

Reproductive endocrinologist and infertility specialists' knowledge, skills, behaviors, and attitudes regarding the care for transgender and gender-diverse individuals

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Objective: To investigate associations between reproductive endocrinology and infertility (REI) providers' prior training and current knowledge, skills, attitudes, and behaviors regarding fertility preservation and family building for transgender and gender-diverse (T/GD) patients.

Design: The survey was distributed to members of the Society for Reproductive Endocrinology and Infertility, the REI-physician-focused professional body within the American Society for Reproductive Medicine, with additional participants recruited through snowball sampling.

Results: Participants (n = 206) reported on training in T/GD care; 51% endorsed prior training. Most participants (93%) believed T/GD individuals were as fit for parenthood as cisgender individuals. Prior training was associated with an increased likelihood of offering T/GD health resources and more frequent consultations with specialist colleagues.

Common barriers to providing care indicated by respondents included cost, delays in gender-affirming care, and lack of knowledge of the potential impact of hormonal interventions. Common facilitators included education and training, prior experience, and affordability of services.

Conclusions: Most REI providers believed T/GD individuals are fit for parenthood and agreed that prior training facilitates care for T/GD patients. The lack of provider knowledge emerged as a barrier to care. Although training helped facilitate some components of care, systemic barriers such as the cost and variability of patient population characteristics/experiences are important considerations when serving T/GD individuals. (Fertil Steril Rep® 2023;4:213–23. ©2023 by American Society for Reproductive Medicine.)

Key Words: Transgender, fertility, fertility preservation, LGBTQ+, education, family building

The United States is home to at least 1.3 million transgender and gender-diverse (T/GD) individuals (i.e., persons whose gender identity differs from that commonly associated with their sex assigned at birth), representing at least 0.7% of the total adult population (1). Among this sizable population,

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many T/GD individuals wish to create a family, yet there is little scientific research about whether and how health care providers are equipped to support T/GD patients in fertility preservation and family building. Furthermore, because at least 2.1% of Generation Z adults are T/GD, the demand for tailored reproductive and family health care services is likely to grow (2–6). Specifically, T/GD individuals may present to discuss gender-affirming treatments, fertility preservation, and family building (7–10). Some studies of LGBT youth show this population is no less likely to plan for and imagine parenthood than their cisgender counterparts (11), although some work focused specifically on T/GD youth highlight a more mixed picture concerning fertility and family-building desires (4). Importantly, T/GD youth acknowledge the possibility of a changing perspective regarding family building, thus underscoring the importance of ongoing counseling about fertility preservation and family building (12).

Although many reproductive health goals and desires of T/GD people overlap with those of cisgender people (i.e., whose gender identity aligns with that commonly associated with their sex assigned at birth), T/GD people may have specific considerations given the interplay of medical gender affirmation and family-building goals. This is because gender-affirming treatment sought by some T/GD people, including hormone therapy (HT) and surgery, may impact and potentially limit an individual's fertility and family-building options (13–15). Despite the possible impact of gender-affirming HT on fertility and that studies demonstrate many T/GD individuals desire parenthood (16–18), T/GD individuals are often not provided sufficient counseling or appropriate resources to prepare them to plan around desired fertility (5, 19). For instance, Chen et al. (16) found that only 20.5% of T/GD youth reported fertility was discussed by their physician, and only 13.5% stated their provider discussed the potential fertility impacts of HT. Even among T/GD patients who do receive counseling, few individuals undergo fertility preservation methods because of a host of possible factors, including cost, desire not to delay gender-affirming care, discomfort using reproductive organs, and patient openness to many forms of family-building (i.e., adoption, surrogacy, etc.) (4, 20–22). Studies in this area show that 20% to 39.5% of T/GD youth desire biological children (12, 16, 22).

This dearth of counseling for T/GD individuals concerning fertility, family building, and the potential impacts of medical gender affirmation on future fertility are particularly striking given that such counseling is recommended by both the World Professional Association for Transgender Health (WPATH) and Endocrine Society before initiation of gender-affirming medical procedures (13, 15). Recommended counseling includes guidance that individuals interested in pursuing fertility preservation should be referred to a reproductive endocrinology and infertility (REI) specialist. Despite these recommendations, adolescents and young adults are rarely referred for fertility preservation despite receiving counseling (23). Nonetheless, REI specialists are uniquely poised to have significant and lasting impacts on the lives of T/GD individuals, ensuring they receive equitable, affirming, and inclusive reproductive health care (10). Despite the importance of REI providers in T/GD health care, fertility preservation, and family building, there is little research regarding how REIs

counsel their T/GD patients around reproductive health care. Therefore, this study sought to describe how prior training in T/GD health care impacts REI providers' current knowledge, skills, behaviors, and attitudes related to fertility preservation and family building in T/GD patients of all ages and investigate whether these outcomes differ based on a history of prior training in T/GD health care.

MATERIALS AND METHODS

Survey design

A 48-item online survey was designed to assess the impact of prior training on REI providers' knowledge, skills, behaviors, and attitudes regarding fertility preservation and reproductive health of T/GD patients (survey included in the [Supplemental material](#), available online). Participants were asked if they had received training in T/GD health care in residency or fellowship. There were no specific open-ended questions in which participants were asked to describe their prior training experience. As no previous studies have surveyed REI providers on their knowledge, skills, behaviors, and attitudes regarding the care of T/GD, no existing validated surveys could be used. Instead, the survey was adapted from measures used in previous fertility-related research in both cisgender and T/GD populations (24–34). Modifications were made to enhance the appropriateness for the target respondent audience of REI specialists. Knowledge questions assessed participants' background understanding of topics such as hormones and fertility preservation options for T/GD patients. Skills and behavior questions assessed the ability of physicians to navigate clinical scenarios such as counseling their T/GD patients on fertility preservation and consulting with other experts in the field of T/GD care. Questions about attitudes assessed participants' comfort or discomfort with aspects of T/GD care or their own beliefs around family-building for T/GD patients.

The survey was refined through two rounds of piloting with a diverse mix of practicing generalists, subspecialist Obstetricians and Gynecologists, and REIs nationally in September 2019. The first round of piloting led to clarification of questions regarding knowledge of current T/GD care standards. The second round helped to specify further the meaning of question stems and answer choices. In the final version of the survey, branching logic was employed such that not all participants were exposed to all questions. We aimed for a survey completion time of less than 15 minutes; the average response time was 11 minutes after removing improbable values. Respondents provided demographics and rated their agreement with statements on the reproductive health of T/GD patients using a five-point Likert scale. Open and closed questions inquired about knowledge, skills, behaviors, and attitudes for both barriers and facilitators to delivering fertility preservation and reproductive health care to T/GD patients.

Participants and procedure

Data were collected from July 2020 to July 2021. The survey was distributed by the Society of Reproductive Endocrinology and Infertility (SREI), a professional group within the

American Society for Reproductive Medicine (ASRM) whose members are United States or internationally board certified in the REI subspecialty of Obstetrics and Gynecology or are in the process of completing an REI fellowship. The survey was distributed to 850 SREI members via two distinct e-mail communications and posts to the SREI members-only electronic message board. Additional emails were sent to REI fellowship directors, and two physical mailings in May and June 2021. Additional study recruitment was performed by direct contact through e-mail and various social media platforms with institutional review board -approved messaging directed to the intended study population.

Inclusion criteria for the study were any physician currently practicing as, or in training to become, an REI specialist, age over 18, and English language competence. Because an indication of prior training in T/GD health was an integral component of the present study, participants who did not answer this question were excluded ($n = 48$). All participants were provided an explanation of the study and proceeded through electronic institutional review board consent, which was available as a downloadable electronic consent form. On consent affirmation, the survey was initiated on Qualtrics ([Qualtrics.com](https://www.qualtrics.com)), a platform that is approved by Stanford University School of Medicine for high-risk and protected health information and personally identifiable information (PII) associated data. Participants self-administered the survey via their web-enabled devices. The only PII collected were dates, residence zip codes, and IP addresses. These data were analyzed only in aggregate and never used to re-identify individual participants. E-mail addresses and names were only collected if participants chose to enroll in the gift drawing survey and were collected separately from any content-related answers or PII/protected health information by drawing survey information. Incentives were twelve \$50 Amazon gift cards, administered through a randomized lottery of those who opted for entry into the gift card drawing survey.

Data analysis

We described participant responses and demographics by count and percentage. Demographic variables included age, race/ethnicity, gender identity, sexual orientation, year of medical school completion, and practice setting type. Questions related to T/GD health matters are presented by the following subgroups: knowledge, skills, behaviors, and attitudes (with further subgroups facilitators and barriers to care). Chi-squared test or Fisher's exact test for cells <5 was performed to assess for significant differences in demographic and response patterns for knowledge, behavior, and attitude-type questions among those with compared with those without prior training in T/GD health. Participants with missing responses are presented as count only and were not included in the denominator for calculating percentages or statistical comparisons. Responses to T/GD health questions that assessed provider comfort, facilitators, and barriers to care were assessed using chi-square P values comparing the frequency of nonmissing responders and Fisher's exact test when cells were <5 . Participants could select multiple

responses for questions of comfort, facilitators, and barriers; thus, rank-order responses represent the total times an answer choice was selected. All analyses were performed using SAS version 9.4 (Cary, NC).

RESULTS

Survey sample

The survey was initially directly distributed to 850 individuals via an SREI list serve, the majority of whom are members of the SREI. However, because additional snowball recruitment was sought, the final response rate could not be calculated. The survey was initiated by 254 eligible individuals. Among the participants, 48 did not report whether they had received prior training in T/GD health and were excluded from analyses. The final analytic sample was 206 people (henceforth "participants"). Participant demographics ([Table 1](#)) were categorized by receiving prior training in T/GD health. Age ranged from 24–77 years old. Most participants worked in academic medical centers and were identified as white, cisgender (predominately cisgender women), and heterosexual. Participants with prior training in T/GD health ($n = 105$) were overall younger than those who had not received training ($n = 101$, $P < .0001$). Of the 105 participants who indicated they had prior training in T/GD health care, 13 had training in T/GD health care as a resident only (6.3%), 39 had training in T/GD health care as a fellow only (19%), and 53 had training as both a resident and fellow (26%). When comparing participants with and without prior training in T/GD health care, various themes were explored and discussed further below.

Knowledge regarding the provision of care for T/GD patients

Compared with participants without prior training in T/GD health care, participants with prior training were more likely to know that the WPATH Standards of Care and Endocrine Society Clinical Practice Guidelines recommend discussing fertility preservation with T/GD individuals before the initiation of hormonal interventions ($P = .007$). Otherwise, prior training was unrelated to the knowledge of hormonal regimens, the possible effects of these regimens on future fertility, or options for fertility preservation for T/GD individuals ([Table 2](#)).

Behaviors and skills of REI providers relating to the provision of care for T/GD patients

Differences based on prior training were evident; participants with prior training were more likely to have patient resources on T/GD health care available in their practice ($P < .0001$) and to consult with specialist colleagues when caring for T/GD patients ($P = .0328$). There were no differences based on training in whether participants discussed the potential impact of hormone replacement therapy on future fertility with patients and/or their parents/guardians or felt comfortable providing counseling about fertility preservation to T/GD patients ([Table 3](#)).

TABLE 1

Participant demographics (n = 206) among REI provider respondents.

	Prior training in transgender/gender-diverse health care		P value
	Yes n (%)	No n (%)	
Total	105	101	
Age (y)			< .0001
24–29	2 (1.9)	0 (0)	
30–35	21 (20)	1 (1)	
36–41	28 (26.7)	8 (8)	
42–47	21 (20)	19 (19)	
48–53	6 (5.7)	15 (15)	
54–59	8 (7.6)	20 (20)	
60–65	10 (9.5)	29 (29)	
66+	9 (8.6)	8 (8)	
Missing		1	
Year completed M.D.			< .0001
1978 and prior	4 (3.9)	5 (5)	
1979–1984	9 (8.7)	20 (20)	
1985–1990	12 (11.5)	25 (25)	
1991–1996	5 (4.8)	15 (15)	
1997–2002	10 (9.6)	18 (18)	
2003–2008	29 (27.9)	14 (14)	
2009–2014	17 (16.4)	2 (2)	
2015–2020	18 (17.3)	1 (1)	
Missing	1	1	
Practice setting			.602
Academic medical center	60 (57.1)	49 (48.5)	
Community clinic/health center		1 (1)	
Local or federal government agency	2 (1.9)	1 (1)	
Private practice “without” training residents and/or fellows	22 (21)	23 (22.8)	
Private practice “with” training residents and/or fellows	21 (20)	26 (25.7)	
Other		1 (1)	
Race/ethnicity			.273
American Indian or Alaska Native		1 (1)	
Asian	11 (10.5)	8 (8)	
Black, African American, or African	3 (2.9)	4 (4)	
Hispanic, Latino, or Spanish	3 (2.9)	3 (3)	
Middle Eastern or North African	3 (2.9)	4 (4)	
White	69 (65.7)	76 (76)	
None of these fully describe me	1 (1)	0 (0)	
Two or more	9 (8.6)	3 (3)	
Prefer not to answer	6 (5.7)	1 (1)	
Missing		1	
Gender identity			.124
Cisgender female/cisgender woman	64 (61)	47 (47)	
Cisgender male/cisgender man	13 (12.4)	23 (23)	
Genderqueer/nonbinary	1 (1)	0 (0)	
Man	14 (13.3)	18 (18)	
Woman	12 (11.4)	12 (12)	
Prefer not to answer	1 (1)	0 (0)	
Missing		1	
Sexual orientation			.926
Bisexual	1 (1)	2 (2)	
Gay	2 (1.9)	2 (2)	
Lesbian		1 (1)	
Queer	1 (1)	0 (0)	
Straight/heterosexual	100 (95.2)	94 (94)	
Prefer not to answer	1 (1)	1 (1)	
Missing		1	

REI = reproductive endocrinology and infertility

Lipkin. REI counseling of transgender patients. *Fertil Steril Rep* 2023.

TABLE 2

Knowledge regarding the provision of care for T/GD patients among REI providers (n = 206).

	Prior training in T/GD health care		P value
	Yes n (%)	No n (%)	
Total	105	101	
The effect of exogenous testosterone on the future fertility of transgender and gender-diverse individuals is unknown			.9952
Strongly agree	12 (12.1)	11 (11.3)	
Somewhat agree	42 (42.4)	39 (40.2)	
Neither agree nor disagree	8 (8.1)	8 (8.3)	
Somewhat disagree	28 (28.3)	30 (30.9)	
Strongly disagree	9 (9.1)	9 (9.3)	
Missing	6	4	
The effect of exogenous estrogen on the future fertility of transgender and gender-diverse individuals is unknown			.6201
Strongly agree	9 (9.1)	10 (10.3)	
Somewhat agree	39 (39.4)	30 (30.9)	
Neither agree nor disagree	9 (9.1)	12 (12.4)	
Somewhat disagree	31 (31.3)	37 (38.1)	
Strongly disagree	11 (11.1)	8 (8.3)	
Missing	6	4	
I am familiar with hormonal regimens transgender and gender-diverse patients use for gender affirmation and transition			.9313
Strongly agree	24 (24.2)	21 (21.7)	
Somewhat agree	47 (47.5)	46 (47.4)	
Neither agree nor disagree	6 (6.1)	8 (8.3)	
Somewhat disagree	14 (14.1)	12 (12.4)	
Strongly disagree	8 (8.1)	10 (10.3)	
Missing	6	4	
Sperm cryopreservation, embryo cryopreservation, oocyte cryopreservation, and ovarian tissue cryopreservation are the only established (non-experimental) methods of fertility preservation in the United States relevant to transgender individuals			.2816
Strongly agree	59 (59.6)	62 (63.9)	
Somewhat agree	31 (31.3)	25 (25.8)	
Neither agree nor disagree	3 (3)	1 (1)	
Somewhat disagree	2 (2)	7 (7.2)	
Strongly disagree	4 (4)	2 (2.1)	
Missing	6	4	
Puberty blockers (GnRH analogs) prevent the maturation of germ cells when used in early puberty (Tanner stages 2–3), thus negatively impacting fertility preservation options			.5352
Strongly agree	8 (8.1)	10 (10.3)	
Somewhat agree	27 (27.3)	23 (23.7)	
Neither agree nor disagree	22 (22.2)	17 (17.5)	
Somewhat disagree	30 (30.3)	39 (40.2)	
Strongly disagree	12 (12.1)	8 (8.3)	
Missing	6	4	

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TABLE 2

Continued.

	Prior training in T/GD health care		P value
	Yes n (%)	No n (%)	
WPATH Standards of Care and Endocrine Society Clinical Practice Guidelines recommend discussing fertility preservation with transgender and gender-diverse individuals and their families before initiation of hormonal interventions			.007
Strongly agree	87 (87.9)	69 (71.1)	
Somewhat agree	6 (6.1)	20 (20.6)	
Neither agree nor disagree	6 (6.1)	7 (7.2)	
Somewhat disagree		1 (1)	
Strongly disagree			
Missing	6	4	

REI = reproductive endocrinology and infertility; T/GD = transgender and gender-diverse; WPATH = World Professional Association for Transgender Health.

Lipkin. REI counseling of transgender patients. *Fertil Steril Rep* 2023.

Attitudes and beliefs regarding the care of T/GD patients

Regardless of prior training in T/GD health care, participants shared the belief that T/GD individuals are as fit for parenthood as cisgender individuals and that REI specialists should receive training regarding fertility preservation and the reproductive health needs of T/GD patients. Most study participants also indicated that they believe conversations about fertility and reproductive health are an essential aspect of T/GD health care (Table 4).

Facilitators to care provision for T/GD patients

Participants with prior training in T/GD health care (n = 53) were likelier to select prior education and training as important facilitators of T/GD care than those without training (n = 33, $P = .007$). Mentorship was also a statistically significant facilitator for care in participation with vs. without prior training (trained, n = 27; untrained, n = 12; $P = .010$). All other cited facilitators to care were not statistically significant in participants with vs. without a history of prior training. These not statistically significant factors included clinical guidelines (trained, n = 45; untrained, n = 45) and prior experience (trained, n = 51; untrained, n = 41). Participants also cited structural factors, such as affordability of fertility preservation and family-building services (trained, n = 27; untrained, n = 12) and knowledge/access insurance mandate offering coverage of fertility preservation and family-building services for T/GD patients (trained, n = 19; untrained, n = 15) as facilitators to care. Trained participants indicated less often that their personal values played a role

in providing care to T/GD individuals (trained, n = 12; untrained, n = 15).

Barriers to care provision for T/GD patients

Participants also reported on perceived barriers to providing fertility preservation and family-building care to T/GD patients (Supplemental Fig. 2, available online). There were statistically significant differences in how participants with prior training in T/GD health care ranked the following barriers to care: delaying gender-affirming medical intervention (trained, n = 40; untrained, n = 25, $P = .029$) and lack of T/GD specific research (trained, n = 23; untrained, n = 12; $P = .047$). Regardless of prior training, there was no statistical difference in participants' ranking of cost as the most significant barrier to providing fertility preservation and family-building care to T/GD individuals (trained, n = 73; untrained, n = 73).

Discomfort in family planning care provision to T/GD patients

Participants were asked to indicate which, if any, factors contributed to any discomfort with providing fertility preservation and family-building care to T/GD patients. Participants who had not received prior training in T/GD were more likely to cite the lack of prior training as a factor leading to discomfort (trained, n = 23; untrained, n = 12; $P = .038$). Regardless of prior training, the discomfort was related to the lack of prior clinical experiences, lack of adequate data regarding possible risks of exogenous hormone replacement therapy use on fertility, and fear of doing or saying the wrong thing during a clinical encounter.

TABLE 3

Behaviors of REI providers relating to the provision of care to T/GD patients (n = 206).			
	Prior training in T/GD health care		P value
	Yes n (%)	No n (%)	
Total	105	101	
I discuss the impact of hormone therapy (i.e., testosterone/estrogen) on future fertility with my transgender and gender-diverse patients and/or their parents/guardians			.106
Always	65 (69.9)	60 (71.4)	
Often	22 (23.7)	13 (15.5)	
Sometimes	3 (3.2)	9 (10.7)	
Rarely	3 (3.2)	1 (1.2)	
Never		1 (1.2)	
Missing	12	17	
If I have questions about how best to provide care to my transgender and gender-diverse patients, I consult with other infertility specialists or endocrinologists who have more practice experience and/or knowledge about fertility in transgender and gender-diverse patients			.033
No, but I consult other resources (i.e., guidelines and online resources)	10 (10.1)	15 (15.6)	
Yes, I consult with my colleagues	87 (87.9)	71 (74)	
I do not have colleagues with experience treating transgender and gender-diverse patients		4 (4.2)	
Other	2 (2)	6 (6.3)	
Missing	6	5	
There are resources (such as brochures, handouts, and website/online information) available and offered to transgender and gender-diverse patients in my practice regarding their reproductive health needs and options			< .0001
No	25 (25.3)	54 (56.3)	
Yes	53 (53.5)	31 (32.3)	
I do not know	21 (21.2)	11 (11.5)	
Missing	6	5	
I feel comfortable providing counseling about fertility preservation to patients who identify as transgender and gender-diverse			.303
Strongly agree	51 (51.5)	50 (52.1)	

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TABLE 3

Continued.

	Prior training in T/GD health care		P value
	Yes n (%)	No n (%)	
Somewhat agree	37 (37.4)	29 (30.2)	
Neither agree nor disagree	5 (5.1)	6 (6.3)	
Somewhat disagree	6 (6.1)	7 (7.3)	
Strongly disagree		4 (4.2)	
Missing	6	5	

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Participants also indicated that it was their perception of how T/GD patients might feel regarding their gender dysphoria or financial concerns that led to their own discomfort in care provision.

DISCUSSION

Our study surveyed REI providers on their knowledge, skills, attitudes, and behaviors related to providing care to T/GD patients in the context of prior training in T/GD health care on these factors. Here, we found that prior training was associated with increased availability and use of resources on T/GD health, awareness, use of additional resources in care provision, and increased consultation of expert colleagues or other specialists when caring for T/GD patients. These findings suggest that prior training leads to more comprehensive resource utilization in care provision, such as more professional collaboration, by orienting providers to seek additional clinical guidance.

The second important study finding was that, regardless of a history of prior training in T/GD care, most study participants believed that T/GD individuals are as fit for parenthood as cisgender individuals. A comment on the language used in the present study: assessing the attitudes of current REI providers toward T/GD patients, the investigators thought that it was important to assess attitudes about the “fitness” of T/GD patients because this group of patients has historically not be supported in family-building desires by the larger medical community. In fact, 16 US states still have no legislature in place that explicitly protects against discrimination in foster care based on sexual orientation and/or gender identity (35). This underpins the hard truth that many lesbian, gay, bisexual, transgender and queer patients face discrimination when building their families. The investigators thought it would be powerful to report that in modern practice, most REI providers generally believe T/GD to be as fit for parenthood as their cisgender patients. Here, REI specialists’ perspectives mirror a growing cultural acceptance of T/GD individuals and expansive approaches to family-building (36). Although cultural acceptance of diverse family networks continues to grow, research on these family structures has historically emphasized spurious

concerns about the appropriateness of childrearing by T/GD people (37). In fact, many countries still impose forced sterilization of T/GD people seeking medical gender affirmation (38). This is despite the 2020 American Psychological Association’s resolution that research “has consistently failed to uncover any empirical justification” for concerns about the well-being of children raised in “nontraditional” families (39). Given that most providers in our survey supported T/GD parenthood, REI specialists will likely welcome additional education and training opportunities. In 2021, the ASRM released a Committee Opinion supporting access to care for T/GD individuals, illustrating that larger clinical organizations are also aligned in their assertion of the importance of equitable access to care for T/GD individuals (40). This represents an important call to action and a foundational step; the ASRM and other professional bodies should take this opportunity to establish clinical practice guidelines to address knowledge gaps (41).

Our study identified factors that are facilitators and barriers to providing T/GD fertility preservation and family-building care. Most participants identified education and training, prior medical experience, and affordability of services as important facilitators. Commonly identified barriers included the cost of fertility preservation, delays in gender-affirming care, lack of knowledge of the potential impact of hormonal interventions on fertility, and the ability to engage with children of different ages/developmental levels. We found noteworthy differences in the factors participants identified as either facilitators or barriers based on prior training in T/GD health care. Participants with prior training were more likely to cite prior training as well as access to a mentor in the field as essential facilitators to care, underscoring the importance of training, education, and access to expertise as factors that enabled the delivery of care to T/GD patients. The importance of training was further underscored by findings among participants who had not undergone prior training, more commonly citing this lack of prior training as a source of discomfort related to caring for T/GD individuals. Participants echoed the importance of T/GD training for REI providers stating in open-ended questions such sentiments as, “I would love to have more formal training and resources available to help this population of people” and “This

TABLE 4

Attitudes/beliefs regarding the care of T/GD patients (n = 206).			
	Prior training in T/GD health care		P value
	Yes n (%)	No n (%)	
Total	105	101	.562
I believe transgender and gender-diverse individuals are as fit for parenthood as non-transgender (cisgender) individuals			
Strongly agree	85 (85.9)	77 (80.2)	
Somewhat agree	10 (10.1)	12 (12.5)	
Neither agree nor disagree	4 (4)	5 (5.2)	
Somewhat disagree		2 (2.1)	
Strongly disagree			
Missing	6	5	.097
Having conversations about fertility and reproductive health with transgender and gender-diverse patients is an essential aspect of their general health care			
Strongly agree	97 (98)	89 (92.7)	
Somewhat agree	2 (2)	7 (7.3)	
Neither agree nor disagree			
Somewhat disagree			
Strongly disagree			
Missing	6	5	.388
I believe that all REI specialists should receive training regarding fertility preservation and the reproductive health needs of transgender and gender-diverse patients			
Strongly agree	91 (91.9)	82 (85.4)	
Somewhat agree	7 (7.1)	12 (12.5)	
Neither agree nor disagree	1 (1)	2 (2.1)	
Somewhat disagree			
Strongly disagree			
Missing	6	5	

REI = reproductive endocrinology and infertility; T/GD = transgender and gender-diverse.
Lipkin. REI counseling of transgender patients. Fertil Steril Rep 2023.

area needs to be part of the ABOG REI Curriculum requirements and included on both the qualifying and certifying examinations,” and “I feel like I really need to know more to [do] as good a job for these patients as I do for other patients.” From the patient’s perspective, prior studies have found that a lack of access to knowledgeable providers is one of the greatest barriers to care for T/GD individuals (42–44).

Our study also highlights the importance of structural factors in REI providers’ approach to T/GD care. Regardless of prior training in T/GD health care, most participants

believed that insurance mandates should cover the cost of fertility preservation for iatrogenic infertility, including medical gender affirmation therapies for T/GD individuals. As of June 2022, only nine US states—New Jersey, California, Connecticut, Delaware, Illinois, Maryland, New Hampshire, New York, and Rhode Island—have adopted mandates requiring private insurers to cover the cost of fertility preservation if a medically necessary procedure compromises fertility (i.e., iatrogenic infertility) (45). Although usually modeled after oncologic therapies, these insurance mandates have the potential to be extended to cover infertility caused by medical gender affirmation therapy for T/GD individuals, including surgical interventions and/or HT (45, 14). However, as Kyweluk et al. (45) point out, “despite broad legislative language [within these insurance mandates], how the new legislation will be implemented for transgender individuals seeking fertility preservation remains unclear.” Future efforts should be aimed at expanding insurance coverage for fertility services and advocating for the inclusion of insurance coverage because of iatrogenic infertility for T/GD individuals.

Finally, these findings highlight the urgent need for further research into the potential effects of hormone replacement therapy on future fertility. Our survey found that regardless of prior training, REI providers were aware of gender-affirming hormonal regimens and FDA-approved methods of fertility preservation options in the United States and agreed that the effects of testosterone and estrogen on future fertility are currently unknown. We are encouraged that there is an awareness of regimens and the boundaries of the current evidence base and note that there is a critical and timely need for further research that elucidates the relationship between HT for T/GD individuals and their future fertility.

The results in this article should be interpreted in the context of limitations. One limitation is the relatively small number of survey participants (n = 206). The attenuated sample size likely stemmed from multiple factors, including common challenges in gathering participants for survey-based studies, survey subject matter, e-mail fatigue, and the COVID-19 pandemic. Additionally, online physician surveys often have lower participation rates (46, 47). Our study’s focus on the reproductive health needs of T/GD individuals may have further limited the subset of participants willing to complete an online survey on this topic. Selection bias may have played a role in that participants with prior experience in T/GD health care and/or an interest in the topic may have been more willing to complete the study than those prospective REI participants with less or little prior experience and/or exposure to T/GD health care.

Additionally, study participants were predominately in their 30s–40s, academically based and identifying as white, cisgender, and heterosexual, and were primarily members of SREI. In total, these factors potentially limit the generalizability of the study results to a broader demographic of REI providers nationally. Given the limiting factors in this study’s generalizability, further studies are needed to sample a wider and more diverse population of REI providers, and the findings of this study should be understood within this more

limited setting. Although the study participants may not be a readily generalizable population, the important findings of this study, namely, that training in T/GD health care is essential to empower physicians to provide care to T/GD patients, is likely true for a wider population of REI providers nationally given the importance of ongoing education and training in the health care profession.

CONCLUSION

This study of REI providers' knowledge, skills, attitudes, and behaviors regarding the reproductive health needs of T/GD individuals demonstrates that REI providers believe T/GD people should be parents and that prior education and/or training in T/GD health care is associated with increased availability of resources on T/GD health and more frequent consultation with experts in the field. Training facilitates the ability to provide REI services to T/GD patients, and the lack of overall knowledge of the effects of gender-affirming HT on fertility preservation could be addressed by systematic inclusion of training about T/GD health, fertility preservation, and family-building in residency and fellowship. Likewise, continuing education should be developed and encouraged by professional bodies and academic centers to ensure providers at all levels of training and career stages receive this important education. The often-prohibitive cost of fertility preservation and family-building services were identified as barriers to providing care to this population, underscoring an urgent need to develop structural support for the delivery of T/GD health care, including fertility preservation, within the US. Results can directly inform the ASRM LGBTQ+ Health Special Interest Group (including investigators on this manuscript), which is actively drafting national guidelines for T/GD health care and family building to be disseminated to REI specialists.

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