assisted lipectomy)
16. Mastopexy
17. Pectoral implants for chest masculinization
18. Reproductive services including, but not limited to, sperm or oocyte preservation, cryopreservation of fertilized embryos
19. Reversal of genital surgery or reversal of surgery to revise secondary sexual characteristics
20. Rhinoplasty
21. Skin resurfacing (e.g., dermabrasion, chemical peels, laser)
22. Thyroid cartilage reduction/reduction thyroid chondroplasty/trachea shave (removal or reduction of the Adam's apple)
23. Voice modification surgery (e.g. laryngoplasty, glottoplasty or shortening of the vocal cords)
24. Voice lessons and voice therapy

Documentation Required:

- Referral letters from a qualified mental health professional as described in the indications containing all of the following:

1. Client's general identifying characteristics (include pertinent clinical information such as preferred gender pronoun); **and**
2. Results of the client's psychosocial assessment, including any diagnoses; **and**

3. The duration of the mental health professional's relationship with the client, including the type of evaluation and therapy or counseling to date; **and**

4. An explanation that the WPATH criteria for surgery have been met, and a brief description of the clinical rationale for supporting the patient's request for surgery; **and**

5. A statement about the fact that informed consent has been obtained from the patient; **and**

6. A statement that the mental health professional is available for coordination of care and how contact can be made

- Medication Records

- Laboratory records if indicated

References:

1. Markwick L. Male, Female, Other: Transgender and the Impact in Primary Care. The Journal for Nurse Practitioners Vol 12, Issue 5, May 2016.

2. Hayes MTD Sex reassignment for the Treatment of gender Dysphoria. Publication Date May 15, 2014. Annual Review April 12, 2016.

3. Hayes MTD Hormone Therapy for the Treatment of Gender Dysphoria. Publication Date May 19, 2014. Annual Review April 15, 2016.

4. Hayes MTD Ancillary Procedures and Services for the Treatment of Gender Dysphoria. Publication Date May 9, 2014. Annual Review April 12, 2016.

5. World Professional Association for Transgender Health (WPATH): 2012 WPATH Standards of care for the health of transsexual, transgender, and gender nonconforming people, version 7

6. MCG 21st ed. ORG: B-010-IOP (BHG). Other Psychiatric disorders: Intensive Outpatient Program.

7. MCG 21st ed. ORG: B-010-RES (BHG). Other Psychiatric disorders: Residential Care.

WPS/Arise Review History:

Implemented	08/21/17
Medical Policy Committee Approval	06/16/17
Reviewed	
Revised	
Developed	06/16/17

Approved by the Medical Director

Exhibit C

Medical Policy
Transgender Services

Table of Contents

Policy Number: 189

BCBSA Reference Number: N/A
NCD/LCD: N/A

Related Policies

None

Policy[1]

Commercial Members: Managed Care (HMO and POS), PPO, and Indemnity Medicare HMO Blue℠ and Medicare PPO Blue℠ Members

Please Note: According to the American Psychiatric Association, the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) defines gender dysphoria as a condition where a person's gender at birth is contrary to the one they identify with. This definition replaces the criteria for gender identity disorder which will no longer be used in DSM-5. However, ICD-10 codes continue to use the term gender identity disorder, and providers will need to submit claims for coverage using this diagnosis.

Mastectomy and/or creation of a male chest for female to male/gender neutral patients may be considered **MEDICALLY NECESSARY** when **ALL** of the following candidate criteria are met:

- The candidate is at least 18 years of age,
  - If the candidate is less than 18 years of age, then treating clinician must submit information indicating why it would be clinically inappropriate to require the candidate to meet this criterion.
- The candidate has been diagnosed with gender dysphoria (ICD-10 codes F64.0-F64.9 gender identity disorder), including meeting **ALL** of the following indications:
  - The desire to live and be accepted as a member of another sex other than one's assigned sex, typically accompanied by the desire to make the physical body as congruent as possible with the identified sex through surgery and hormone treatment
  - The new gender identity has been present for at least 12 months
  - The gender dysphoria (ICD-10 codes F64.0-F64.9 gender identity disorder) is not a symptom of another mental disorder.
- The candidate has completed a minimum of 12 months of successful continuous full time real-life experience in their new gender, with no returning to their original gender. This includes members who identify as genders other than male or female.

- If the candidate does not meet the 12 month time frame criteria of 12 months of successful continuous full time real-life experience in their new gender noted above, then the treating clinician must submit information indicating why it would be clinically inappropriate to require the candidate to meet these criteria. When submitted, the criteria of 12 months of successful continuous full time real-life experience in their new gender may be waived.

Breast augmentation in male to female patients may be considered **MEDICALLY NECESSARY** when **ALL** of the following candidate criteria are met:

- The candidate is at least 18 years of age,
  - If the candidate is less than 18 years of age, then treating clinician must submit information indicating why it would be clinically inappropriate to require the candidate to meet this criterion.
- The candidate has been diagnosed with gender dysphoria (ICD-10 codes F64.0-F64.9 gender identity disorder), including meeting **ALL** of the following indications:
  - The desire to live and be accepted as a member of another sex other than one's assigned sex, typically accompanied by the desire to make the physical body as congruent as possible with the identified sex through surgery and hormone treatment
  - The new gender identity has been present for at least 12 months
  - The gender dysphoria (ICD-10 codes F64.0-F64.9 gender identity disorder) is not a symptom of another mental disorder.
- For those candidates without a medical contraindication, the candidate has undergone a minimum of 12 months of continuous hormonal therapy that is provided under the supervision of a licensed clinician.
- The candidate has completed a minimum of 12 months of successful continuous full time real-life experience in their new gender, with no returning to their original gender. This includes members who identify as genders other than male or female.
  - If the candidate does not meet the 12 month time frame criteria of 12 months of successful continuous full time real-life experience in their new gender noted above, then the treating clinician must submit information indicating why it would be clinically inappropriate to require the candidate to meet these criteria. When submitted, the criteria of 12 months of successful continuous full time real-life experience in their new gender may be waived.

Genital surgery in male to female, female to male, or gender neutral patients may be considered **MEDICALLY NECESSARY** when **ALL** of the following candidate criteria are met as documented by **two** treating clinicians:

- The candidate is at least 18 years of age,
  - If the candidate is less than 18 years of age, then treating clinicians must submit information indicating why it would be clinically inappropriate to require the candidate to meet this criterion.
- The candidate has been diagnosed with gender dysphoria (ICD-10 codes F64.0-F64.9 gender identity disorder), including meeting **ALL** of the following indications:
  - The desire to live and be accepted as a member of another sex other than one's assigned sex, typically accompanied by the desire to make the physical body as congruent as possible with the identified sex through surgery and hormone treatment
  - The new gender identity has been present for at least 12 months
  - The gender dysphoria (ICD-10 codes F64.0-F64.9 gender identity disorder) is not a symptom of another mental disorder.
- For those candidates without a medical contraindication, the candidate has undergone a minimum of 12 months of continuous hormonal therapy that is provided under the supervision of a licensed clinician.
- The candidate has completed a minimum of 12 months of successful continuous full time real-life experience in their new gender, with no returning to their original gender. This includes members who identify as genders other than male or female.
  - If the candidate does not meet the 12 month time frame criteria of 12 months of successful continuous full time real-life experience in their new gender noted above, then the treating

clinician must submit information indicating why it would be clinically inappropriate to require the candidate to meet these criteria. When submitted, the criteria of 12 months of successful continuous full time real-life experience in their new gender may be waived.

Facial Feminization (typical components of facial feminization) or Masculinization may be considered **MEDICALLY NECESSARY** when **ALL** of the following candidate criteria are met:

- The candidate is at least 18 years of age,
  - If the candidate is less than 18 years of age, then the treating clinician must submit information indicating why it would be clinically inappropriate to require the candidate to meet this criterion.
- The candidate has been diagnosed with gender dysphoria (ICD-10 codes F64.0-F64.9 gender identity disorder), including meeting **ALL** of the following indications:
  - The desire to live and be accepted as a member of another sex other than one's assigned sex, typically accompanied by the desire to make the physical body as congruent as possible with the identified sex through surgery and hormone treatment
  - The new gender identity has been present for at least 12 months
  - The gender dysphoria (ICD-10 codes F64.0-F64.9 gender identity disorder) is not a symptom of another mental disorder.
- The candidate has completed a minimum of 12 months of successful continuous full time real-life experience in their new gender, with no returning to their original gender.
  - If the candidate does not meet the 12 month time frame criteria of 12 months of successful continuous full time real-life experience in their new gender noted above, then the treating clinician must submit information indicating why it would be clinically inappropriate to require the candidate to meet these criteria. When submitted, the criteria of 12 months of successful continuous full time real-life experience in their new gender may be waived.
- Covered procedures when medical necessity criteria are met:
  - Forehead contouring
  - Rhinoplasty
  - Mandible reconstruction
  - Trachea shave
  - Blepharoplasty
  - Brow lift
  - Cheek augmentation
  - Face lift or liposuction (only as needed in conjunction with one of the above procedures).

The following facial procedures are considered **INVESTIGATIONAL** and are not covered:

- Lip enhancement
- Neck lift
- Dermabrasion
- Chemical peel
- Hair transplant
- Electrolysis (except for genital surgery as noted below).

Electrolysis performed by a licensed dermatologist may be considered **MEDICALLY NECESSARY** for the removal of hair on a skin graft donor site prior to its use in genital sex reassignment surgery.

Oocyte, embryo, or sperm retrieval, freezing and storage for up to 24 months for transgender members prior to undergoing hormone therapy or genital sex reassignment surgery may be considered **MEDICALLY NECESSARY**. (See medical policy #086, Infertility Diagnosis and Treatment)

- Per subscriber certificate language, cryopreservation is limited to one cycle only.

GRS is **INVESTIGATIONAL** in the following circumstances:

- When one or more of the criteria above have not been met, OR
- Any services performed to reverse GRS, OR

- GRS procedures that are considered cosmetic are not covered unless otherwise specified in the member's individual subscriber certificate/benefit description.

Prior Authorization Information

Pre-service approval is required for all inpatient services for all products.
See below for situations where prior authorization may be required or may not be required for outpatient services.
Yes indicates that prior authorization is required.
No indicates that prior authorization is not required.
N/A indicates that this service is primarily performed in an inpatient setting.

	Outpatient
Commercial Managed Care (HMO and POS)	NO for Gender Reassignment Surgery YES for Oocyte, Embryo or Sperm retrieval, freezing and storage
Commercial PPO and Indemnity	NO for Gender Reassignment Surgery YES for Oocyte, Embryo or Sperm retrieval, freezing and storage
Medicare HMO Blue℠	NO for Gender Reassignment Surgery YES for Oocyte, Embryo or Sperm retrieval, freezing and storage
Medicare PPO Blue℠	No

Description

Gender reassignment surgery (GRS) is a treatment option for Gender Dysphoria, a condition in which a person feels a strong and persistent identification with a gender other than the one assigned at birth accompanied by a severe sense of discomfort with their own gender. People with gender dysphoria often report a feeling of being born as the wrong sex.

GRS is not a single procedure, but part of a complex process involving multiple medical, psychiatric, and surgical modalities performed in conjunction with each other to help the candidate for gender reassignment achieve successful behavioral and medical outcomes. Before undertaking GRS, candidates need to undergo important medical and psychological evaluations, and begin medical therapies and behavioral trials to confirm that surgery is the most appropriate treatment choice.

Policy History

Date	**Action**
12/2017	Medically necessary criteria revised. New investigational indications described. Clarified coding information. New references added. Effective 12/1/2017.
4/2017	Clarified coding information.
2/2017	Clarified coding information.
4/2016	Electrolysis added as medically necessary prior to sex reassignment surgery. Clarified coding information. Clarified cryopreservation statement. Effective 4/1/2016.
10/2015	Clarified coding information.
9/2015	Clarified coding information.
8/2015	Ongoing coverage on cryopreservation for transgender members added. Statement transferred from medical policy #086, Infertility Diagnosis and Treatment. 8/1/2015
4/2015	Coverage for facial surgical procedures and documentation requirement clarified. Effective 4/1/2015.
11/2014	Medically necessary statement clarified. Effective 11/14/2014.
10/2014	Coding information clarified.
9/2014	Coding information clarified.
8/2014	Updated criteria for SRS qualification. Added facial feminization to non-cosmetic surgery section. Coding information clarified. Effective 8/27/2014.

6/2014	Updated Coding section with ICD10 procedure and diagnosis codes, effective 10/2015.
4/2014	Language on benefit riders added.
4/2014	Coding information clarified.
11/2011-4/2012	Medical policy ICD 10 remediation: Formatting, editing and coding updates. No changes to policy statements.
11/2011	Reviewed - Medical Policy Group - Plastic Surgery and Dermatology. No changes to policy statements.
12/2010	Reviewed - Medical Policy Group - Plastic Surgery and Dermatology. No changes to policy statements.
1/2/2010	New policy, effective 1/2/2010, describing covered and non-covered services.

Information Pertaining to All Blue Cross Blue Shield Medical Policies

Click on any of the following terms to access the relevant information:

Medical Policy Terms of Use
Managed Care Guidelines
Indemnity/PPO Guidelines
Clinical Exception Process
Medical Technology Assessment Guidelines

References

1. Becker S, Bosinski HA, Clement U, et al. Standards for treatment and expert opinion on transsexuals. The German Society for Sexual Research, The Academy of Sexual medicine and the Society for Sexual Science. Fortschr Neurol Psychiatr. 1998;66(4):164-169.
2. Standards of care: The hormonal and surgical sex reassignment of gender dysphoric persons. Harry Benjamin International Gender Dysphoria Association. Arch Sex Behav. 1985;14(1):79-90 and (Fifth Version) June 15, 1998.
3. Landen M, Walinder J, Lundstrom B. Clinical characteristics of a total cohort of female and male applicants for sex reassignment: A descriptive study. Acta Psychiatr Scand. 1998;97(3):189-194.
4. Schlatterer K, Yassouridis A, von Werder K, et al. A follow-up study for estimating the effectiveness of a cross-gender hormone substitution therapy on transsexual patients. Arch Sex Behav. 1998;27(5):475-492.
5. Midence K, Hargreaves I. Psychosocial adjustment in male-to-female transsexuals: An overview of the research evidence. J Psychol. 1997;131(6):602-614.
6. van Kesteren PJ, Asscheman H, Megens JA, et al. Mortality and morbidity in transsexual subjects treated with cross-sex hormones. Clin Endocrinol (Oxf). 1997;47(3):337-342.
7. Eldh J, Berg A, Gustafsson M. Long-term follow up after sex reassignment surgery. Scand J Plast Reconstr Surg Hand Surg. 1997;31(1):39-45.
8. Bradley SJ, Zucker KJ. Gender identity disorder: A review of the past 10 years. J Am Acad Child Adolesc Psychiatry. 1997;36(7):872-880.
9. Luton JP, Bremont C. The place of endocrinology in the management of transsexualism. Bull Acad Natl Med. 1996;180(6):1403-1407.
10. Beemer BR. Gender dysphoria update. J Psychosoc Nurs Ment Health Serv. 1996;34(4):12-19.
11. Schlatterer K, von Werder K, Stalla GK. Multistep treatment concept of transsexual patients. Exp Clin Endocrinol Diabetes. 1996;104(6):413-419.
12. Breton J, Cordier B. Psychiatric aspects of transsexualism. Bull Acad Natl Med. 1996;180(6):1389-1393; discussion 1393-1394.
13. Hage JJ. Medical requirements and consequences of sex reassignment surgery. Med Sci Law. 1995;35(1):17-24.
14. Cole CM, Emory LE, Huang T, et al. Treatment of gender dysphoria (transsexualism). Tex Med. 1994;90(5):68-72.
15. Snaith RP, Hohberger AD. Transsexualism and gender reassignment. Br J Psychiatry. 1994;165(3):418-419.
16. Cohen-Kettenis PT, Kuiper AJ, Zwaan WA, et al. Transsexualism. II. Diagnosis: The initial, tentative phase. Ned Tijdschr Geneeskd. 1992;136(39):1895-1897.

Williams Report Ex. C

Roth Decl. Ex. R

17. Brown GR. A review of clinical approaches to gender dysphoria. J Clin Psychiatry. 1990;51(2):57-64.
18. Mate-Kole C. Sex reassignment surgery. Br J Hosp Med. 1989;42(4):340.
19. Gooren LJ. Transsexualism. I. Description, etiology, management. Ned Tijdschr Geneeskd. 1992;136(39):1893-1895.
20. Petersen ME, Dickey R. Surgical sex reassignment: A comparative survey of international centers. Arch Sex Behav. 1995;24(2):135-156.
21. Alberta Heritage Foundation for Medical Research (AHFMR). Phalloplasty in female-male transsexuals. Technote TN 6. Edmonton, AB: AHFMR; 1996.
22. Alberta Heritage Foundation for Medical Research (AHFMR). Vaginoplasty in male-female transsexuals and criteria for sex reassignment surgery. Technote TN 7. Edmonton, AB: AHFMR; 1997.
23. Best L, Stein K. Surgical gender reassignment for male to female transsexual people. DEC Report No. 88. Southampton, UK: Wessex Institute for Health Research and Development, University of Southampton; 1998.
24. Smith YL, Cohen L, Cohen-Kettenis PT. Postoperative psychological functioning of adolescent transsexuals: A Rorschach study. Arch Sex Behav. 2002;31(3):255-261.
25. Day P. Trans-gender reassignment surgery. NZHTA Tech Brief Series. Christchurch, New Zealand: New Zealand Health Technology Assessment (NZHTA); 2002;1(1).
26. Lawrence AA, Latty EM, Chivers ML, Bailey JM. Measurement of sexual arousal in postoperative male-to-female transsexuals using vaginal photoplethysmography. Arch Sex Behav. 2005;34(2):135-145.
27. Meyer W, Bockting W, Cohen-Kettenis P, et al.; Harry Benjamin International Gender Dysphoria Association. The standards of care for gender identity disorders -- Sixth version. Int J Transgenderism. 2001;5(1).
28. Lawrence AA. Factors associated with satisfaction or regret following male-to-female sex reassignment surgery. Arch Sex Behav. 2003;32(4):299-315.
29. Tugnet N, Goddard JC, Vickery RM, et al. Current management of male-to-female gender identity disorder in the UK. Postgrad Med J. 2007;83(984):638-642.
30. Anthem UM Guideline accessed via the web 10-12-09 http://www.anthem.com/medicalpolicies/guidelines/gl_pw_a051166.htm
31. World Professional Association for Transgender Health (formerly the Harry Benjamin International Gender Dysphoria Association). *WPATH Standards of Care for the Health of Transsexual, Transgender, and Gender Nonconforming People*. Minneapolis, MN: World Professional Association for Transgender Health. 7th ed. Available at: www.wpath.org
32. Kääriäinen M, Salonen K, Helminen M, et al. Chest-wall contouring surgery in female-to-male transgender patients: A one-center retrospective analysis of applied surgical techniques and results. Scand J Surg. 2017 Mar;106(1):74-79.
33. Colebunders B, Brondeel S, D'Arpa S, et al. Sex An Update on the Surgical Treatment for Transgender Patients. Med Rev. 2017 Jan;5(1):103-109.
34. Bluebond-Langner R, Berli JU, Sabino J, et al. Top Surgery in Transgender Men: How Far Can You Push the Envelope? Plast Reconstr Surg. 2017 Apr;139(4):873e-882e.
35. Frederick MJ, Berhanu AE, Bartlett R. Ann. Chest Surgery in Female to Male Transgender Individuals. Plast Surg. 2017 Mar;78(3):249-253.
36. Papadopulos NA, Lellé JD, Zavlin D, Herschbach P, et al. Quality of Life and Patient Satisfaction Following Male-to-Female Sex Reassignment Surgery. J Sex Med. 2017 May;14(5):721-730
37. Wesp LM, Deutsch MB. Hormonal and Surgical Treatment Options for Transgender Women and Transfeminine Spectrum Persons. Psychiatr Clin North Am. 2017 Mar;40(1):99-111.
38. Bertrand B, Perchenet AS, Colson TR, et al. [Female-to-male transgender chest reconstruction: A retrospective study of patient satisfaction]. Ann Chir Plast Esthet. 2017 Jun 14.
39. Lo Russo G, Tanini S, Innocenti M. Masculine Chest-Wall Contouring in FtM Transgender: a Personal Approach. Aesthetic Plast Surg. 2017 Apr;41(2):369-374.
40. Papadopulos NA, Zavlin D, Lellé JD, et al. Combined vaginoplasty technique for male-to-female sex reassignment surgery: Operative approach and outcomes. Surg. 2017 May 27
41. Donato DP, Walzer NK, Rivera A, et al. Female-to-Male Chest Reconstruction: A Review of Technique and Outcomes. Ann Plast Surg. 2017 Jun 1.

42. Colebunders B, Brondeel S, D'Arpa S, et al. An Update on the Surgical Treatment for Transgender Patients. Sex Med Rev. 2017 Jan;5(1):103-109.
43. Capitán L, Simon D, Meyer T, et al. Facial Feminization Surgery: Simultaneous Hair Transplant during Forehead Reconstruction. Plast Reconstr Surg. 2017 Mar;139(3):573-584.
44. Bouman MB, van der Sluis WB, Buncamper ME, et al. Primary Total Laparoscopic Sigmoid Vaginoplasty in Transgender Women with Penoscrotal Hypoplasia: A Prospective Cohort Study of Surgical Outcomes and Follow-Up of 42 Patients. Plast Reconstr Surg. 2016 Oct;138(4):614e-23e.
45. Plemons ED. Description of sex difference as prescription for sex change: on the origins of facial feminization surgery. Soc Stud Sci. 2014 Oct;44(5):657-79.
46. Ainsworth TA, Spiegel JH. Quality of life of individuals with and without facial feminization surgery or gender reassignment surgery. Qual Life Res. 2010 Sep;19(7):1019-24. doi: 10.1007/s11136-010-9668-7. Epub 2010 May 12.

CPT Codes / HCPCS Codes / ICD Codes

Inclusion or exclusion of a code does not constitute or imply member coverage or provider reimbursement. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage as it applies to an individual member.

Providers should report all services using the most up-to-date industry-standard procedure, revenue, and diagnosis codes, including modifiers where applicable.

The following codes are included below for informational purposes only; this is not an all-inclusive list.

The above medical necessity criteria on pp. 1-2 MUST be met for the following codes to be covered for Commercial Members: Managed Care (HMO and POS), PPO, Indemnity, Medicare HMO Blue and Medicare PPO Blue:

CPT Codes
Male to Female Surgery

CPT codes:	Code Description
17380	Electrolysis epilation, each 30 minutes
19325	Mammaplasty, augmentation; with prosthetic implant
19350	Nipple/areola reconstruction
19357	Breast reconstruction, immediate or delayed, with tissue expander, including subsequent expansion
19380	Breast reconstruction, immediate or delayed, with tissue expander, including subsequent expansion
53410	Urethroplasty, 1-stage reconstruction of male anterior urethra
54120	Amputation of penis; partial
54125	Amputation of penis; complete
54300	Plastic operation of penis for straightening of chordee (eg, hypospadias), with or without mobilization of urethra
54520	Orchiectomy, simple (including subcapsular), with or without testicular prosthesis, scrotal or inguinal approach
54690	Laparoscopy, surgical; orchiectomy
55970	Intersex surgery; male to female
56800	Plastic repair of introitus
56805	Clitoroplasty for intersex state
57291	Construction of artificial vagina; without graft
57292	Construction of artificial vagina; with graft
57335	Vaginoplasty for intersex state

Facial Surgery (Male or Female)

Brow Reconstruction

CPT codes	Code Description
21137	Reduction forehead; contouring only
21138	Reduction forehead; contouring and application of prosthetic material or bone graft (includes obtaining autograft)
21139	Reduction forehead; contouring and setback of anterior frontal sinus wall
21208	Osteoplasty, facial bones; augmentation (autograft, allograft, or prosthetic implant)
21209	Osteoplasty, facial bones; reduction

Brow Lift

CPT codes	Code Description
67900	Repair of brow ptosis (supraciliary, mid-forehead or coronal approach)

Blepharoplasty

CPT codes	Code Description
15820	Blepharoplasty, lower eyelid
15821	Blepharoplasty, lower eyelid; with extensive herniated fat pad
15822	Blepharoplasty, upper eyelid
15823	Blepharoplasty, upper eyelid; with excessive skin weighting down lid

Rhinoplasty

CPT codes	Code Description
30400	Rhinoplasty, primary; lateral and alar cartilages and/or elevation of nasal tip
30410	Rhinoplasty, primary; complete, external parts including bony pyramid, lateral and alar cartilages, and/or elevation of nasal tip
30420	Rhinoplasty, primary; including major septal repair

Cheek Augmentation

CPT codes	Code Description
21270	Malar augmentation, prosthetic material
21208	Osteoplasty, facial bones; augmentation (autograft, allograft, or prosthetic implant)
21209	Osteoplasty, facial bones; reduction

Jaw Reconstruction

CPT codes	Code Description
21125	Augmentation, mandibular body or angle; prosthetic material
21127	Augmentation, mandibular body or angle; with bone graft, onlay or interpositional (includes obtaining autograft)
21208	Osteoplasty, facial bones; augmentation (autograft, allograft, or prosthetic implant)
21209	Osteoplasty, facial bones; reduction

Chin Reconstruction

CPT codes	Code Description
21120	Genioplasty; augmentation (autograft, allograft, prosthetic material)
21121	Genioplasty; sliding osteotomy, single piece
21122	Genioplasty; sliding osteotomies, 2 or more osteotomies (eg, wedge excision or bone wedge reversal for asymmetrical chin)
21123	Genioplasty; sliding, augmentation with interpositional bone grafts (includes obtaining autografts)
21208	Osteoplasty, facial bones; augmentation (autograft, allograft, or prosthetic implant)
21209	Osteoplasty, facial bones; reduction

Face Lift
The following codes are covered when required as part of a medically necessary facial feminization procedure.

CPT codes	Code Description
15824	Rhytidectomy; forehead
15825	Rhytidectomy; neck with platysmal tightening (platysmal flap, P-flap)
15826	Rhytidectomy; glabellar frown lines
15828	Rhytidectomy; cheek, chin, and neck

Liposuction
The following codes are covered when required as part of a medically necessary facial feminization procedure.

CPT codes	Code Description
15876	Suction assisted lipectomy; head and neck
15877	Suction assisted lipectomy; trunk
15878	Suction assisted lipectomy; upper extremity
15879	Suction assisted lipectomy; lower extremity

Trachea Shave

CPT codes	Code Description
31599	Unlisted procedure, larynx

Female to Male Surgery

CPT codes:	Code Description
19303	Mastectomy, simple, complete
19304	Mastectomy, subcutaneous
19316	Mastopexy
19350	Nipple/areola reconstruction
53430	Urethroplasty, reconstruction of female urethra
54660	Insertion testicular prosthesis
55175	Scrotoplasty; simple
55180	Scrotoplasty; complex
55980	Intersex surgery; female to male
56620	Vulvectomy; simple
56625	Vulvectomy; complete
56800	Plastic repair of introitus
56805	Clitoroplasty for intersex state
56810	Perineoplasty, repair of perineum, nonobstetrical
57110	Vaginectomy; complete removal of vaginal wall
57111	Vaginectomy; with removal of paravaginal tissue (radical vaginectomy)
58150	Total abdominal hysterectomy (corpus and cervix), with or without removal of tube(s), with or without removal of ovary(s)
58180	Supracervical abdominal hysterectomy (subtotal hysterectomy), with or without removal of tube(s), with or without removal of ovary(s)
58260	Vaginal hysterectomy, for uterus 250 gms or less
58262	Vaginal hysterectomy, for uterus 250 g or less; with removal of tube(s), and/or ovary(s)
58275	Vaginal hysterectomy, with total or partial vaginectomy
58290	Vaginal hysterectomy, for uterus greater than 250 g
58291	Vaginal hysterectomy, for uterus greater than 250 g; with removal of tube(s) and/or ovary(s)
58541	Laparoscopy, surgical, supracervical hysterectomy, for uterus 250 g or less;
58542	Laparoscopy, surgical, supracervical hysterectomy, for uterus 250 g or less; with removal of tube(s) and/or ovary(s)
58543	Laparoscopy, surgical, supracervical hysterectomy, for uterus greater than 250 g

58544	Laparoscopy, surgical, supracervical hysterectomy, for uterus greater than 250 g; with removal of tube(s) and/or ovary(s)
58550	Laparoscopy, surgical, with vaginal hysterectomy, for uterus 250 g or less;
58552	Laparoscopy, surgical, with vaginal hysterectomy, for uterus 250 grams or less; with removal of tube(s) and/or ovary(s)
58553	Laparoscopy, surgical, with vaginal hysterectomy, for uterus greater than 250 g
58554	Laparoscopy, surgical, with vaginal hysterectomy, for uterus greater than 250 grams; with removal of tube(s) and/or ovary(s)
58570	Laparoscopy, surgical, with total hysterectomy, for uterus 250 g or less;
58571	Laparoscopy, surgical, with total hysterectomy, for uterus 250 g or less; with removal of tube(s) and/or ovary(s)
58572	Laparoscopy, surgical, with total hysterectomy, for uterus greater than 250 g;
58573	Laparoscopy, surgical, with total hysterectomy, for uterus greater than 250 g; with removal of tube(s) and/or ovary(s)

The following ICD Diagnosis Codes are considered medically necessary when submitted with the CPT code above if above medical necessity criteria on pp. 1-2 are met:

ICD-10 Diagnosis Codes

ICD-10-CM Diagnosis codes:	Code Description
F64.0	Transsexualism
F64.1	Gender identity disorder in adolescence and adulthood
F64.2	Gender identity disorder of childhood
F64.8	Other gender identity disorders
F64.9	Gender identity disorder, unspecified

The above medical necessity criteria on pp. 1-2 MUST be met for the following codes to be covered for Commercial Members: Managed Care (HMO and POS), PPO, Indemnity, Medicare HMO Blue and Medicare PPO Blue:

ICD-10 Procedure Codes
Male to Female Surgery

ICD-10-PCS procedure codes:	Code Description
0VTC0ZZ	Resection of Bilateral Testes, Open Approach
0H0T0ZZ	Alteration of Right Breast, Open Approach
0H0T3ZZ	Alteration of Right Breast, Percutaneous Approach
0H0TXZZ	Alteration of Right Breast, External Approach
0H0U0ZZ	Alteration of Left Breast, Open Approach
0H0U3ZZ	Alteration of Left Breast, Percutaneous Approach
0H0UXZZ	Alteration of Left Breast, External Approach
0H0V07Z	Alteration of Bilateral Breast with Autologous Tissue Substitute, Open Approach
0H0V0JZ	Alteration of Bilateral Breast with Synthetic Substitute, Open Approach
0H0V0KZ	Alteration of Bilateral Breast with Nonautologous Tissue Substitute, Open Approach
0H0V0ZZ	Alteration of Bilateral Breast, Open Approach
0H0V37Z	Alteration of Bilateral Breast with Autologous Tissue Substitute, Percutaneous Approach
0H0V3JZ	Alteration of Bilateral Breast with Synthetic Substitute, Percutaneous Approach
0H0V3KZ	Alteration of Bilateral Breast with Nonautologous Tissue Substitute, Percutaneous Approach

0H0V3ZZ	Alteration of Bilateral Breast, Percutaneous Approach
0H0VXZZ	Alteration of Bilateral Breast, External Approach
0HDSXZZ	Extraction of Hair, External Approach
0HMTXZZ	Reattachment of Right Breast, External Approach
0HMUXZZ	Reattachment of Left Breast, External Approach
0HMVXZZ	Reattachment of Bilateral Breast, External Approach
0HMWXZZ	Reattachment of Right Nipple, External Approach
0HMXXZZ	Reattachment of Left Nipple, External Approach
0U5J0ZZ	Destruction of Clitoris, Open Approach
0U5JXZZ	Destruction of Clitoris, External Approach
0U9J00Z	Drainage of Clitoris with Drainage Device, Open Approach
0U9J0ZZ	Drainage of Clitoris, Open Approach
0U9JX0Z	Drainage of Clitoris with Drainage Device, External Approach
0U9JXZZ	Drainage of Clitoris, External Approach
0UBJ0ZX	Excision of Clitoris, Open Approach, Diagnostic
0UBJ0ZZ	Excision of Clitoris, Open Approach
0UBJXZX	Excision of Clitoris, External Approach, Diagnostic
0UBJXZZ	Excision of Clitoris, External Approach
0UCJ0ZZ	Extirpation of Matter from Clitoris, Open Approach
0UCJXZZ	Extirpation of Matter from Clitoris, External Approach
0UMJXZZ	Reattachment of Clitoris, External Approach
0UNJ0ZZ	Release Clitoris, Open Approach
0UNJXZZ	Release Clitoris, External Approach
0UQG0ZZ	Repair Vagina, Open Approach
0UQJ0ZZ	Repair Clitoris, Open Approach
0UQJXZZ	Repair Clitoris, External Approach
0UTJ0ZZ	Resection of Clitoris, Open Approach
0UTJXZZ	Resection of Clitoris, External Approach
0UUG07Z	Supplement Vagina with Autologous Tissue Substitute, Open Approach
0UUG0JZ	Supplement Vagina with Synthetic Substitute, Open Approach
0UUG0KZ	Supplement Vagina with Nonautologous Tissue Substitute, Open Approach
0UUG47Z	Supplement Vagina with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0UUG4JZ	Supplement Vagina with Synthetic Substitute, Percutaneous Endoscopic Approach
0UUG4KZ	Supplement Vagina with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0UUG77Z	Supplement Vagina with Autologous Tissue Substitute, Via Natural or Artificial Opening
0UUG7JZ	Supplement Vagina with Synthetic Substitute, Via Natural or Artificial Opening
0UUG7KZ	Supplement Vagina with Nonautologous Tissue Substitute, Via Natural or Artificial Opening
0UUG87Z	Supplement Vagina with Autologous Tissue Substitute, Via Natural or Artificial Opening Endoscopic
0UUG8JZ	Supplement Vagina with Synthetic Substitute, Via Natural or Artificial Opening Endoscopic
0UUG8KZ	Supplement Vagina with Nonautologous Tissue Substitute, Via Natural or Artificial Opening Endoscopic
0UUGX7Z	Supplement Vagina with Autologous Tissue Substitute, External Approach
0UUGXJZ	Supplement Vagina with Synthetic Substitute, External Approach
0UUGXKZ	Supplement Vagina with Nonautologous Tissue Substitute, External Approach
0UUJ07Z	Supplement Clitoris with Autologous Tissue Substitute, Open Approach
0UUJ0JZ	Supplement Clitoris with Synthetic Substitute, Open Approach
0UUJ0KZ	Supplement Clitoris with Nonautologous Tissue Substitute, Open Approach

0UUJX7Z	Supplement Clitoris with Autologous Tissue Substitute, External Approach
0UUJXJZ	Supplement Clitoris with Synthetic Substitute, External Approach
0UUJXKZ	Supplement Clitoris with Nonautologous Tissue Substitute, External Approach
0VT90ZZ	Resection of Right Testis, Open Approach
0VT94ZZ	Resection of Right Testis, Percutaneous Endoscopic Approach
0VTB0ZZ	Resection of Left Testis, Open Approach
0VTB4ZZ	Resection of Left Testis, Percutaneous Endoscopic Approach
0VTC4ZZ	Resection of Bilateral Testes, Percutaneous Endoscopic Approach
0VTS0ZZ	Resection of Penis, Open Approach
0VTS4ZZ	Resection of Penis, Percutaneous Endoscopic Approach
0VTSXZZ	Resection of Penis, External Approach
0W4M070	Creation of Vagina in Male Perineum with Autologous Tissue Substitute, Open Approach
0W4M0J0	Creation of Vagina in Male Perineum with Synthetic Substitute, Open Approach
0W4M0K0	Creation of Vagina in Male Perineum with Nonautologous Tissue Substitute, Open Approach
0W4M0Z0	Creation of Vagina in Male Perineum, Open Approach

Facial Surgery (Male or Female)

ICD-10-PCS procedure codes:	**Code Description**
080N0ZZ	Alteration of Right Upper Eyelid, Open Approach
080N3ZZ	Alteration of Right Upper Eyelid, Percutaneous Approach
080NXZZ	Alteration of Right Upper Eyelid, External Approach
080P0ZZ	Alteration of Left Upper Eyelid, Open Approach
080P3ZZ	Alteration of Left Upper Eyelid, Percutaneous Approach
080PXZZ	Alteration of Left Upper Eyelid, External Approach
080Q0ZZ	Alteration of Right Lower Eyelid, Open Approach
080Q3ZZ	Alteration of Right Lower Eyelid, Percutaneous Approach
080QXZZ	Alteration of Right Lower Eyelid, External Approach
080R0ZZ	Alteration of Left Lower Eyelid, Open Approach
080R3ZZ	Alteration of Left Lower Eyelid, Percutaneous Approach
080RXZZ	Alteration of Left Lower Eyelid, External Approach
090K0ZZ	Alteration of Nose, Open Approach
090K3ZZ	Alteration of Nose, Percutaneous Approach
090K4ZZ	Alteration of Nose, Percutaneous Endoscopic Approach
090KXZZ	Alteration of Nose, External Approach
09QM0ZZ	Repair Nasal Septum, Open Approach
09QM3ZZ	Repair Nasal Septum, Percutaneous Approach
09QM4ZZ	Repair Nasal Septum, Percutaneous Endoscopic Approach
0J040ZZ	Alteration of Anterior Neck Subcutaneous Tissue and Fascia, Open Approach
0J043ZZ	Alteration of Anterior Neck Subcutaneous Tissue and Fascia, Percutaneous Approach
0J050ZZ	Alteration of Posterior Neck Subcutaneous Tissue and Fascia, Open Approach
0J053ZZ	Alteration of Posterior Neck Subcutaneous Tissue and Fascia, Percutaneous Approach
0J060ZZ	Alteration of Chest Subcutaneous Tissue and Fascia, Open Approach
0J063ZZ	Alteration of Chest Subcutaneous Tissue and Fascia, Percutaneous Approach
0J070ZZ	Alteration of Back Subcutaneous Tissue and Fascia, Open Approach
0J073ZZ	Alteration of Back Subcutaneous Tissue and Fascia, Percutaneous Approach
0J080ZZ	Alteration of Abdomen Subcutaneous Tissue and Fascia, Open Approach
0J083ZZ	Alteration of Abdomen Subcutaneous Tissue and Fascia, Percutaneous Approach

0J090ZZ	Alteration of Buttock Subcutaneous Tissue and Fascia, Open Approach
0J093ZZ	Alteration of Buttock Subcutaneous Tissue and Fascia, Percutaneous Approach
0J0D0ZZ	Alteration of Right Upper Arm Subcutaneous Tissue and Fascia, Open Approach
0J0D3ZZ	Alteration of Right Upper Arm Subcutaneous Tissue and Fascia, Percutaneous Approach
0J0F0ZZ	Alteration of Left Upper Arm Subcutaneous Tissue and Fascia, Open Approach
0J0F3ZZ	Alteration of Left Upper Arm Subcutaneous Tissue and Fascia, Percutaneous Approach
0J0G0ZZ	Alteration of Right Lower Arm Subcutaneous Tissue and Fascia, Open Approach
0J0G3ZZ	Alteration of Right Lower Arm Subcutaneous Tissue and Fascia, Percutaneous Approach
0J0H0ZZ	Alteration of Left Lower Arm Subcutaneous Tissue and Fascia, Open Approach
0J0H3ZZ	Alteration of Left Lower Arm Subcutaneous Tissue and Fascia, Percutaneous Approach
0J0L0ZZ	Alteration of Right Upper Leg Subcutaneous Tissue and Fascia, Open Approach
0J0L3ZZ	Alteration of Right Upper Leg Subcutaneous Tissue and Fascia, Percutaneous Approach
0J0M0ZZ	Alteration of Left Upper Leg Subcutaneous Tissue and Fascia, Open Approach
0J0M3ZZ	Alteration of Left Upper Leg Subcutaneous Tissue and Fascia, Percutaneous Approach
0J0N0ZZ	Alteration of Right Lower Leg Subcutaneous Tissue and Fascia, Open Approach
0J0N3ZZ	Alteration of Right Lower Leg Subcutaneous Tissue and Fascia, Percutaneous Approach
0J0P0ZZ	Alteration of Left Lower Leg Subcutaneous Tissue and Fascia, Open Approach
0J0P3ZZ	Alteration of Left Lower Leg Subcutaneous Tissue and Fascia, Percutaneous Approach
08SN0ZZ	Reposition Right Upper Eyelid, Open Approach
08SN3ZZ	Reposition Right Upper Eyelid, Percutaneous Approach
08SNXZZ	Reposition Right Upper Eyelid, External Approach
08SP0ZZ	Reposition Left Upper Eyelid, Open Approach
08SP3ZZ	Reposition Left Upper Eyelid, Percutaneous Approach
08SPXZZ	Reposition Left Upper Eyelid, External Approach
08SQ0ZZ	Reposition Right Lower Eyelid, Open Approach
08SQ3ZZ	Reposition Right Lower Eyelid, Percutaneous Approach
08SQXZZ	Reposition Right Lower Eyelid, External Approach
08SR0ZZ	Reposition Left Lower Eyelid, Open Approach
08SR3ZZ	Reposition Left Lower Eyelid, Percutaneous Approach
08SRXZZ	Reposition Left Lower Eyelid, External Approach
0KS10ZZ	Reposition Facial Muscle, Open Approach
0KS14ZZ	Reposition Facial Muscle, Percutaneous Endoscopic Approach
0NNC0ZZ	Release Right Sphenoid Bone, Open Approach
0NNC3ZZ	Release Right Sphenoid Bone, Percutaneous Approach
0NNC4ZZ	Release Right Sphenoid Bone, Percutaneous Endoscopic Approach
0NND0ZZ	Release Left Sphenoid Bone, Open Approach
0NND3ZZ	Release Left Sphenoid Bone, Percutaneous Approach
0NND4ZZ	Release Left Sphenoid Bone, Percutaneous Endoscopic Approach
0NNF0ZZ	Release Right Ethmoid Bone, Open Approach
0NNF3ZZ	Release Right Ethmoid Bone, Percutaneous Approach
0NNF4ZZ	Release Right Ethmoid Bone, Percutaneous Endoscopic Approach
0NNG0ZZ	Release Left Ethmoid Bone, Open Approach
0NNG3ZZ	Release Left Ethmoid Bone, Percutaneous Approach
0NNG4ZZ	Release Left Ethmoid Bone, Percutaneous Endoscopic Approach
0NNH0ZZ	Release Right Lacrimal Bone, Open Approach
0NNH3ZZ	Release Right Lacrimal Bone, Percutaneous Approach

0NNH4ZZ	Release Right Lacrimal Bone, Percutaneous Endoscopic Approach
0NNJ0ZZ	Release Left Lacrimal Bone, Open Approach
0NNJ3ZZ	Release Left Lacrimal Bone, Percutaneous Approach
0NNJ4ZZ	Release Left Lacrimal Bone, Percutaneous Endoscopic Approach
0NNK0ZZ	Release Right Palatine Bone, Open Approach
0NNK3ZZ	Release Right Palatine Bone, Percutaneous Approach
0NNK4ZZ	Release Right Palatine Bone, Percutaneous Endoscopic Approach
0NNL0ZZ	Release Left Palatine Bone, Open Approach
0NNL3ZZ	Release Left Palatine Bone, Percutaneous Approach
0NNL4ZZ	Release Left Palatine Bone, Percutaneous Endoscopic Approach
0NNM0ZZ	Release Right Zygomatic Bone, Open Approach
0NNM3ZZ	Release Right Zygomatic Bone, Percutaneous Approach
0NNM4ZZ	Release Right Zygomatic Bone, Percutaneous Endoscopic Approach
0NNN0ZZ	Release Left Zygomatic Bone, Open Approach
0NNN3ZZ	Release Left Zygomatic Bone, Percutaneous Approach
0NNN4ZZ	Release Left Zygomatic Bone, Percutaneous Endoscopic Approach
0NNP0ZZ	Release Right Orbit, Open Approach
0NNP3ZZ	Release Right Orbit, Percutaneous Approach
0NNP4ZZ	Release Right Orbit, Percutaneous Endoscopic Approach
0NNQ0ZZ	Release Left Orbit, Open Approach
0NNQ3ZZ	Release Left Orbit, Percutaneous Approach
0NNQ4ZZ	Release Left Orbit, Percutaneous Endoscopic Approach
0NNR0ZZ	Release Right Maxilla, Open Approach
0NNR3ZZ	Release Right Maxilla, Percutaneous Approach
0NNR4ZZ	Release Right Maxilla, Percutaneous Endoscopic Approach
0NNS0ZZ	Release Left Maxilla, Open Approach
0NNS3ZZ	Release Left Maxilla, Percutaneous Approach
0NNS4ZZ	Release Left Maxilla, Percutaneous Endoscopic Approach
0NNT0ZZ	Release Right Mandible, Open Approach
0NNT3ZZ	Release Right Mandible, Percutaneous Approach
0NNT4ZZ	Release Right Mandible, Percutaneous Endoscopic Approach
0NNV0ZZ	Release Left Mandible, Open Approach
0NNV3ZZ	Release Left Mandible, Percutaneous Approach
0NNV4ZZ	Release Left Mandible, Percutaneous Endoscopic Approach
0NQC0ZZ	Repair Right Sphenoid Bone, Open Approach
0NQC3ZZ	Repair Right Sphenoid Bone, Percutaneous Approach
0NQC4ZZ	Repair Right Sphenoid Bone, Percutaneous Endoscopic Approach
0NQCXZZ	Repair Right Sphenoid Bone, External Approach
0NQD0ZZ	Repair Left Sphenoid Bone, Open Approach
0NQD3ZZ	Repair Left Sphenoid Bone, Percutaneous Approach
0NQD4ZZ	Repair Left Sphenoid Bone, Percutaneous Endoscopic Approach
0NQDXZZ	Repair Left Sphenoid Bone, External Approach
0NQF0ZZ	Repair Right Ethmoid Bone, Open Approach
0NQF3ZZ	Repair Right Ethmoid Bone, Percutaneous Approach
0NQF4ZZ	Repair Right Ethmoid Bone, Percutaneous Endoscopic Approach
0NQFXZZ	Repair Right Ethmoid Bone, External Approach
0NQG0ZZ	Repair Left Ethmoid Bone, Open Approach
0NQG3ZZ	Repair Left Ethmoid Bone, Percutaneous Approach
0NQG4ZZ	Repair Left Ethmoid Bone, Percutaneous Endoscopic Approach
0NQGXZZ	Repair Left Ethmoid Bone, External Approach
0NQH0ZZ	Repair Right Lacrimal Bone, Open Approach

0NQH3ZZ	Repair Right Lacrimal Bone, Percutaneous Approach
0NQH4ZZ	Repair Right Lacrimal Bone, Percutaneous Endoscopic Approach
0NQHXZZ	Repair Right Lacrimal Bone, External Approach
0NQJ0ZZ	Repair Left Lacrimal Bone, Open Approach
0NQJ3ZZ	Repair Left Lacrimal Bone, Percutaneous Approach
0NQJ4ZZ	Repair Left Lacrimal Bone, Percutaneous Endoscopic Approach
0NQJXZZ	Repair Left Lacrimal Bone, External Approach
0NQK0ZZ	Repair Right Palatine Bone, Open Approach
0NQK3ZZ	Repair Right Palatine Bone, Percutaneous Approach
0NQK4ZZ	Repair Right Palatine Bone, Percutaneous Endoscopic Approach
0NQKXZZ	Repair Right Palatine Bone, External Approach
0NQL0ZZ	Repair Left Palatine Bone, Open Approach
0NQL3ZZ	Repair Left Palatine Bone, Percutaneous Approach
0NQL4ZZ	Repair Left Palatine Bone, Percutaneous Endoscopic Approach
0NQLXZZ	Repair Left Palatine Bone, External Approach
0NQM0ZZ	Repair Right Zygomatic Bone, Open Approach
0NQM3ZZ	Repair Right Zygomatic Bone, Percutaneous Approach
0NQM4ZZ	Repair Right Zygomatic Bone, Percutaneous Endoscopic Approach
0NQMXZZ	Repair Right Zygomatic Bone, External Approach
0NQN0ZZ	Repair Left Zygomatic Bone, Open Approach
0NQN3ZZ	Repair Left Zygomatic Bone, Percutaneous Approach
0NQN4ZZ	Repair Left Zygomatic Bone, Percutaneous Endoscopic Approach
0NQNXZZ	Repair Left Zygomatic Bone, External Approach
0NQX0ZZ	Repair Hyoid Bone, Open Approach
0NQX3ZZ	Repair Hyoid Bone, Percutaneous Approach
0NQX4ZZ	Repair Hyoid Bone, Percutaneous Endoscopic Approach
0NQXXZZ	Repair Hyoid Bone, External Approach
0NRC07Z	Replacement of Right Sphenoid Bone with Autologous Tissue Substitute, Open Approach
0NRC0JZ	Replacement of Right Sphenoid Bone with Synthetic Substitute, Open Approach
0NRC0KZ	Replacement of Right Sphenoid Bone with Nonautologous Tissue Substitute, Open Approach
0NRC37Z	Replacement of Right Sphenoid Bone with Autologous Tissue Substitute, Percutaneous Approach
0NRC3JZ	Replacement of Right Sphenoid Bone with Synthetic Substitute, Percutaneous Approach
0NRC3KZ	Replacement of Right Sphenoid Bone with Nonautologous Tissue Substitute, Percutaneous Approach
0NRC47Z	Replacement of Right Sphenoid Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRC4JZ	Replacement of Right Sphenoid Bone with Synthetic Substitute, Percutaneous Endoscopic Approach
0NRC4KZ	Replacement of Right Sphenoid Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRD07Z	Replacement of Left Sphenoid Bone with Autologous Tissue Substitute, Open Approach
0NRD0JZ	Replacement of Left Sphenoid Bone with Synthetic Substitute, Open Approach
0NRD0KZ	Replacement of Left Sphenoid Bone with Nonautologous Tissue Substitute, Open Approach
0NRD37Z	Replacement of Left Sphenoid Bone with Autologous Tissue Substitute, Percutaneous Approach
0NRD3JZ	Replacement of Left Sphenoid Bone with Synthetic Substitute, Percutaneous Approach

0NRD3KZ	Replacement of Left Sphenoid Bone with Nonautologous Tissue Substitute, Percutaneous Approach
0NRD47Z	Replacement of Left Sphenoid Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRD4JZ	Replacement of Left Sphenoid Bone with Synthetic Substitute, Percutaneous Endoscopic Approach
0NRD4KZ	Replacement of Left Sphenoid Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRF07Z	Replacement of Right Ethmoid Bone with Autologous Tissue Substitute, Open Approach
0NRF0JZ	Replacement of Right Ethmoid Bone with Synthetic Substitute, Open Approach
0NRF0KZ	Replacement of Right Ethmoid Bone with Nonautologous Tissue Substitute, Open Approach
0NRF37Z	Replacement of Right Ethmoid Bone with Autologous Tissue Substitute, Percutaneous Approach
0NRF3JZ	Replacement of Right Ethmoid Bone with Synthetic Substitute, Percutaneous Approach
0NRF3KZ	Replacement of Right Ethmoid Bone with Nonautologous Tissue Substitute, Percutaneous Approach
0NRF47Z	Replacement of Right Ethmoid Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRF4JZ	Replacement of Right Ethmoid Bone with Synthetic Substitute, Percutaneous Endoscopic Approach
0NRF4KZ	Replacement of Right Ethmoid Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRG07Z	Replacement of Left Ethmoid Bone with Autologous Tissue Substitute, Open Approach
0NRG0JZ	Replacement of Left Ethmoid Bone with Synthetic Substitute, Open Approach
0NRG0KZ	Replacement of Left Ethmoid Bone with Nonautologous Tissue Substitute, Open Approach
0NRG37Z	Replacement of Left Ethmoid Bone with Autologous Tissue Substitute, Percutaneous Approach
0NRG3JZ	Replacement of Left Ethmoid Bone with Synthetic Substitute, Percutaneous Approach
0NRG3KZ	Replacement of Left Ethmoid Bone with Nonautologous Tissue Substitute, Percutaneous Approach
0NRG47Z	Replacement of Left Ethmoid Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRG4JZ	Replacement of Left Ethmoid Bone with Synthetic Substitute, Percutaneous Endoscopic Approach
0NRG4KZ	Replacement of Left Ethmoid Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRH07Z	Replacement of Right Lacrimal Bone with Autologous Tissue Substitute, Open Approach
0NRH0JZ	Replacement of Right Lacrimal Bone with Synthetic Substitute, Open Approach
0NRH0KZ	Replacement of Right Lacrimal Bone with Nonautologous Tissue Substitute, Open Approach
0NRH37Z	Replacement of Right Lacrimal Bone with Autologous Tissue Substitute, Percutaneous Approach
0NRH3JZ	Replacement of Right Lacrimal Bone with Synthetic Substitute, Percutaneous Approach
0NRH3KZ	Replacement of Right Lacrimal Bone with Nonautologous Tissue Substitute, Percutaneous Approach
0NRH47Z	Replacement of Right Lacrimal Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach

0NRH4JZ	Replacement of Right Lacrimal Bone with Synthetic Substitute, Percutaneous Endoscopic Approach
0NRH4KZ	Replacement of Right Lacrimal Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRJ07Z	Replacement of Left Lacrimal Bone with Autologous Tissue Substitute, Open Approach
0NRJ0JZ	Replacement of Left Lacrimal Bone with Synthetic Substitute, Open Approach
0NRJ0KZ	Replacement of Left Lacrimal Bone with Nonautologous Tissue Substitute, Open Approach
0NRJ37Z	Replacement of Left Lacrimal Bone with Autologous Tissue Substitute, Percutaneous Approach
0NRJ3JZ	Replacement of Left Lacrimal Bone with Synthetic Substitute, Percutaneous Approach
0NRJ3KZ	Replacement of Left Lacrimal Bone with Nonautologous Tissue Substitute, Percutaneous Approach
0NRJ47Z	Replacement of Left Lacrimal Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRJ4JZ	Replacement of Left Lacrimal Bone with Synthetic Substitute, Percutaneous Endoscopic Approach
0NRJ4KZ	Replacement of Left Lacrimal Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRK07Z	Replacement of Right Palatine Bone with Autologous Tissue Substitute, Open Approach
0NRK0JZ	Replacement of Right Palatine Bone with Synthetic Substitute, Open Approach
0NRK0KZ	Replacement of Right Palatine Bone with Nonautologous Tissue Substitute, Open Approach
0NRK37Z	Replacement of Right Palatine Bone with Autologous Tissue Substitute, Percutaneous Approach
0NRK3JZ	Replacement of Right Palatine Bone with Synthetic Substitute, Percutaneous Approach
0NRK3KZ	Replacement of Right Palatine Bone with Nonautologous Tissue Substitute, Percutaneous Approach
0NRK47Z	Replacement of Right Palatine Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRK4JZ	Replacement of Right Palatine Bone with Synthetic Substitute, Percutaneous Endoscopic Approach
0NRK4KZ	Replacement of Right Palatine Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRL07Z	Replacement of Left Palatine Bone with Autologous Tissue Substitute, Open Approach
0NRL0JZ	Replacement of Left Palatine Bone with Synthetic Substitute, Open Approach
0NRL0KZ	Replacement of Left Palatine Bone with Nonautologous Tissue Substitute, Open Approach
0NRL37Z	Replacement of Left Palatine Bone with Autologous Tissue Substitute, Percutaneous Approach
0NRL3JZ	Replacement of Left Palatine Bone with Synthetic Substitute, Percutaneous Approach
0NRL3KZ	Replacement of Left Palatine Bone with Nonautologous Tissue Substitute, Percutaneous Approach
0NRL47Z	Replacement of Left Palatine Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRL4JZ	Replacement of Left Palatine Bone with Synthetic Substitute, Percutaneous Endoscopic Approach
0NRL4KZ	Replacement of Left Palatine Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRM07Z	Replacement of Right Zygomatic Bone with Autologous Tissue Substitute, Open Approach
0NRM0JZ	Replacement of Right Zygomatic Bone with Synthetic Substitute, Open Approach

0NRM0KZ	Replacement of Right Zygomatic Bone with Nonautologous Tissue Substitute, Open Approach
0NRM37Z	Replacement of Right Zygomatic Bone with Autologous Tissue Substitute, Percutaneous Approach
0NRM3JZ	Replacement of Right Zygomatic Bone with Synthetic Substitute, Percutaneous Approach
0NRM3KZ	Replacement of Right Zygomatic Bone with Nonautologous Tissue Substitute, Percutaneous Approach
0NRM47Z	Replacement of Right Zygomatic Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRM4JZ	Replacement of Right Zygomatic Bone with Synthetic Substitute, Percutaneous Endoscopic Approach
0NRM4KZ	Replacement of Right Zygomatic Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRN07Z	Replacement of Left Zygomatic Bone with Autologous Tissue Substitute, Open Approach
0NRN0JZ	Replacement of Left Zygomatic Bone with Synthetic Substitute, Open Approach
0NRN0KZ	Replacement of Left Zygomatic Bone with Nonautologous Tissue Substitute, Open Approach
0NRN37Z	Replacement of Left Zygomatic Bone with Autologous Tissue Substitute, Percutaneous Approach
0NRN3JZ	Replacement of Left Zygomatic Bone with Synthetic Substitute, Percutaneous Approach
0NRN3KZ	Replacement of Left Zygomatic Bone with Nonautologous Tissue Substitute, Percutaneous Approach
0NRN47Z	Replacement of Left Zygomatic Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRN4JZ	Replacement of Left Zygomatic Bone with Synthetic Substitute, Percutaneous Endoscopic Approach
0NRN4KZ	Replacement of Left Zygomatic Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRP0KZ	Replacement of Right Orbit with Nonautologous Tissue Substitute, Open Approach
0NRP3KZ	Replacement of Right Orbit with Nonautologous Tissue Substitute, Percutaneous Approach
0NRP4KZ	Replacement of Right Orbit with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRQ0KZ	Replacement of Left Orbit with Nonautologous Tissue Substitute, Open Approach
0NRQ3KZ	Replacement of Left Orbit with Nonautologous Tissue Substitute, Percutaneous Approach
0NRQ4KZ	Replacement of Left Orbit with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRR07Z	Replacement of Right Maxilla with Autologous Tissue Substitute, Open Approach
0NRR0JZ	Replacement of Right Maxilla with Synthetic Substitute, Open Approach
0NRR0KZ	Replacement of Right Maxilla with Nonautologous Tissue Substitute, Open Approach
0NRR37Z	Replacement of Right Maxilla with Autologous Tissue Substitute, Percutaneous Approach
0NRR3JZ	Replacement of Right Maxilla with Synthetic Substitute, Percutaneous Approach
0NRR3KZ	Replacement of Right Maxilla with Nonautologous Tissue Substitute, Percutaneous Approach
0NRR47Z	Replacement of Right Maxilla with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRR4JZ	Replacement of Right Maxilla with Synthetic Substitute, Percutaneous Endoscopic Approach

0NRR4KZ	Replacement of Right Maxilla with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRS07Z	Replacement of Left Maxilla with Autologous Tissue Substitute, Open Approach
0NRS0JZ	Replacement of Left Maxilla with Synthetic Substitute, Open Approach
0NRS0KZ	Replacement of Left Maxilla with Nonautologous Tissue Substitute, Open Approach
0NRS37Z	Replacement of Left Maxilla with Autologous Tissue Substitute, Percutaneous Approach
0NRS3JZ	Replacement of Left Maxilla with Synthetic Substitute, Percutaneous Approach
0NRS3KZ	Replacement of Left Maxilla with Nonautologous Tissue Substitute, Percutaneous Approach
0NRS47Z	Replacement of Left Maxilla with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRS4JZ	Replacement of Left Maxilla with Synthetic Substitute, Percutaneous Endoscopic Approach
0NRS4KZ	Replacement of Left Maxilla with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRX07Z	Replacement of Hyoid Bone with Autologous Tissue Substitute, Open Approach
0NRX0JZ	Replacement of Hyoid Bone with Synthetic Substitute, Open Approach
0NRX0KZ	Replacement of Hyoid Bone with Nonautologous Tissue Substitute, Open Approach
0NRX37Z	Replacement of Hyoid Bone with Autologous Tissue Substitute, Percutaneous Approach
0NRX3JZ	Replacement of Hyoid Bone with Synthetic Substitute, Percutaneous Approach
0NRX3KZ	Replacement of Hyoid Bone with Nonautologous Tissue Substitute, Percutaneous Approach
0NRX47Z	Replacement of Hyoid Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NRX4JZ	Replacement of Hyoid Bone with Synthetic Substitute, Percutaneous Endoscopic Approach
0NRX4KZ	Replacement of Hyoid Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUC07Z	Supplement Right Sphenoid Bone with Autologous Tissue Substitute, Open Approach
0NUC0JZ	Supplement Right Sphenoid Bone with Synthetic Substitute, Open Approach
0NUC0KZ	Supplement Right Sphenoid Bone with Nonautologous Tissue Substitute, Open Approach
0NUC37Z	Supplement Right Sphenoid Bone with Autologous Tissue Substitute, Percutaneous Approach
0NUC3JZ	Supplement Right Sphenoid Bone with Synthetic Substitute, Percutaneous Approach
0NUC3KZ	Supplement Right Sphenoid Bone with Nonautologous Tissue Substitute, Percutaneous Approach
0NUC47Z	Supplement Right Sphenoid Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUC4JZ	Supplement Right Sphenoid Bone with Synthetic Substitute, Percutaneous Endoscopic Approach
0NUC4KZ	Supplement Right Sphenoid Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUD07Z	Supplement Left Sphenoid Bone with Autologous Tissue Substitute, Open Approach
0NUD0JZ	Supplement Left Sphenoid Bone with Synthetic Substitute, Open Approach
0NUD0KZ	Supplement Left Sphenoid Bone with Nonautologous Tissue Substitute, Open Approach
0NUD37Z	Supplement Left Sphenoid Bone with Autologous Tissue Substitute, Percutaneous Approach
0NUD3JZ	Supplement Left Sphenoid Bone with Synthetic Substitute, Percutaneous Approach
0NUD3KZ	Supplement Left Sphenoid Bone with Nonautologous Tissue Substitute, Percutaneous Approach

0NUD47Z	Supplement Left Sphenoid Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUD4JZ	Supplement Left Sphenoid Bone with Synthetic Substitute, Percutaneous Endoscopic Approach
0NUD4KZ	Supplement Left Sphenoid Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUF07Z	Supplement Right Ethmoid Bone with Autologous Tissue Substitute, Open Approach
0NUF0JZ	Supplement Right Ethmoid Bone with Synthetic Substitute, Open Approach
0NUF0KZ	Supplement Right Ethmoid Bone with Nonautologous Tissue Substitute, Open Approach
0NUF37Z	Supplement Right Ethmoid Bone with Autologous Tissue Substitute, Percutaneous Approach
0NUF3JZ	Supplement Right Ethmoid Bone with Synthetic Substitute, Percutaneous Approach
0NUF3KZ	Supplement Right Ethmoid Bone with Nonautologous Tissue Substitute, Percutaneous Approach
0NUF47Z	Supplement Right Ethmoid Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUF4JZ	Supplement Right Ethmoid Bone with Synthetic Substitute, Percutaneous Endoscopic Approach
0NUF4KZ	Supplement Right Ethmoid Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUG07Z	Supplement Left Ethmoid Bone with Autologous Tissue Substitute, Open Approach
0NUG0JZ	Supplement Left Ethmoid Bone with Synthetic Substitute, Open Approach
0NUG0KZ	Supplement Left Ethmoid Bone with Nonautologous Tissue Substitute, Open Approach
0NUG37Z	Supplement Left Ethmoid Bone with Autologous Tissue Substitute, Percutaneous Approach
0NUG3JZ	Supplement Left Ethmoid Bone with Synthetic Substitute, Percutaneous Approach
0NUG3KZ	Supplement Left Ethmoid Bone with Nonautologous Tissue Substitute, Percutaneous Approach
0NUG47Z	Supplement Left Ethmoid Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUG4JZ	Supplement Left Ethmoid Bone with Synthetic Substitute, Percutaneous Endoscopic Approach
0NUG4KZ	Supplement Left Ethmoid Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUH07Z	Supplement Right Lacrimal Bone with Autologous Tissue Substitute, Open Approach
0NUH0JZ	Supplement Right Lacrimal Bone with Synthetic Substitute, Open Approach
0NUH0KZ	Supplement Right Lacrimal Bone with Nonautologous Tissue Substitute, Open Approach
0NUH37Z	Supplement Right Lacrimal Bone with Autologous Tissue Substitute, Percutaneous Approach
0NUH3JZ	Supplement Right Lacrimal Bone with Synthetic Substitute, Percutaneous Approach
0NUH3KZ	Supplement Right Lacrimal Bone with Nonautologous Tissue Substitute, Percutaneous Approach
0NUH47Z	Supplement Right Lacrimal Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUH4JZ	Supplement Right Lacrimal Bone with Synthetic Substitute, Percutaneous Endoscopic Approach
0NUH4KZ	Supplement Right Lacrimal Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUJ07Z	Supplement Left Lacrimal Bone with Autologous Tissue Substitute, Open Approach
0NUJ0JZ	Supplement Left Lacrimal Bone with Synthetic Substitute, Open Approach
0NUJ0KZ	Supplement Left Lacrimal Bone with Nonautologous Tissue Substitute, Open Approach

0NUJ37Z	Supplement Left Lacrimal Bone with Autologous Tissue Substitute, Percutaneous Approach
0NUJ3JZ	Supplement Left Lacrimal Bone with Synthetic Substitute, Percutaneous Approach
0NUJ3KZ	Supplement Left Lacrimal Bone with Nonautologous Tissue Substitute, Percutaneous Approach
0NUJ47Z	Supplement Left Lacrimal Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUJ4JZ	Supplement Left Lacrimal Bone with Synthetic Substitute, Percutaneous Endoscopic Approach
0NUJ4KZ	Supplement Left Lacrimal Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUK07Z	Supplement Right Palatine Bone with Autologous Tissue Substitute, Open Approach
0NUK0JZ	Supplement Right Palatine Bone with Synthetic Substitute, Open Approach
0NUK0KZ	Supplement Right Palatine Bone with Nonautologous Tissue Substitute, Open Approach
0NUK37Z	Supplement Right Palatine Bone with Autologous Tissue Substitute, Percutaneous Approach
0NUK3JZ	Supplement Right Palatine Bone with Synthetic Substitute, Percutaneous Approach
0NUK3KZ	Supplement Right Palatine Bone with Nonautologous Tissue Substitute, Percutaneous Approach
0NUK47Z	Supplement Right Palatine Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUK4JZ	Supplement Right Palatine Bone with Synthetic Substitute, Percutaneous Endoscopic Approach
0NUK4KZ	Supplement Right Palatine Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUL07Z	Supplement Left Palatine Bone with Autologous Tissue Substitute, Open Approach
0NUL0JZ	Supplement Left Palatine Bone with Synthetic Substitute, Open Approach
0NUL0KZ	Supplement Left Palatine Bone with Nonautologous Tissue Substitute, Open Approach
0NUL37Z	Supplement Left Palatine Bone with Autologous Tissue Substitute, Percutaneous Approach
0NUL3JZ	Supplement Left Palatine Bone with Synthetic Substitute, Percutaneous Approach
0NUL3KZ	Supplement Left Palatine Bone with Nonautologous Tissue Substitute, Percutaneous Approach
0NUL47Z	Supplement Left Palatine Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUL4JZ	Supplement Left Palatine Bone with Synthetic Substitute, Percutaneous Endoscopic Approach
0NUL4KZ	Supplement Left Palatine Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUM07Z	Supplement Right Zygomatic Bone with Autologous Tissue Substitute, Open Approach
0NUM0JZ	Supplement Right Zygomatic Bone with Synthetic Substitute, Open Approach
0NUM0KZ	Supplement Right Zygomatic Bone with Nonautologous Tissue Substitute, Open Approach
0NUM37Z	Supplement Right Zygomatic Bone with Autologous Tissue Substitute, Percutaneous Approach
0NUM3JZ	Supplement Right Zygomatic Bone with Synthetic Substitute, Percutaneous Approach
0NUM3KZ	Supplement Right Zygomatic Bone with Nonautologous Tissue Substitute, Percutaneous Approach
0NUM47Z	Supplement Right Zygomatic Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUM4JZ	Supplement Right Zygomatic Bone with Synthetic Substitute, Percutaneous Endoscopic Approach

0NUM4KZ	Supplement Right Zygomatic Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUN07Z	Supplement Left Zygomatic Bone with Autologous Tissue Substitute, Open Approach
0NUN0JZ	Supplement Left Zygomatic Bone with Synthetic Substitute, Open Approach
0NUN0KZ	Supplement Left Zygomatic Bone with Nonautologous Tissue Substitute, Open Approach
0NUN37Z	Supplement Left Zygomatic Bone with Autologous Tissue Substitute, Percutaneous Approach
0NUN3JZ	Supplement Left Zygomatic Bone with Synthetic Substitute, Percutaneous Approach
0NUN3KZ	Supplement Left Zygomatic Bone with Nonautologous Tissue Substitute, Percutaneous Approach
0NUN47Z	Supplement Left Zygomatic Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUN4JZ	Supplement Left Zygomatic Bone with Synthetic Substitute, Percutaneous Endoscopic Approach
0NUN4KZ	Supplement Left Zygomatic Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUP07Z	Supplement Right Orbit with Autologous Tissue Substitute, Open Approach
0NUP0KZ	Supplement Right Orbit with Nonautologous Tissue Substitute, Open Approach
0NUP37Z	Supplement Right Orbit with Autologous Tissue Substitute, Percutaneous Approach
0NUP3KZ	Supplement Right Orbit with Nonautologous Tissue Substitute, Percutaneous Approach
0NUP47Z	Supplement Right Orbit with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUP4KZ	Supplement Right Orbit with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUQ07Z	Supplement Left Orbit with Autologous Tissue Substitute, Open Approach
0NUQ0KZ	Supplement Left Orbit with Nonautologous Tissue Substitute, Open Approach
0NUQ37Z	Supplement Left Orbit with Autologous Tissue Substitute, Percutaneous Approach
0NUQ3KZ	Supplement Left Orbit with Nonautologous Tissue Substitute, Percutaneous Approach
0NUQ47Z	Supplement Left Orbit with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUQ4KZ	Supplement Left Orbit with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUR07Z	Supplement Right Maxilla with Autologous Tissue Substitute, Open Approach
0NUR0JZ	Supplement Right Maxilla with Synthetic Substitute, Open Approach
0NUR0KZ	Supplement Right Maxilla with Nonautologous Tissue Substitute, Open Approach
0NUR37Z	Supplement Right Maxilla with Autologous Tissue Substitute, Percutaneous Approach
0NUR3JZ	Supplement Right Maxilla with Synthetic Substitute, Percutaneous Approach
0NUR3KZ	Supplement Right Maxilla with Nonautologous Tissue Substitute, Percutaneous Approach
0NUR47Z	Supplement Right Maxilla with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUR4JZ	Supplement Right Maxilla with Synthetic Substitute, Percutaneous Endoscopic Approach
0NUR4KZ	Supplement Right Maxilla with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUS07Z	Supplement Left Maxilla with Autologous Tissue Substitute, Open Approach
0NUS0JZ	Supplement Left Maxilla with Synthetic Substitute, Open Approach
0NUS0KZ	Supplement Left Maxilla with Nonautologous Tissue Substitute, Open Approach
0NUS37Z	Supplement Left Maxilla with Autologous Tissue Substitute, Percutaneous Approach
0NUS3JZ	Supplement Left Maxilla with Synthetic Substitute, Percutaneous Approach

0NUS3KZ	Supplement Left Maxilla with Nonautologous Tissue Substitute, Percutaneous Approach
0NUS47Z	Supplement Left Maxilla with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUS4JZ	Supplement Left Maxilla with Synthetic Substitute, Percutaneous Endoscopic Approach
0NUS4KZ	Supplement Left Maxilla with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUX07Z	Supplement Hyoid Bone with Autologous Tissue Substitute, Open Approach
0NUX0JZ	Supplement Hyoid Bone with Synthetic Substitute, Open Approach
0NUX0KZ	Supplement Hyoid Bone with Nonautologous Tissue Substitute, Open Approach
0NUX37Z	Supplement Hyoid Bone with Autologous Tissue Substitute, Percutaneous Approach
0NUX3JZ	Supplement Hyoid Bone with Synthetic Substitute, Percutaneous Approach
0NUX3KZ	Supplement Hyoid Bone with Nonautologous Tissue Substitute, Percutaneous Approach
0NUX47Z	Supplement Hyoid Bone with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0NUX4JZ	Supplement Hyoid Bone with Synthetic Substitute, Percutaneous Endoscopic Approach
0NUX4KZ	Supplement Hyoid Bone with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0RNC0ZZ	Release Right Temporomandibular Joint, Open Approach
0RNC3ZZ	Release Right Temporomandibular Joint, Percutaneous Approach
0RNC4ZZ	Release Right Temporomandibular Joint, Percutaneous Endoscopic Approach
0RND0ZZ	Release Left Temporomandibular Joint, Open Approach
0RND3ZZ	Release Left Temporomandibular Joint, Percutaneous Approach
0RND4ZZ	Release Left Temporomandibular Joint, Percutaneous Endoscopic Approach
0W0407Z	Alteration of Upper Jaw with Autologous Tissue Substitute, Open Approach
0W040JZ	Alteration of Upper Jaw with Synthetic Substitute, Open Approach
0W040KZ	Alteration of Upper Jaw with Nonautologous Tissue Substitute, Open Approach
0W040ZZ	Alteration of Upper Jaw, Open Approach
0W0437Z	Alteration of Upper Jaw with Autologous Tissue Substitute, Percutaneous Approach
0W043JZ	Alteration of Upper Jaw with Synthetic Substitute, Percutaneous Approach
0W043KZ	Alteration of Upper Jaw with Nonautologous Tissue Substitute, Percutaneous Approach
0W043ZZ	Alteration of Upper Jaw, Percutaneous Approach
0W0447Z	Alteration of Upper Jaw with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0W044JZ	Alteration of Upper Jaw with Synthetic Substitute, Percutaneous Endoscopic Approach
0W044KZ	Alteration of Upper Jaw with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0W044ZZ	Alteration of Upper Jaw, Percutaneous Endoscopic Approach
0W0507Z	Alteration of Lower Jaw with Autologous Tissue Substitute, Open Approach
0W050JZ	Alteration of Lower Jaw with Synthetic Substitute, Open Approach
0W050KZ	Alteration of Lower Jaw with Nonautologous Tissue Substitute, Open Approach
0W050ZZ	Alteration of Lower Jaw, Open Approach
0W0537Z	Alteration of Lower Jaw with Autologous Tissue Substitute, Percutaneous Approach
0W053JZ	Alteration of Lower Jaw with Synthetic Substitute, Percutaneous Approach
0W053KZ	Alteration of Lower Jaw with Nonautologous Tissue Substitute, Percutaneous Approach
0W053ZZ	Alteration of Lower Jaw, Percutaneous Approach
0W0547Z	Alteration of Lower Jaw with Autologous Tissue Substitute, Percutaneous Endoscopic Approach

0W054JZ	Alteration of Lower Jaw with Synthetic Substitute, Percutaneous Endoscopic Approach
0W054KZ	Alteration of Lower Jaw with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0W054ZZ	Alteration of Lower Jaw, Percutaneous Endoscopic Approach
0W020ZZ	Alteration of Face, Open Approach
0W0207Z	Alteration of Face with Autologous Tissue Substitute, Open Approach
0W020JZ	Alteration of Face with Synthetic Substitute, Open Approach
0W020KZ	Alteration of Face with Nonautologous Tissue Substitute, Open Approach
0W023ZZ	Alteration of Face, Percutaneous Approach
0W0247Z	Alteration of Face with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0W024JZ	Alteration of Face with Synthetic Substitute, Percutaneous Endoscopic Approach
0W024KZ	Alteration of Face with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0W024ZZ	Alteration of Face, Percutaneous Endoscopic Approach
0NS104Z	Reposition Right Frontal Bone with Internal Fixation Device, Open Approach
0NS204Z	Reposition Left Frontal Bone with Internal Fixation Device, Open Approach

Female to Male Surgery

ICD-10-PCS procedure codes:	**Code Description**
0VTC0ZZ	Resection of Bilateral Testes, Open Approach
0H0T0ZZ	Alteration of Right Breast, Open Approach
0H0T3ZZ	Alteration of Right Breast, Percutaneous Approach
0H0TXZZ	Alteration of Right Breast, External Approach
0H0U0ZZ	Alteration of Left Breast, Open Approach
0H0U3ZZ	Alteration of Left Breast, Percutaneous Approach
0H0UXZZ	Alteration of Left Breast, External Approach
0H0V07Z	Alteration of Bilateral Breast with Autologous Tissue Substitute, Open Approach
0H0V0JZ	Alteration of Bilateral Breast with Synthetic Substitute, Open Approach
0H0V0KZ	Alteration of Bilateral Breast with Nonautologous Tissue Substitute, Open Approach
0H0V0ZZ	Alteration of Bilateral Breast, Open Approach
0H0V37Z	Alteration of Bilateral Breast with Autologous Tissue Substitute, Percutaneous Approach
0H0V3JZ	Alteration of Bilateral Breast with Synthetic Substitute, Percutaneous Approach
0H0V3KZ	Alteration of Bilateral Breast with Nonautologous Tissue Substitute, Percutaneous Approach
0H0V3ZZ	Alteration of Bilateral Breast, Percutaneous Approach
0H0VXZZ	Alteration of Bilateral Breast, External Approach
0HDSXZZ	Extraction of Hair, External Approach
0HMTXZZ	Reattachment of Right Breast, External Approach
0HMUXZZ	Reattachment of Left Breast, External Approach
0HMVXZZ	Reattachment of Bilateral Breast, External Approach
0HMWXZZ	Reattachment of Right Nipple, External Approach
0HMXXZZ	Reattachment of Left Nipple, External Approach
0HNT0ZZ	Release Right Breast, Open Approach
0HNT3ZZ	Release Right Breast, Percutaneous Approach
0HNT7ZZ	Release Right Breast, Via Natural or Artificial Opening
0HNT8ZZ	Release Right Breast, Via Natural or Artificial Opening Endoscopic
0HNTXZZ	Release Right Breast, External Approach
0HNU0ZZ	Release Left Breast, Open Approach

0HNU3ZZ	Release Left Breast, Percutaneous Approach
0HNU7ZZ	Release Left Breast, Via Natural or Artificial Opening
0HNU8ZZ	Release Left Breast, Via Natural or Artificial Opening Endoscopic
0HNUXZZ	Release Left Breast, External Approach
0HNV0ZZ	Release Bilateral Breast, Open Approach
0HNV3ZZ	Release Bilateral Breast, Percutaneous Approach
0HNV7ZZ	Release Bilateral Breast, Via Natural or Artificial Opening
0HNV8ZZ	Release Bilateral Breast, Via Natural or Artificial Opening Endoscopic
0HNVXZZ	Release Bilateral Breast, External Approach
0HNW0ZZ	Release Right Nipple, Open Approach
0HNW3ZZ	Release Right Nipple, Percutaneous Approach
0HNW7ZZ	Release Right Nipple, Via Natural or Artificial Opening
0HNW8ZZ	Release Right Nipple, Via Natural or Artificial Opening Endoscopic
0HNWXZZ	Release Right Nipple, External Approach
0HNX0ZZ	Release Left Nipple, Open Approach
0HNX3ZZ	Release Left Nipple, Percutaneous Approach
0HNX7ZZ	Release Left Nipple, Via Natural or Artificial Opening
0HNX8ZZ	Release Left Nipple, Via Natural or Artificial Opening Endoscopic
0HNXXZZ	Release Left Nipple, External Approach
0HQT0ZZ	Repair Right Breast, Open Approach
0HQT3ZZ	Repair Right Breast, Percutaneous Approach
0HQT7ZZ	Repair Right Breast, Via Natural or Artificial Opening
0HQT8ZZ	Repair Right Breast, Via Natural or Artificial Opening Endoscopic
0HQTXZZ	Repair Right Breast, External Approach
0HQU0ZZ	Repair Left Breast, Open Approach
0HQU3ZZ	Repair Left Breast, Percutaneous Approach
0HQU7ZZ	Repair Left Breast, Via Natural or Artificial Opening
0HQU8ZZ	Repair Left Breast, Via Natural or Artificial Opening Endoscopic
0HQUXZZ	Repair Left Breast, External Approach
0HQV0ZZ	Repair Bilateral Breast, Open Approach
0HQV3ZZ	Repair Bilateral Breast, Percutaneous Approach
0HQV7ZZ	Repair Bilateral Breast, Via Natural or Artificial Opening
0HQV8ZZ	Repair Bilateral Breast, Via Natural or Artificial Opening Endoscopic
0HQVXZZ	Repair Bilateral Breast, External Approach
0HQW0ZZ	Repair Right Nipple, Open Approach
0HQW3ZZ	Repair Right Nipple, Percutaneous Approach
0HQW7ZZ	Repair Right Nipple, Via Natural or Artificial Opening
0HQW8ZZ	Repair Right Nipple, Via Natural or Artificial Opening Endoscopic
0HQWXZZ	Repair Right Nipple, External Approach
0HQX0ZZ	Repair Left Nipple, Open Approach
0HQX3ZZ	Repair Left Nipple, Percutaneous Approach
0HQX7ZZ	Repair Left Nipple, Via Natural or Artificial Opening
0HQX8ZZ	Repair Left Nipple, Via Natural or Artificial Opening Endoscopic
0HQXXZZ	Repair Left Nipple, External Approach
0HQY0ZZ	Repair Supernumerary Breast, Open Approach
0HQY3ZZ	Repair Supernumerary Breast, Percutaneous Approach
0HQY7ZZ	Repair Supernumerary Breast, Via Natural or Artificial Opening
0HQY8ZZ	Repair Supernumerary Breast, Via Natural or Artificial Opening Endoscopic
0HQYXZZ	Repair Supernumerary Breast, External Approach
0HRT07Z	Replacement of Right Breast with Autologous Tissue Substitute, Open Approach
0HRT0KZ	Replacement of Right Breast with Nonautologous Tissue Substitute, Open Approach

0HRT37Z	Replacement of Right Breast with Autologous Tissue Substitute, Percutaneous Approach
0HRT3KZ	Replacement of Right Breast with Nonautologous Tissue Substitute, Percutaneous Approach
0HRTXJZ	Replacement of Right Breast with Synthetic Substitute, External Approach
0HRU07Z	Replacement of Left Breast with Autologous Tissue Substitute, Open Approach
0HRU0KZ	Replacement of Left Breast with Nonautologous Tissue Substitute, Open Approach
0HRU37Z	Replacement of Left Breast with Autologous Tissue Substitute, Percutaneous Approach
0HRU3KZ	Replacement of Left Breast with Nonautologous Tissue Substitute, Percutaneous Approach
0HRUXJZ	Replacement of Left Breast with Synthetic Substitute, External Approach
0HRV07Z	Replacement of Bilateral Breast with Autologous Tissue Substitute, Open Approach
0HRV0KZ	Replacement of Bilateral Breast with Nonautologous Tissue Substitute, Open Approach
0HRV37Z	Replacement of Bilateral Breast with Autologous Tissue Substitute, Percutaneous Approach
0HRV3KZ	Replacement of Bilateral Breast with Nonautologous Tissue Substitute, Percutaneous Approach
0HRVXJZ	Replacement of Bilateral Breast with Synthetic Substitute, External Approach
0HRW07Z	Replacement of Right Nipple with Autologous Tissue Substitute, Open Approach
0HRW0JZ	Replacement of Right Nipple with Synthetic Substitute, Open Approach
0HRW0KZ	Replacement of Right Nipple with Nonautologous Tissue Substitute, Open Approach
0HRW37Z	Replacement of Right Nipple with Autologous Tissue Substitute, Percutaneous Approach
0HRW3JZ	Replacement of Right Nipple with Synthetic Substitute, Percutaneous Approach
0HRW3KZ	Replacement of Right Nipple with Nonautologous Tissue Substitute, Percutaneous Approach
0HRWX7Z	Replacement of Right Nipple with Autologous Tissue Substitute, External Approach
0HRWXJZ	Replacement of Right Nipple with Synthetic Substitute, External Approach
0HRWXKZ	Replacement of Right Nipple with Nonautologous Tissue Substitute, External Approach
0HRX07Z	Replacement of Left Nipple with Autologous Tissue Substitute, Open Approach
0HRX0JZ	Replacement of Left Nipple with Synthetic Substitute, Open Approach
0HRX0KZ	Replacement of Left Nipple with Nonautologous Tissue Substitute, Open Approach
0HRX37Z	Replacement of Left Nipple with Autologous Tissue Substitute, Percutaneous Approach
0HRX3JZ	Replacement of Left Nipple with Synthetic Substitute, Percutaneous Approach
0HRX3KZ	Replacement of Left Nipple with Nonautologous Tissue Substitute, Percutaneous Approach
0HRXX7Z	Replacement of Left Nipple with Autologous Tissue Substitute, External Approach
0HRXXJZ	Replacement of Left Nipple with Synthetic Substitute, External Approach
0HRXXKZ	Replacement of Left Nipple with Nonautologous Tissue Substitute, External Approach
0HUT07Z	Supplement Right Breast with Autologous Tissue Substitute, Open Approach
0HUT0JZ	Supplement Right Breast with Synthetic Substitute, Open Approach
0HUT0KZ	Supplement Right Breast with Nonautologous Tissue Substitute, Open Approach
0HUT37Z	Supplement Right Breast with Autologous Tissue Substitute, Percutaneous Approach
0HUT3JZ	Supplement Right Breast with Synthetic Substitute, Percutaneous Approach
0HUT3KZ	Supplement Right Breast with Nonautologous Tissue Substitute, Percutaneous Approach
0HUT77Z	Supplement Right Breast with Autologous Tissue Substitute, Via Natural or Artificial Opening
0HUT7JZ	Supplement Right Breast with Synthetic Substitute, Via Natural or Artificial Opening

0HUT7KZ	Supplement Right Breast with Nonautologous Tissue Substitute, Via Natural or Artificial Opening
0HUT87Z	Supplement Right Breast with Autologous Tissue Substitute, Via Natural or Artificial Opening Endoscopic
0HUT8JZ	Supplement Right Breast with Synthetic Substitute, Via Natural or Artificial Opening Endoscopic
0HUT8KZ	Supplement Right Breast with Nonautologous Tissue Substitute, Via Natural or Artificial Opening Endoscopic
0HUTX7Z	Supplement Right Breast with Autologous Tissue Substitute, External Approach
0HUTXJZ	Supplement Right Breast with Synthetic Substitute, External Approach
0HUTXKZ	Supplement Right Breast with Nonautologous Tissue Substitute, External Approach
0HUU07Z	Supplement Left Breast with Autologous Tissue Substitute, Open Approach
0HUU0JZ	Supplement Left Breast with Synthetic Substitute, Open Approach
0HUU0KZ	Supplement Left Breast with Nonautologous Tissue Substitute, Open Approach
0HUU37Z	Supplement Left Breast with Autologous Tissue Substitute, Percutaneous Approach
0HUU3JZ	Supplement Left Breast with Synthetic Substitute, Percutaneous Approach
0HUU3KZ	Supplement Left Breast with Nonautologous Tissue Substitute, Percutaneous Approach
0HUU77Z	Supplement Left Breast with Autologous Tissue Substitute, Via Natural or Artificial Opening
0HUU7JZ	Supplement Left Breast with Synthetic Substitute, Via Natural or Artificial Opening
0HUU7KZ	Supplement Left Breast with Nonautologous Tissue Substitute, Via Natural or Artificial Opening
0HUU87Z	Supplement Left Breast with Autologous Tissue Substitute, Via Natural or Artificial Opening Endoscopic
0HUU8JZ	Supplement Left Breast with Synthetic Substitute, Via Natural or Artificial Opening Endoscopic
0HUU8KZ	Supplement Left Breast with Nonautologous Tissue Substitute, Via Natural or Artificial Opening Endoscopic
0HUUX7Z	Supplement Left Breast with Autologous Tissue Substitute, External Approach
0HUUXJZ	Supplement Left Breast with Synthetic Substitute, External Approach
0HUUXKZ	Supplement Left Breast with Nonautologous Tissue Substitute, External Approach
0HUV07Z	Supplement Bilateral Breast with Autologous Tissue Substitute, Open Approach
0HUV0JZ	Supplement Bilateral Breast with Synthetic Substitute, Open Approach
0HUV0KZ	Supplement Bilateral Breast with Nonautologous Tissue Substitute, Open Approach
0HUV37Z	Supplement Bilateral Breast with Autologous Tissue Substitute, Percutaneous Approach
0HUV3JZ	Supplement Bilateral Breast with Synthetic Substitute, Percutaneous Approach
0HUV3KZ	Supplement Bilateral Breast with Nonautologous Tissue Substitute, Percutaneous Approach
0HUV77Z	Supplement Bilateral Breast with Autologous Tissue Substitute, Via Natural or Artificial Opening
0HUV7JZ	Supplement Bilateral Breast with Synthetic Substitute, Via Natural or Artificial Opening
0HUV7KZ	Supplement Bilateral Breast with Nonautologous Tissue Substitute, Via Natural or Artificial Opening
0HUV87Z	Supplement Bilateral Breast with Autologous Tissue Substitute, Via Natural or Artificial Opening Endoscopic
0HUV8JZ	Supplement Bilateral Breast with Synthetic Substitute, Via Natural or Artificial Opening Endoscopic
0HUV8KZ	Supplement Bilateral Breast with Nonautologous Tissue Substitute, Via Natural or Artificial Opening Endoscopic
0HUVX7Z	Supplement Bilateral Breast with Autologous Tissue Substitute, External Approach
0HUVXJZ	Supplement Bilateral Breast with Synthetic Substitute, External Approach

0HUVXKZ	Supplement Bilateral Breast with Nonautologous Tissue Substitute, External Approach
0HUW07Z	Supplement Right Nipple with Autologous Tissue Substitute, Open Approach
0HUW0JZ	Supplement Right Nipple with Synthetic Substitute, Open Approach
0HUW0KZ	Supplement Right Nipple with Nonautologous Tissue Substitute, Open Approach
0HUW37Z	Supplement Right Nipple with Autologous Tissue Substitute, Percutaneous Approach
0HUW3JZ	Supplement Right Nipple with Synthetic Substitute, Percutaneous Approach
0HUW3KZ	Supplement Right Nipple with Nonautologous Tissue Substitute, Percutaneous Approach
0HUW77Z	Supplement Right Nipple with Autologous Tissue Substitute, Via Natural or Artificial Opening
0HUW7JZ	Supplement Right Nipple with Synthetic Substitute, Via Natural or Artificial Opening
0HUW7KZ	Supplement Right Nipple with Nonautologous Tissue Substitute, Via Natural or Artificial Opening
0HUW87Z	Supplement Right Nipple with Autologous Tissue Substitute, Via Natural or Artificial Opening Endoscopic
0HUW8JZ	Supplement Right Nipple with Synthetic Substitute, Via Natural or Artificial Opening Endoscopic
0HUW8KZ	Supplement Right Nipple with Nonautologous Tissue Substitute, Via Natural or Artificial Opening Endoscopic
0HUWX7Z	Supplement Right Nipple with Autologous Tissue Substitute, External Approach
0HUWXJZ	Supplement Right Nipple with Synthetic Substitute, External Approach
0HUWXKZ	Supplement Right Nipple with Nonautologous Tissue Substitute, External Approach
0HUX07Z	Supplement Left Nipple with Autologous Tissue Substitute, Open Approach
0HUX0JZ	Supplement Left Nipple with Synthetic Substitute, Open Approach
0HUX0KZ	Supplement Left Nipple with Nonautologous Tissue Substitute, Open Approach
0HUX37Z	Supplement Left Nipple with Autologous Tissue Substitute, Percutaneous Approach
0HUX3JZ	Supplement Left Nipple with Synthetic Substitute, Percutaneous Approach
0HUX3KZ	Supplement Left Nipple with Nonautologous Tissue Substitute, Percutaneous Approach
0HUX77Z	Supplement Left Nipple with Autologous Tissue Substitute, Via Natural or Artificial Opening
0HUX7JZ	Supplement Left Nipple with Synthetic Substitute, Via Natural or Artificial Opening
0HUX7KZ	Supplement Left Nipple with Nonautologous Tissue Substitute, Via Natural or Artificial Opening
0HUX87Z	Supplement Left Nipple with Autologous Tissue Substitute, Via Natural or Artificial Opening Endoscopic
0HUX8JZ	Supplement Left Nipple with Synthetic Substitute, Via Natural or Artificial Opening Endoscopic
0HUX8KZ	Supplement Left Nipple with Nonautologous Tissue Substitute, Via Natural or Artificial Opening Endoscopic
0HUXX7Z	Supplement Left Nipple with Autologous Tissue Substitute, External Approach
0HUXXJZ	Supplement Left Nipple with Synthetic Substitute, External Approach
0HUXXKZ	Supplement Left Nipple with Nonautologous Tissue Substitute, External Approach
0U5J0ZZ	Destruction of Clitoris, Open Approach
0U5JXZZ	Destruction of Clitoris, External Approach
0U9J00Z	Drainage of Clitoris with Drainage Device, Open Approach
0U9J0ZZ	Drainage of Clitoris, Open Approach
0U9JX0Z	Drainage of Clitoris with Drainage Device, External Approach
0U9JXZZ	Drainage of Clitoris, External Approach
0UBJ0ZX	Excision of Clitoris, Open Approach, Diagnostic
0UBJ0ZZ	Excision of Clitoris, Open Approach
0UBJXZX	Excision of Clitoris, External Approach, Diagnostic

0UBJXZZ	Excision of Clitoris, External Approach
0UCJ0ZZ	Extirpation of Matter from Clitoris, Open Approach
0UCJXZZ	Extirpation of Matter from Clitoris, External Approach
0UMJXZZ	Reattachment of Clitoris, External Approach
0UNJ0ZZ	Release Clitoris, Open Approach
0UNJXZZ	Release Clitoris, External Approach
0UQG0ZZ	Repair Vagina, Open Approach
0UQJ0ZZ	Repair Clitoris, Open Approach
0UQJXZZ	Repair Clitoris, External Approach
0UTJ0ZZ	Resection of Clitoris, Open Approach
0UTJXZZ	Resection of Clitoris, External Approach
0UUG07Z	Supplement Vagina with Autologous Tissue Substitute, Open Approach
0UUG0JZ	Supplement Vagina with Synthetic Substitute, Open Approach
0UUG0KZ	Supplement Vagina with Nonautologous Tissue Substitute, Open Approach
0UUG47Z	Supplement Vagina with Autologous Tissue Substitute, Percutaneous Endoscopic Approach
0UUG4JZ	Supplement Vagina with Synthetic Substitute, Percutaneous Endoscopic Approach
0UUG4KZ	Supplement Vagina with Nonautologous Tissue Substitute, Percutaneous Endoscopic Approach
0UUG77Z	Supplement Vagina with Autologous Tissue Substitute, Via Natural or Artificial Opening
0UUG7JZ	Supplement Vagina with Synthetic Substitute, Via Natural or Artificial Opening
0UUG7KZ	Supplement Vagina with Nonautologous Tissue Substitute, Via Natural or Artificial Opening
0UUG87Z	Supplement Vagina with Autologous Tissue Substitute, Via Natural or Artificial Opening Endoscopic
0UUG8JZ	Supplement Vagina with Synthetic Substitute, Via Natural or Artificial Opening Endoscopic
0UUG8KZ	Supplement Vagina with Nonautologous Tissue Substitute, Via Natural or Artificial Opening Endoscopic
0UUGX7Z	Supplement Vagina with Autologous Tissue Substitute, External Approach
0UUGXJZ	Supplement Vagina with Synthetic Substitute, External Approach
0UUGXKZ	Supplement Vagina with Nonautologous Tissue Substitute, External Approach
0UUJ07Z	Supplement Clitoris with Autologous Tissue Substitute, Open Approach
0UUJ0JZ	Supplement Clitoris with Synthetic Substitute, Open Approach
0UUJ0KZ	Supplement Clitoris with Nonautologous Tissue Substitute, Open Approach
0UUJX7Z	Supplement Clitoris with Autologous Tissue Substitute, External Approach
0UUJXJZ	Supplement Clitoris with Synthetic Substitute, External Approach
0UUJXKZ	Supplement Clitoris with Nonautologous Tissue Substitute, External Approach
0VT90ZZ	Resection of Right Testis, Open Approach
0VT94ZZ	Resection of Right Testis, Percutaneous Endoscopic Approach
0VTB0ZZ	Resection of Left Testis, Open Approach
0VTB4ZZ	Resection of Left Testis, Percutaneous Endoscopic Approach
0VTC4ZZ	Resection of Bilateral Testes, Percutaneous Endoscopic Approach
0VTS0ZZ	Resection of Penis, Open Approach
0VTS4ZZ	Resection of Penis, Percutaneous Endoscopic Approach
0VTSXZZ	Resection of Penis, External Approach
0W4N071	Creation of Penis in Female Perineum with Autologous Tissue Substitute, Open Approach
0W4N0J1	Creation of Penis in Female Perineum with Synthetic Substitute, Open Approach
0W4N0K1	Creation of Penis in Female Perineum with Nonautologous Tissue Substitute, Open Approach
0W4N0Z1	Creation of Penis in Female Perineum, Open Approach

Endnotes

[1] Based on local expert opinion

Exhibit D

DeanHealthPlan
A member of SSM Health

Coverage of any medical intervention discussed in a Dean Health Plan medical policy is subject to the limitations and exclusions outlined in the member's benefit certificate.

Sex Transformation Surgery (market-based) MP9465

Covered Service:	**Yes, when member has the Sex Transformation Surgery Rider and meets criteria below.**
Prior Authorization Required:	Yes–as shown below
Additional Information:	The medical policy criteria herein govern coverage determinations for certain Sex Transformation Surgeries for those members covered under a certificate that includes a Sex Transformation Surgery rider. The medical policy applies only to those Sex Transformation Surgery services covered under the rider. All Sex Transformation Surgery services not covered under the rider are governed by MP9469, Sex Transformation Surgery (standard). Sex Transformation Surgeries for those members covered under a certificate that does not include a Sex Transformation Surgery Rider are governed by MP9469, Sex Transformation Surgery (standard). Authorization may only be granted if the member is an active participant in a recognized gender identity treatment program. Sex Transformation Surgery is defined as a surgery performed for the treatment of a confirmed gender dysphoria diagnosis.
Medicare Policy:	Does not apply.
BadgerCare Plus Policy:	Does not apply.

Dean Health Plan Medical Policy:

1.0 **All** Sex Transformation Surgeries **require** prior authorization through the Quality and Care Management Division and are considered medically appropriate when **all** the following are met:

1.1 Letter of referral for surgery from the individual's qualified mental health professional competent in the assessment and treatment of gender dysphoria, which includes:

1.1.1 Letter of referral should include **all** the following information:

1.1.1.1 Member's general identifying characteristics; and

Williams Report Ex. D

Roth Decl. Ex. R

1.1.1.2 Results of the client's psychosocial assessment, including any diagnoses; and

1.1.1.3 The duration of the mental health professional's relationship with the client, including the type of evaluation and therapy or counseling to date; and

1.1.1.4 An explanation that the World Professional Association for Transgender Health (WPATH) criteria for surgery have been met, and a brief description of the clinical rationale for supporting the member's request for surgery; and

1.1.1.5 A statement about the fact that informed consent has been obtained from the member.

1.1.2 One letter of referral is required for breast/chest surgery (e.g., mastectomy, chest reconstruction, or augmentation mammoplasty); **and**

1.1.3 One independent letter of referral is required for genital surgery

1.2 Persistent, well-documented gender dysphoria; **and**

1.3 Capacity to make a fully informed decision and to consent to treatment; **and**

1.4 Age of majority (18 years of age or older); **and**

1.5 If significant medical or mental health concerns are present, conditions must be reasonably well-controlled; **and**

1.6 The member may be required to complete twelve months of continuous and compliant hormone therapy as appropriate to the member's gender goals (unless the member has a medical contraindication or is otherwise unable or unwilling to take hormones); **and**

1.6.1 If required documentation of at least 12 months of continuous hormonal sex reassignment therapy; **and**

1.6.2 The physician responsible for endocrine transition therapy must medically clear the individual for sex reassignment surgery and collaborate with the surgeon regarding hormone use during and after surgery.

1.7 The treatment plan must conform to identifiable external sources including the World Professional Association for Transgender Health Association (WPATH), and/or professional society guidance.

Williams Report Ex. D

Roth Decl. Ex. R

DeanHealthPlan
A member of SSM Health

Coverage of any medical intervention discussed in a Dean Health Plan medical policy is subject to the limitations and exclusions outlined in the member's benefit certificate.

	Committee/Source	Date(s)
Originated:	Medical Policy Committee/Quality and Care Management Division	October 31, 2016
Revised:		
Reviewed:		

Published/Effective: 01/01/2017

Williams Report Ex. D
Roth Decl. Ex. R

Exhibit E

DeanHealthPlan
A member of SSM Health

Coverage of any medical intervention discussed in a Dean Health Plan medical policy is subject to the limitations and exclusions outlined in the member's benefit certificate.

Sex Transformation Surgery (standard) MP9469

Covered Service:	No
Prior Authorization Required:	Not covered
Additional Information:	The medical policy criteria herein govern coverage of the identified categories of Sex Transformation Surgery for treatment of persons with gender dysphoria. For those members covered under a certificate that includes a market-based Sex Transformation Surgery Rider, certain Sex Transformation Surgery services may be governed by MP9465 Sex Transformation Surgery (market-based). Sex Transformation Surgery is defined as a surgery performed for the treatment of a confirmed gender dysphoria diagnosis.
Medicare Policy:	Dean Health Plan makes coverage determinations on an individual claim basis.
BadgerCare Plus Policy:	Dean Health Plan covers when BadgerCare Plus also covers the benefit.

Dean Health Plan Medical Policy:

1.0 Quality and Care Management has determined the following after review of current medical literature and studies regarding the identified categories of Sex Transformation Surgery:

2.0 Based upon lack of published evidence showing conclusively the long-term safety and positive impact on health outcomes, the following categories of Sex Transformation Surgery should be considered not medically necessary:

2.1 Male to Female transition (55970):

2.1.1 Breast augmentation (19324, 19325, 19340, 19342, 19350)

2.1.2 Orchiectomy (54520, 54522, 54690)

2.1.3 Penectomy (54125)

2.1.4 Vaginoplasty (57335)

2.1.5 Colovaginoplasty (55899, 57291, 57292, 58999)

2.1.6 Clitoroplasty (56805)

Williams Report Ex. E

Roth Decl. Ex. R

2.1.7 Labiaplasty (55899, 58999)

2.2 Female to Male transition (55980):

2.2.1 Breast reduction/mastectomy (19301, 19303, 19304, 19318)

2.2.2 Hysterectomy (58150, 58180, 58260-58262, 58275, 58285, 58290, 58291, 58541, 58542, 58543, 58544, 58550, 58552, 58553, 58554, 58570, 58571, 58572, 58573)

2.2.3 Salpingo-oophrectomy (58661, 58720)

2.2.4 Colpectomy / vaginectomy (57106, 57107, 57110, 57111)

2.2.5 Metoidioplasty (55899, 58999)

2.2.6 Phalloplasty (55899, 58999)

2.2.7 Urethroplasty (53430)

2.2.8 Scrotoplasty (55175, 55180)

2.2.9 Placement of erectile prosthesis (54400, 54401, 54405, 54406, 54408, 54410, 54411, 54415, 54416, 54417)

2.2.10 Vulvectomy (56625)

3.0 The following procedures, which may be requested as part of sex transformation surgery, are non-covered benefits because they are generally performed to enhance body appearance and are not reconstructive in nature. This is not an all-inclusive list. Please see MP9022 Plastic and Reconstructive Surgery for additional information:

3.1 Abdominoplasty

3.2 Blepharoplasty or brow ptosis surgery

3.3 Body contouring (including liposuction or subcutaneous injection of filling material)

3.4 Calf implants

3.5 Cheek (malar) implants, nose implants or chin implants

3.6 Face lift or neck lift (rhytidectomy)

3.7 Facial bone reduction

3.8 Feminization of torso

3.9 Hair transplant or removal

3.10 Lip reduction or enhancement

3.11 Masculinization of torso (pectoral implants)

3.12 Mastopexy

3.13 Reduction thyroid chondroplasty

3.14 Removal of excess or redundant skin

Williams Report Ex. E

Roth Decl. Ex. R

3.15 Rhinoplasty

3.16 Skin resurfacing (including dermabrasion, chemical peel or chemical exfoliation)

3.17 Voice modification surgery (including laryngoplasty, cricothyroid approximation or vocal cord shortening)

4.0 Surgical Procedures accompanying a diagnosis of gender dysphoria that have not been listed above must be reviewed by a Medical Director for medical necessity.

	Committee/Source	**Date(s)**
Originated:	Medical Policy Committee/Quality and Care Management Division	October 31, 2016
Revised:	Medical Policy Committee/Quality and Care Management Division	April 19, 2017
Reviewed:	Medical Policy Committee/Quality and Care Management Division	April 19, 2017

Published/Effective: 05/01/2017

Williams Report Ex. E

Roth Decl. Ex. R