

Pathways to parenthood among transgender men and gender diverse people assigned female or intersex at birth in the United States: analysis of a Cross-Sectional 2019 Survey



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OBJECTIVE: To assess pathways to parenthood, pregnancy outcomes, future pregnancy desire, and fertility counseling experiences among a cross-sectional sample of transgender men and gender diverse individuals assigned female or intersex at birth in the United States

METHODS: Participants were recruited from The Population Research in Identity and Disparities for Equality (PRIDE) Study and the general public. Eligible participants for this analysis were able to read and understand English, assigned female or intersex at birth, US residents, 18+ years old, and identified as transgender, nonbinary, or gender diverse. We analyzed responses to close-ended survey questions, overall and stratified by gender identity, race/ethnicity, and testosterone use. We also qualitatively assessed open-text responses on fertility counseling.

RESULTS: Among the 1694 participants, median age was 27 years (range: 18–72), 12% had ever been pregnant, and 12% were parents. Carrying a pregnancy where the individual was the egg source (36%) was the most common pathway to parenthood. Individuals with an exclusively binary gender identity (ie, transgender man or man) more often reported becoming parents through adoption than individuals with gender diverse identities (19% vs 12%). A third of individuals did not receive fertility counseling prior to initiating testosterone; individuals who exclusively reported nonbinary identities were recommended to investigate fertility preservation options less often (36%) compared to transgender men (50%).

CONCLUSION: Transgender men and gender diverse individuals who were assigned female or intersex at birth build their families through a variety of pathways, including pregnancy, stepparenting, and adoption. Clinicians should avoid making assumptions about reproductive desires in these populations based on gender identities or testosterone use and should provide consistent fertility counseling prior to and after hormone initiation.

Key words: family building, fertility counseling, non-binary persons, parenthood, pregnancy, reproduction, sexual and gender minorities, sexual health, transgender persons

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AJOG Global Reports at a Glance

Why was this study conducted?

Data on the pathways to parenthood for TMGD individuals, particularly regarding pregnancy, are needed to support evidence-based, culturally-competent reproductive healthcare.

Key findings

Transgender men and gender diverse individuals who were assigned female or intersex at birth build their families through a variety of pathways, including pregnancy, stepparenting, and adoption. A third of individuals did not receive fertility counseling prior to initiating testosterone. Individuals who exclusively reported nonbinary identities were recommended to investigate fertility preservation options less often compared to transgender men.

What does this add to what is known?

Transgender men and gender diverse individuals often become parents through diverse means and can desire to become pregnant in the future. There is a need for additional transgender-specific research and patient resources on conception after testosterone therapy.

Introduction

Varied pathways to parenthood exist for lesbian, gay, bisexual, transgender, queer, intersex, and asexual (LGBTQIA+) individuals, including through adoption or fostering, medically assisted reproduction supported pregnancy, and sexual activity leading to pregnancy.^{1,2} While research examining aspects of LGBTQIA+ parenthood and family life exists, there is limited information on how transgender men and gender diverse (TMGD) people assigned female or intersex at birth specifically build their families.^{1,3} Many TMGD individuals who were assigned female or intersex at birth have a uterus, and some choose to carry pregnancies.^{4,5} Understanding the pathways to parenthood is increasingly important given that TMGD people have unique birthing experiences and face substantial barriers within legal and healthcare systems, rooted in institutional erasure and structural cisnormativity and heteronormativity.^{6–14} Rich qualitative and mixed-methods work provides a foundation for understanding the complex and nuanced journeys of TMGD people pursuing parenthood, but there is a paucity of descriptive and quantitative work on this topic.^{4,8,15–18}

Data on the pathways to parenthood for TMGD individuals, particularly regarding pregnancy, are needed to

support evidence-based, culturally-competent reproductive healthcare. To address this gap and contribute to the epidemiological evidence base, we conducted a descriptive, quantitative analysis of data from a cross-sectional national survey among a large sample of TMGD individuals in the United States (US) who were assigned female or intersex at birth.

Methods**Study population**

We recruited participants from two sources: (1) The Population Research in Identity and Disparities for Equality (PRIDE) Study, a longitudinal cohort study of LGBTQIA+ adults (18+ years) in the US¹⁹ and (2) from the general public. Between May and September 2019, The PRIDE Study participants could opt into a self-administered cross-sectional online survey within their participant dashboard. We additionally recruited TMGD individuals aged 18 to 45 *via* social media posts, e-mail distribution lists, word of mouth, and flyers at academic conferences and community events (details elsewhere⁹). This age range was targeted to recruit individuals most likely to be of reproductive ages and per original grant/funding materials. For these participants recruited from the general public,

the survey could be accessed anonymously online *via* a standalone website distinct from The PRIDE Study. All eligible participants could read and understand English, were assigned female or intersex at birth, resided in the US, and identified as LGBTQIA+ (The PRIDE Study), or more specifically identified as transgender or gender diverse (general public). Upon survey completion, participants could opt into a raffle to receive one of 100 \$50 electronic gift cards. We used a validated two-step approach, augmented with write-in gender identity responses, to identify TMGD participants (Appendix B).²⁰ Results from cisgender sexual minority women from this sample are described elsewhere.²¹

Data collection

The online survey on sexual and reproductive health needs and experiences of LGBTQIA+ individuals is described elsewhere.⁹ To maximize comfort, participants could customize up to nine medical words and phrases regarding reproductive anatomy and processes (*eg*, “vagina,” “period,” “pregnant,” *etc.*) that were propagated throughout the survey (described elsewhere^{9,22}). The survey included the following topics: current gender identity, sex assigned at birth, current sexual orientation, gender affirmation process history, sexual activity, contraceptive use and preferences, pregnancy history and desires, abortion history, and preferences, priorities for sexual and reproductive health care, and family building experiences.²²

Study measures

Primary outcomes included pathways to parenthood and pregnancy outcomes, assessed using structured questions. Given that not all individuals build their families through pregnancy, we examined whether participants were parents or if they had ever been pregnant. We assessed if participants were ever pregnant or currently pregnant, their number of previous pregnancies, pregnancy outcomes (miscarriage, ectopic pregnancy, abortion, stillbirth, live birth, and cesarean birth), and prospective pregnancy intentions. We derived testosterone use

as a dichotomous ‘ever used’ *versus* ‘never used’ variable, and assessed whether and when participants received fertility counseling associated with the receipt of gender affirming hormones, puberty blockers, and surgery. Relevant survey items are presented in [Appendix B](#) and a prior publication.⁹

We created three exclusive analytic categories for gender: (1) individuals who only endorsed man or transgender man; (2) individuals who only endorsed a gender diverse identity (ie, agender, genderqueer, nonbinary, Two-spirit, additional write-in gender); and (3) individuals who endorsed man or transgender man along with any gender diverse identities. For brevity, we subsequently refer to these groups as “binary gender identity only,” “gender diverse identity only,” and “both binary and gender diverse identity,” respectively. We excluded participants who only endorsed one or more of the following: woman, transgender woman, or cisgender woman. We assessed racial and ethnic identity as a social category. Additional self-reported characteristics at the time of survey completion included age, sexual orientation, annual household income, relationship status, marital status, education, health insurance coverage, percent of healthcare providers aware of gender identity, and US census region (created by assigning zip codes to states and US census regions).

Analyses. We analyzed close-ended multiple-choice and open-ended survey questions. Frequencies, percentages, and medians were calculated for participant characteristics, overall and stratified by whether the participant was a parent or had ever been pregnant. Additionally, frequencies were calculated for pathways to parenthood, pregnancy experiences, pregnancy intentions, and fertility counseling received by individuals who ever used testosterone in the overall sample as well as stratified using the three analytic gender categories described above and race/ethnicity. We also assessed pregnancy intentions stratified by testosterone use.

When queried about fertility counseling experiences while initiating gender affirming hormones, participants could provide further context through an open-ended response field ([Appendix B](#)). As an exploratory analysis, a rapid qualitative analysis (an alternative to thematic analysis) of these responses was conducted to identify key themes and exemplary quotations.²³

This study was reviewed and approved by the Institutional Review Boards (IRB) of Stanford University and the University of California, San Francisco, and is now included in continuing review by WCG IRB. Additionally, The PRIDE Study Research Advisory Committee and The PRIDE Study Participant Advisory Committee (pridestudy.org/pridenet) reviewed and approved the study. All analyses were performed in SAS 9.4 (Cary, NC).

Results

Participant characteristics

Of the 1,694 individuals who identified as TMGD, 99.4% were assigned female at birth (0.4% selected “Not listed”; wrote-in responses included “intersex,” “intersex female,” “both male and female,” “was not assigned a sex,” and others). A total of 322 individuals endorsed at least one racial/ethnic identity other than Non-Latinx White (19%; [Table 1](#)). Participants often selected multiple sexual orientations (60%) and multiple gender identities (61%). Commonly endorsed sexual orientations included queer (68%) and bisexual (34%) and commonly endorsed gender identities included nonbinary (51%) and transgender man (39%). In the sample, 12% (n=210) of individuals had ever been pregnant, and 12% (n=200) were parents; 57% (n=113) of parents had ever been pregnant.

Pathways to parenthood

Among parents (n=200), carrying a pregnancy as the egg source (36%) was the most common pathway to parenthood (94% of these individuals co-selected sexual activity leading to pregnancy; [Table 2](#)). In addition, participants became parents through stepparenting (25.5%), adoption (13.5%), and fostering

(5.5%). Individuals with binary gender identity only (ie, transgender man or man) were equally likely to become parents through carrying a pregnancy as the egg source (29%) or stepparenting (29%); adoption (19%) were also common. In contrast, individuals with gender diverse identity only were more likely to become parents through carrying a pregnancy as the egg source (38%) or use sexual activity to get pregnant (41%); we observed similar results for individuals with both binary and gender diverse identity (42% for both carrying a pregnancy as the egg source and using sexual activity to get pregnant). Anonymous donor sperm for pregnancy was more often used by individuals with binary gender identity only (19%), compared to individuals with gender diverse identity only (11%) or those who endorsed both gender diverse and binary identities (8%). Data on pathways to parenthood, pregnancy intentions, and hormone use stratified by race/ethnicity can be found in the supplementary materials ([Table A.1](#), [A.2](#) and [A.4](#)).

Pregnancy experiences and intentions

Among participants who had ever been pregnant (n=210), there were 433 pregnancies ([Table 3](#)). Gender groups had similar history of live birth: 44% of individuals with a binary identity only, 39% of gender diverse individuals, and 41% who endorsed both binary and gender diverse identity. Miscarriage was more common among individuals with gender diverse identity only (38%), while individuals who endorsed binary gender only or individuals who endorsed both binary and gender diverse identity more commonly had abortions (27% and 29%, respectively, compared to 19% among gender diverse identity only). Pregnancy outcomes stratified by race/ethnicity are reported elsewhere.¹⁹

Individuals with binary gender identity were more likely to have ever used testosterone (87% for binary only, 81% for both binary and gender diverse), compared to those with a gender diverse identity only (22%; [Table 5](#)). A higher proportion of individuals who had ever used testosterone desired a future

TABLE 1

Participant characteristics of a sample of transgender men and gender diverse individuals assigned female or intersex at birth, overall and stratified by status as a parent and by pregnancy history (N=1694)

	Overall (N=1694)	Is a parent ^a		Has ever been pregnant ^b	
		Yes (N=200, 11.8%)	No (N=1420, 83.8%)	Yes (N=210, 12.4%)	No (N = 1455, 85.9%)
Age in years, Median (IQR)	27.1 (17.1, 37.1)	39 (25.1, 52.9)	26.1 (17.6, 34.7)	34.9 (21.8, 48)	26.3 (17.1, 35.5)
	N (%)	N (%)	N (%)	N (%)	N (%)
Race^c					
American Indian or Alaska Native	42 (2.5)	7 (3.5)	35 (2.5)	9 (4.3)	33 (2.3)
Asian ^d	77 (4.6)	4 (2)	73 (5.1)	12 (5.7)	65 (4.5)
Black or African American	67 (4)	6 (3)	61 (4.3)	8 (3.8)	59 (4.1)
Hispanic or Latinx	101 (6)	10 (5)	91 (6.4)	13 (6.2)	88 (6.1)
Middle Eastern or North African	24 (1.4)	3 (1.5)	21 (1.5)	5 (2.4)	19 (1.3)
Native Hawaiian or Pacific Islander	5 (0.3)	0 (0)	5 (0.4)	0 (0)	5 (0.3)
White	1472 (86.9)	183 (91.5)	1289 (90.8)	190 (90.5)	1280 (88)
None of these	57 (3.4)	6 (3)	51 (3.6)	11 (5.2)	46 (3.2)
Another/Unknown	4 (0.2)	2 (1)	2 (0.1)	2 (1)	2 (0.1)
Multiple racial identities	202 (11.9)	16 (8)	186 (13.1)	34 (16.2)	168 (11.6)
Missing	96 (5.7)	2 (1)	20 (1.4)	8 (3.8)	61 (4.2)
Sexual orientation^c					
Asexual	252 (14.9)	15 (7.5)	232 (16.3)	20 (9.5)	232 (16)
Gay	348 (20.5)	25 (12.5)	317 (22.3)	47 (22.4)	301 (20.7)
Bisexual	571 (33.7)	54 (27)	506 (35.6)	68 (32.4)	499 (34.3)
Lesbian	218 (12.9)	36 (18)	178 (12.5)	26 (12.4)	191 (13.1)
Pansexual	418 (24.7)	56 (28)	346 (24.4)	74 (35.2)	339 (23.3)
Queer	1150 (67.9)	134 (67)	984 (69.3)	142 (67.6)	1000 (68.7)
Same-gender loving	111 (6.6)	18 (9)	91 (6.4)	17 (8.1)	94 (6.5)
Straight	61 (3.6)	16 (8)	43 (3)	4 (1.9)	57 (3.9)
Questioning	69 (4.1)	3 (1.5)	65 (4.6)	7 (3.3)	61 (4.2)
Another sexual orientation	129 (7.6)	15 (7.5)	105 (7.4)	17 (8.1)	112 (7.7)
Multiple sexual orientations	1010 (59.6)	101 (50.5)	885 (62.3)	126 (60)	879 (60.4)
Missing	75 (4.4)	14 (7)	38 (2.7)	2 (1)	53 (3.6)
Gender Identity^c					
Agender	226 (13.3)	19 (9.5)	197 (13.9)	34 (16.2)	189 (13)
Cisgender Woman	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Genderqueer	655 (38.7)	82 (41)	559 (39.4)	95 (45.2)	554 (38.1)
Man	293 (17.3)	33 (16.5)	245 (17.3)	19 (9.1)	269 (18.5)
Nonbinary	868 (51.2)	87 (43.5)	751 (52.9)	110 (52.4)	745 (51.2)
Prefer not to say	2 (0.1)	1 (0.5)	1 (0.1)	1 (0.5)	1 (0.1)
Transgender man	662 (39.1)	85 (42.5)	542 (38.2)	70 (33.3)	579 (39.8)
Transgender woman	4 (0.2)	1 (0.5)	1 (0.1)	1 (0.5)	2 (0.1)
Two-spirit	26 (1.5)	9 (4.5)	15 (1.1)	9 (4.3)	16 (1.1)

(continued)

TABLE 1**Participant characteristics of a sample of transgender men and gender diverse individuals assigned female or intersex at birth, overall and stratified by status as a parent and by pregnancy history (N=1694) (continued)**

	Overall (N=1694)	Is a parent ^a		Has ever been pregnant ^b	
		Yes (N=200, 11.8%)	No (N=1420, 83.8%)	Yes (N=210, 12.4%)	No (N = 1455, 85.9%)
Woman	204 (12)	21 (10.5)	176 (12.4)	20 (9.5)	181 (12.4)
Multiple gender identities	1036 (61.2)	113 (56.5)	887 (62.5)	118 (56.2)	901 (61.9)
Another gender identity	197 (11.6)	18 (9)	174 (12.3)	24 (11.4)	171 (11.8)
Missing	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Relationship status					
Not in a relationship	570 (33.7)	25 (12.5)	545 (38.4)	48 (22.9)	522 (35.9)
1 partner, not living with partner	268 (15.8)	16 (8)	252 (17.8)	21 (10)	247 (17)
1 partner, living with partner	580 (34.2)	127 (63.5)	453 (31.9)	96 (45.7)	483 (33.2)
>1 partner, not living with partner(s)	79 (4.7)	12 (6)	67 (4.7)	22 (10.5)	56 (3.9)
>1 partner, living with partner(s)	105 (6.2)	20 (10)	85 (6)	19 (9.1)	85 (5.8)
Another type of relationship	57 (3.4)	9 (4.5)	48 (3.4)	7 (3.3)	50 (3.4)
Missing	76 (4.5)	0 (0)	2 (0.1)	5 (2.4)	44 (3)
Legal marital status					
Single, never married	1113 (65.7)	29 (14.5)	1084 (76.3)	71 (33.8)	1041 (71.6)
Married	342 (20.2)	122 (61)	220 (15.5)	85 (40.5)	256 (17.6)
Legally recognized civil union	3 (0.2)	1 (0.5)	2 (0.1)	0 (0)	3 (0.2)
Registered domestic partnership	7 (0.4)	0 (0)	7 (0.5)	1 (0.5)	6 (0.4)
Separated	21 (1.2)	13 (6.5)	8 (0.6)	13 (6.2)	8 (0.6)
Divorced	84 (5)	28 (14)	56 (3.9)	32 (15.2)	52 (3.6)
Widowed	3 (0.2)	2 (1)	1 (0.1)	1 (0.5)	2 (0.1)
Not listed	46 (2.7)	4 (2)	42 (3)	2 (1)	44 (3)
Missing	75 (4.4)	1 (0.5)	0 (0)	5 (2.4)	43 (3)
Annual household income					
<\$15,000	624 (36.8)	33 (16.5)	517 (36.4)	51 (24.3)	546 (37.5)
\$15-<30,000	162 (9.6)	10 (5)	152 (10.7)	19 (9.1)	143 (9.8)
\$30-<50,000	265 (15.6)	27 (13.5)	238 (16.8)	38 (18.1)	227 (15.6)
\$50-<75,000	218 (12.9)	30 (15)	188 (13.2)	31 (14.8)	185 (12.7)
\$75-<100,000	152 (9)	32 (16)	120 (8.5)	23 (11)	129 (8.9)
\$100-<150,000	151 (8.9)	38 (19)	113 (8)	31 (14.8)	120 (8.3)
≥\$150,000	122 (7.2)	30 (15)	92 (6.5)	17 (8.1)	105 (7.2)
Health insurance coverage					
Yes	1512 (89.3)	187 (93.5)	1325 (93.3)	190 (90.5)	1320 (90.7)
No	92 (5.4)	11 (5.5)	81 (5.7)	12 (5.7)	80 (5.5)
Don't Know	10 (0.6)	1 (0.5)	9 (0.6)	1 (0.5)	9 (0.6)
Missing	80 (4.7)	1 (0.5)	5 (0.4)	7 (3.3)	46 (3.2)

(continued)

TABLE 1

Participant characteristics of a sample of transgender men and gender diverse individuals assigned female or intersex at birth, overall and stratified by status as a parent and by pregnancy history (N=1694) (continued)

	Overall (N=1694)	Is a parent ^a		Has ever been pregnant ^b	
		Yes (N=200, 11.8%)	No (N=1420, 83.8%)	Yes (N=210, 12.4%)	No (N = 1455, 85.9%)
Percent of healthcare providers aware of gender identity					
0%	340 (20.1)	39 (19.5)	300 (21.1)	293 (20.1)	46 (21.9)
1-50%	482 (28.5)	58 (29)	421 (29.7)	414 (28.5)	67 (31.9)
51-90%	340 (20.1)	29 (14.5)	310 (21.8)	311 (21.4)	29 (13.8)
>90%	357 (21.1)	58 (29)	298 (21)	305 (21)	52 (24.8)
I don't know	94 (5.6)	15 (7.5)	79 (5.6)	84 (5.8)	10 (4.8)
Missing	81 (4.8)	1 (0.5)	12 (0.9)	48 (3.3)	6 (2.9)
US Census Region					
Midwest	304 (18)	37 (18.5)	267 (18.8)	34 (16.2)	269 (18.5)
Northeast	411 (24.3)	44 (22)	367 (25.9)	45 (21.4)	366 (25.2)
South	326 (19.2)	38 (19)	288 (20.3)	44 (21)	281 (19.3)
West	468 (27.6)	66 (33)	402 (28.3)	66 (31.4)	402 (27.6)
Missing	185 (10.9)	15 (7.5)	96 (6.8)	21 (10)	137 (9.4)

Abbreviations: IQR, interquartile range, US United States.

^a Observations with missing status as a parent, N=74; ^b Observations with missing pregnancy history, N=29; ^c Categories presented are overlapping and are not mutually exclusive, since participants could endorse multiple categories; ^d Asian category was collapsed from Central Asian, East Asian, South Asian, and Southeast Asian due to sample size.

Bane. Pathways to parenthood among transgender men and gender diverse people. *Am J Obstet Gynecol Glob Rep* 2024.

pregnancy (15%) compared to never users (7%; Table 4). Gender diverse individuals more often desired a future pregnancy (15%) compared with individuals with a binary gender only (6%) and those who endorsed both binary and gender diverse identity (5%).

Fertility counseling as part of gender affirming care

Overall, 48% of participants had ever used testosterone (n=807; Table 5). Among those individuals, 71% received fertility counseling prior to initiating testosterone and 32% received fertility counseling after initiating testosterone. Individuals with a gender diverse identity only (44%) and individuals with both binary and gender diverse identities (40%) were more frequently told that their provider was unsure of their pregnancy capability after initiating testosterone compared to those with binary gender identity only (32%). Gender diverse individuals were recommended to investigate fertility

preservation options less often (36%) than individuals with binary gender only (49%) or individuals with both binary and gender diverse identity (51%). Data for puberty blocker use (n=17) and gender affirming surgeries (n=115) are presented in Table A.3.

Among the 87 write-in responses regarding fertility counseling conversations with providers, multiple themes emerged (Table 6). Participants reported a wide range of experiences, including information from providers that was contradictory, vague, or inaccurate. Several participants noted that their providers emphasized that pregnancy was possible while on testosterone but also cautioned about the potential of infertility with prolonged hormone usage: “[I was told] I would have a very low probability of getting pregnant initially and that would approach zero over time.” In contrast, a single participant noted: “[When] I asked about capability to get pregnant in the context of strongly not wanting to be, they said I “would

probably not have to worry about it” while on hormones.” Some participants were informed that the impact of hormones on fertility was unknown. Others were counseled about the possibility of pregnancy if hormones were stopped and that they would need to cease hormones if they desired to continue the pregnancy or risk complications.

Discussion

Summary of Key Findings

In a large study of TMGD individuals assigned female or intersex at birth from across the US, we explored pathways to parenthood, pregnancy outcomes, and fertility counseling experiences. A third of TMGD participants grew their family by carrying pregnancies achieved through sexual activity, and pathways to parenthood differed by gender identity. Transgender men were more likely to adopt compared to gender diverse individuals, who more commonly relied on sexual activity that led to a pregnancy. A desire for future pregnancy was more

TABLE 2**Pathways to parenthood among a sample of transgender men and gender diverse individuals assigned female or intersex at birth, by gender identity categories (N=1694)**

	Overall		Binary Identity: Man/transgender man (only) ^a		Endorsed both gender diverse and man/transgender man ^b		Gender diverse identity (only) ^c	
	n	%	n	%	n	%	n	%
N	1694	100	466	100	232	100	966	100
Is a parent	200	11.8	62	13.3	26	11.2	110	11.4
Pathways to parenthood ever used ^d								
Pregnancy, respondent carried pregnancy								
Sexual activity leading to pregnancy with another parent of the child	68	34.0	11	17.7	11	42.3	45	40.9
Carried pregnancy and was egg source	72	36.0	18	29.0	11	42.3	42	38.2
Carried pregnancy but was not egg source	0	0	0	0	0	0	0	0
Pregnancy, respondent did not carry pregnancy								
Provided egg that a partner carried	4	2.0	3	4.8	0	0	1	0.9
Surrogacy	0	0	0	0	0	0	0	0
Second parent adoption of partner's genetic child ^e	14	7.0	3	4.8	1	3.8	10	9.1
Pathways not involving respondent or partner's pregnancy								
Adoption	27	13.5	12	19.4	2	7.7	13	11.8
Stepparent	51	25.5	18	29.0	4	15.4	29	26.4
Foster parent	11	5.5	4	6.5	1	3.8	6	5.5
Ever used gamete donors ^d								
Nonidentified donor sperm	26	13.0	12	19.4	2	7.7	12	10.9
Identified donor sperm	10	5.0	4	6.5	1	3.8	5	4.5
Egg donor	0	0	0	0	0	0	0	0

^a Includes individuals who only endorsed man or transgender man as their gender; ^b Endorsed man or transgender man along with any gender diverse identities (agender, genderqueer, nonbinary, Two-spirit, additional gender); if woman or cisgender woman was endorsed, the record was excluded from this category; ^c Did not endorse man or transgender man and endorsed any gender identity (agender, genderqueer, nonbinary, Two-spirit, additional gender); ^d Denominator is among parents.; ^e This is process in which parents who are not otherwise related to a child can adopt their partner's child without terminating the first legal parent's right.

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TABLE 3
Pregnancy experiences among a sample of transgender men and gender diverse individuals assigned female or intersex at birth, by gender identity categories (N=1694)

	Overall		Binary Identity: Man/transgender man (only) ^a		Endorsed both gender diverse and man/transgender man ^b		Gender diverse identity (only) ^c	
	n	%	n	%	n	%	n	%
N	1694	100	466	100	232	100	966	100
Ever pregnant	210	12.4	41	8.8	29	12.5	135	14.0
Currently pregnant	7	0.4	1	0.2	0	0	5	0.5
Number of pregnancies ^d								
1	115	54.8	23	56.1	12	41.4	78	57.8
2	47	22.4	7	17.1	10	34.5	28	20.7
3+	48	22.9	11	26.8	7	24.1	29	21.5
Total pregnancies	433	100	82	100	62	100	281	100
Pregnancy outcomes ^e								
Still pregnant	7	1.7	1	1.2	0	0	5	1.8
Miscarriage	142	33.7	20	24.4	16	27.1	104	38.0
Ectopic pregnancy	2	0.5	0	0	1	1.7	1	0.4
Abortion	92	21.9	22	26.8	17	28.8	53	19.3
Stillbirth	2	0.5	1	1.2	0	0	1	0.4
Live birth	169	40.1	36	43.9	24	40.7	106	38.7
Cesarean birth ^f	39	23.1	9	25.0	1	4.2	27	25.5

^a Includes individuals who only endorsed man or transgender man as their gender; ^b Endorsed man or transgender man along with any gender diverse identities (agender, genderqueer, nonbinary, Two-spirit, additional gender); if woman or cisgender woman was endorsed, the record was excluded from this category; ^c Did not endorse man or transgender man and endorsed any gender identity (agender, genderqueer, nonbinary, Two-spirit, additional gender); ^d Denominator is among those ever pregnant; ^e Denominator is among all births with an outcome provided (N=421 in overall sample); ^f Denominator is among all live births (N=169 in overall sample).

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TABLE 4
Future pregnancy desire among a sample of transgender men and gender diverse individuals assigned female or intersex at birth, by testosterone use and gender identity categories (N=1694)

	Testosterone Use						Gender					
	Overall		Ever Use		Never Use		Binary Identity: Man/transgender man (only) ^a		Endorsed both gender diverse and man/transgender man ^b		Gender diverse identity (only) ^c	
	n	%	n	%	n	%	n	%	n	%	n	%
Would like to be pregnant at some point	186	11.0	131	14.5	55	7.0	26	5.6	11	4.7	141	14.6
Within next year ^d	31	16.7	21	16.0	10	18.2	2	7.7	2	18.2	27	19.2
Within next 5 years ^d	60	32.3	42	32.1	18	32.7	11	42.3	2	18.2	45	31.9
Within 6-10 years ^d	57	30.7	43	32.8	14	25.5	5	19.2	5	45.5	45	31.9
More than 10 years ^d	4	2.2	3	2.3	1	1.8	1	3.9	1	9.1	2	1.4

^a Includes individuals who only endorsed man or transgender man as their gender; ^b Endorsed man or transgender man along with any gender diverse identities (gender, genderqueer, nonbinary, Two-spirit, additional gender); if woman or cisgender woman was endorsed, the record was excluded from this category; ^c Did not endorse man or transgender man and endorsed any gender identity (gender, genderqueer, nonbinary, Two-spirit, additional gender); ^d Denominator is among those who would like to be pregnant at some point.
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often reported by individuals who had ever used testosterone compared to those who had never used testosterone. Although participants across gender identities indicated a desire for future pregnancy, nearly one third of participants who had ever used testosterone did not receive fertility counseling prior to initiating hormones. Among those who did receive fertility counseling, the advice received was mixed.

Findings in context of prior work

Prior studies have demonstrated that transgender men build their families using pregnancy.^{4,16} Relatedly, in this sample, sexual activity that led to pregnancy was the most common pathway to parenthood, alongside other methods of family building (including stepparenting, adoption, and fostering). Notably, a very low proportion of individuals used surrogacy and reciprocal *in vitro* fertilization (IVF; ie, provided an egg that a partner carried or vice versa). Although we did not directly ask about medically assisted reproductive technologies use, 18% of parents reported using identified or non-identified donor gametes for pregnancy. TMGD individuals experience financial and other barriers to medically assisted reproduction, which is expensive and rarely covered by insurance.^{24,25} In light of this, and the fact that 11% of the sample desired future pregnancy, further investigation of how these barriers specifically impact pathways to parenthood among TMGD populations is warranted. The pathways to parenthood reported in this study do not tell us about preferences for family building. The most commonly used pathways in this study may simply be the pathways that were practical and accessible to TMGD individuals but are not necessarily the most desired or preferred, due to legal, logistical, social, and financial barriers.⁶⁻¹²

We observed differences in pathways to parenthood by gender. Transgender men in our sample were less likely to pursue pregnancy and more likely to adopt than gender diverse individuals. Gender diverse individuals most commonly expressed a desire to be pregnant in the future. Tornello et al.²⁶ reported similar

TABLE 5
Fertility counseling with gender affirming hormone use among a sample of transgender men and gender diverse individuals assigned female or intersex at birth, by gender identity categories (N=1694)

	Overall		Binary Identity: Man/transgender man (only) ^a		Endorsed both gender diverse and man/transgender man ^b		Gender diverse identity (only) ^c	
	n	%	n	%	n	%	N	%
Received Hormones	807	47.6	404	86.7	187	80.6	213	22.1
Received fertility counseling <i>prior</i> to hormone use	571	70.8	281	69.6	144	77.0	143	67.1
Was told would be capable of pregnancy after ^d	267	46.8	135	48.0	63	43.8	69	48.3
Was told would not be capable of pregnancy after ^d	51	8.9	25	8.9	12	8.3	14	9.8
Was told provider was unsure of pregnancy capabilities after ^d	214	37.5	91	32.4	57	39.6	63	44.1
Recommended to investigate fertility preservation options ^d	265	46.4	138	49.1	74	51.4	51	35.7
Received fertility counseling <i>after</i> hormone use	260	32.2	144	35.6	53	28.3	62	29.1

^a includes individuals who only endorsed man or transgender man as their gender; ^b Endorsed man or transgender man along with any gender diverse identities (gender, genderqueer, nonbinary, Two-spirit, additional gender); if woman or cisgender woman was endorsed, the record was excluded from this category; ^c Did not endorse man or transgender man and endorsed any gender identity (gender, genderqueer, nonbinary, Two-spirit, additional gender); ^d Denominator is among those who received fertility counseling prior to hormone use.

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results from a survey of 311 TMGD individuals. Higher proportions of transgender men became parents through adoption or foster parenting compared to gender diverse individuals, and higher proportions of gender diverse individuals were genetically related to their children compared to transgender men.

Across the gender identity categories assessed there was a similar prevalence of live births, supporting that TMGD individuals can and do give birth. Gender diverse individuals were more likely to experience miscarriages and less likely to get an abortion than transgender men. It is known that gender diverse individuals experience structural limitations to optimal health and health care, such as increased psychological stress, lack of access to care, lower socioeconomic position.^{27–29} Further in depth investigation is warranted to understand whether these factors differ between transgender and gender diverse individuals. Alternatively, it is possible that this difference is a data artifact due to small sample size.³⁰ The higher rates of abortion among transgender men may contribute to the lower miscarriage rates (eg, through the elective termination of complicated or undesired pregnancies). Prior work using this sample has demonstrated that unintended pregnancies were slightly more likely to end in miscarriage as compared to intended pregnancies.¹⁰ Given small sample sizes and these data are self-reported, the findings may not be broadly generalizable. Prior studies using this sample showed that participants more commonly sought procedural (61%) over medication abortions (34%), although they preferred medication abortions for a future abortion. Among participants who attempted a self-managed abortion, the majority used unsafe methods (eg, physical trauma) or methods of unknown safety (eg, herbs) due to privacy concerns and lack of access.^{31,32} Existing evidence comparing perinatal outcomes among transgender men³³ or birthing fathers³⁴ shows similar prevalence of perinatal outcomes including cesarean birth, postpartum hemorrhage, and severe morbidity compared to the overall

TABLE 6**Key themes and supporting quotes from write-in fields for fertility counseling received with gender affirming hormone use among a sample of transgender men and gender diverse individuals assigned female or intersex at birth (N=87)**

Theme/Content	Quotes
Testosterone is not a form of birth control	<ul style="list-style-type: none"> • “My doctor basically said that testosterone is not birth control. She later admitted that she wished she spoke to me more thoroughly about fertility preservation before starting HRT though.” • “T is not birth control; people have gotten pregnant on T so use other forms of birth control if having sex that could get me pregnant; that if I wanted to get pregnant, I'd need to go off T” • “That Testosterone isn't birth control and transmasculine people have gotten accidentally pregnant on T, so to use a backup if I wanted to have partners who could get me pregnant before bottom surgery”
Increasing potential for infertility with hormone usage	<ul style="list-style-type: none"> • “That I would most likely preserve my ability to get pregnant if I took hormones for a limited period of time and stopped taking hormones before attempting to get pregnant, but that the longer I were to take hormones the less likely it would be that I would be able to get pregnant.” • “I would be capable of getting pregnant after starting hormones, but that long term hormone use would greatly reduce the likelihood of getting pregnant.” • “I would have a very low probability of getting pregnant initially and that would approach zero over time.” • “Long term use of testosterone may or may not lead to permanent infertility, although it wasn't framed as a definite.”
Lack of information on risk of infertility	<ul style="list-style-type: none"> • “She said that there isn't a lot of research done so far on testosterone and fertility, and it would likely depend on how long I took testosterone, and while there's a chance it could make me infertile, there's no guarantee, so I should also use non-estrogen-based birth control.” • “That long-term effects on fertility are still not clear.” • “That there aren't enough studies on HRT so I could become infertile, and to take that into consideration, and that I could become pregnant, and to also take that into consideration.” • “That there is a lack of research on fertility after taking hormones, so there is not a definitive answer.”
Possibility for future pregnancies	<ul style="list-style-type: none"> • “I asked about capability to get pregnant in the context of strongly not wanting to be, they said I “would probably not have to worry about it” while on hormones” • “I think they said it would be likely, but not definite, that I could get pregnant if I stopped my testosterone for a period of time” • “I would have to cease taking hormone therapy for at least 3 to 6 months before I attempt to get pregnant, if I were to want to do that.” • “It would be harder to get pregnant, but not impossible.”
Risks for future pregnancies while on hormones	<ul style="list-style-type: none"> • “If I got pregnant after taking hormones, I was told it would be risky for me and the child, and that it would be difficult but not impossible to conceive and very painful to carry to term.” • “It is unlikely but could happen, and it is class X for birth defects.” • “That if I did get pregnant, I would need to stop Testosterone for the health of the child.” • “They said that testosterone can have negative effects on fetuses/my body and that while I can get pregnant on hormones, it would be bad.”
Ambivalence towards Fertility Preservation	<ul style="list-style-type: none"> • “Don't remember if they recommended fertility preservation but they said the evidence of T's effect on pregnancy is unclear. I was very clear that I did not want to take estrogen etc. for egg freezing.” • “My doctor basically said that testosterone is not birth control. She later admitted that she wished she spoke to me more thoroughly about fertility preservation before starting HRT though.”

Abbreviations: HRT hormone replacement therapy, T testosterone.

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population, although more work with prospective collection of gender identity is needed.^{33,34}

Implications for clinical practice and research

In this study, approximately 1 in 10 participants desired a future pregnancy. Individuals who had ever used testosterone were more likely to desire a future pregnancy than those who had never used testosterone. This implies that initiating testosterone for masculinization does not preclude TMGD individuals from later desiring a pregnancy. Concerningly, approximately one-third of participants did not receive fertility counseling prior to hormone use, and 9% were incorrectly informed that they would be incapable of pregnancy after initiating hormones. These statistics are underscored by the exploratory qualitative analysis, in which participants shared how they received contradictory, vague, and incorrect counseling with concerning their fertility prospects. Although there are limited data on the effect of gender affirming hormone therapy on fertility and fecundity, after initiation of exogenous testosterone and desires for pregnancy can change after initiating testosterone.^{4,35,36} Given the cross-sectional nature of these data, rate of fertility counseling and the specific natures of counseling may have improved by the present time. Regardless, these data support the need for ongoing fertility counseling not only before testosterone use but also as an ongoing practice by clinicians.³⁷ Crucially, given that desires for parenthood can change over time, fertility counseling should be a routine and ongoing practice by clinicians. Write-in responses indicated that participants received inconsistent and contradictory fertility counseling. Clinicians who discuss fertility preservation options with their patients, prior to and after gender affirming surgery or hormone use, should base their recommendations on patients' desires for pregnancy and/or children of their own genetic material regardless of patient gender identity.^{37,38} Fertility preservation, when desired, may not be accessible or

affordable to TMGD patients, who are disproportionately likely to experience economic disenfranchisement and live in poverty.³⁹ It is imperative that fertility preservation is covered by health insurance to meet the family building needs of TMGD people.

Our findings underscore the importance of evidence-based and culturally competent reproductive healthcare, particularly with regard to hormone use and fertility preservation, if desired. Clinicians and researchers cannot make assumptions about an individual's desire for pregnancy or parenthood based on their gender identity or hormone use history. Differences exist among pathways to parenthood by gender identity among TMGD individuals. While the focus of our study was quantitative and descriptive in nature, our numerical findings on fertility preservation were supported by our exploratory rapid qualitative analysis of open-text responses to questions on fertility preservation. Given that the majority of research on this topic is qualitative, future research should consider mixed methods and quantitative designs for such research questions with appropriate rigor.

Strengths and Limitations

This study's strengths included a relatively large sample of TMGD individuals who were assigned female or intersex at birth with diversity in gender identity, sexual orientation, and geography. Prior foundational work examined smaller study samples, typically from clinical settings.^{4,8,15–17} The study instrument was designed using a community-engaged approach and was tailored to the needs and lived experiences of TMGD individuals. Our findings add critical information and nuance to how this underserved and under-researched population builds their families. This study is not without limitations. First, the survey instrument was cross-sectional and used convenience sampling, limiting our ability to address temporal or causal questions. Notably, the cross-sectional nature of these data cannot capture how perspectives on family building could change across the life course; future work could access life course differences

in desires for pregnancy and pathways to parenthood among TMGD individuals. Second, this study sample might not represent the diversity of the TMGD population in the US. For example, 87% (n=1,472) of participants endorsed Non-Latinx White as their race/ethnicity (12% of whom also endorsed other racial/ethnic categories). Additionally, a part of our recruitment strategy applied an upper age limit of 45 years; we acknowledge that individuals older than 45 years can be capable of pregnancy or pursue other pathways to parenthood. Future work should sample for racial/ethnic diversity and wider age ranges. Third, we cannot distinguish whether the observed pathways to parenthood for TMGD individuals represent their most desired paths. The data we observed could be impacted by access and affordability (eg, fewer individuals in this study used medically assisted reproductive technologies or surrogacy). Additionally, we did not directly ask about medically assisted reproductive therapy use directly or the sex, gender, or available gametes of partners at the time that participants become parents, all of which could impact the pathways to parenthood chosen. Fourth, we considered testosterone use as a dichotomous variable, which does not capture variation between past vs current use and timing of testosterone initiation. Only 11 individuals who desired a future pregnancy had prior (but not current) testosterone use. Future studies with larger sample sizes should examine testosterone use in greater detail. Lastly, we did not collect comprehensive on the timing of all pregnancies (just the most recent pregnancy) and hence cannot appropriately assess the role of age during pregnancy for pregnancy outcomes.

Conclusions

We descriptively assessed the pathways by which TMGD individuals who were assigned female or intersex at birth become parents. We observed that TMGD individuals often become parents through pregnancy (in addition to stepparenting or adoption) and can desire to become pregnant in the future. While we showed that TMGD individuals are succeeding in building families,

we highlighted gaps in the reproductive healthcare they receive. Despite being most likely to desire future pregnancies, TMGD participants who had ever used testosterone often did not receive fertility counseling prior to initiating hormones. Given the dearth of information available for fertility and pregnancy after testosterone, there is a need for additional transgender-specific research and patient resources on conception after testosterone therapy. These findings provide clinicians with context from which to counsel their TMGD patients, underscoring the importance of consistent, evidence-based, and inclusive reproductive healthcare.

Patient consent statement

Patient consent is not required because no personal information or details are included.

Tweetable statement

Transgender men and gender diverse individuals who were assigned female or intersex at birth build their families through a variety of pathways, including pregnancy, stepparenting, and adoption. ■

CRediT authorship contribution statement

Shalmali Sunil Bane: Writing – review & editing, Writing – original draft, Software, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Juno Obedin-Maliver:** Writing – review & editing, Resources, Project administration, Investigation, Funding acquisition, Data curation, Conceptualization. **Sachiko Ragosta:** Writing – review & editing, Validation, Software, Investigation, Data curation. **Jen Hastings:** Writing – review & editing, Methodology, Investigation, Funding acquisition. **Mitchell R. Lunn:** Writing – review & editing, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Data curation. **Annesa Flentje:** Writing – review & editing, Resources, Methodology, Investigation. **Matthew R. Capriotti:** Writing – review & editing,

Methodology, Investigation. **Micah E. Lubensky:** Writing – review & editing, Methodology, Investigation. **Diana M. Tordoff:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **Heidi Moseson:** Writing – review & editing, Writing – original draft, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Data curation, Conceptualization.

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Supplementary materials

Supplementary material associated with this article can be found in the online version at [doi:10.1016/j.xagr.2024.100381](https://doi.org/10.1016/j.xagr.2024.100381).

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