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## A self-guided curriculum on endocrinology standard of care for gender diverse youth, including ethical considerations

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### Abstract

**Objective:** While the field of pediatric endocrinology, and the American Board of Pediatrics, continues expanding training to include gender-affirming care, many pediatric endocrinology fellowship programs do not have formal curriculum for this patient population. Members of the Pediatric Endocrine Society (PES) that have a special interest in transgender health designed a curriculum based on Endocrine Society practice guidelines to expand the knowledge of gender affirming care for medical trainees' and faculty.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

**Methods:** PES members designed a 5-part self-guided educational module series with embedded knowledge questions. Uniquely, medical ethical reflections were included within each module. Participants completed baseline demographic and baseline and follow-up knowledge surveys.

**Results:** Most participants were pediatric endocrinology fellows and 44 % percent ( $n = 21$ ) completed all study components, including the follow up knowledge survey. Knowledge question data analysis demonstrated knowledge gained in medical management of pubertal youth and surgical interventions.

**Conclusion:** This is the first medical education curriculum in gender-affirming care created by pediatric endocrinologists grounded in the Endocrine Society practice guidelines. This study demonstrates medical knowledge gained in caring for gender diverse youth and is the first to incorporate ethical considerations for this patient population. While initially designed for pediatric endocrinology trainees and faculty, this curriculum may be of great utility for any provider interested in caring for gender diverse youth.

### Keywords

Gender diverse; Transgender; Gender dysphoria; Gender-affirming care; Pediatric endocrinology; Education modules

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## 1. Introduction

Gender diverse youth (GDY) include any child or adolescent whose gender identity differs from that which was assigned at birth (Hembree et al., 2017). Recent studies have estimated the prevalence of GDY from 1.8 to 2.7 % of surveyed U.S. high school students (Johns et al., 2019; Rider et al., 2018). With prior studies estimating that there are 1.4 million transgender adults in the United States, about 0.6 % of the population, with an increased prevalence among the younger adults, this may suggest there will be an increasing demand for gender-affirming care across pediatrics (Flores et al., 2016). Additionally, clinics providing care for GDY are seeing increasing rates of referrals, hypothesized to be related to increased societal awareness of gender diversity (Handler et al., 2019). Equitable access to specialty care is impacted by a myriad of health disparities including race and ethnicity, as well as geographical location, as most pediatric gender affirming care clinics are located in larger academic medical centers in urban areas (Kidd et al., 2021; Kimberly et al., 2018). In addition, more recently, there has been a drastic increase in legislation targetted at restricting gender-affirming care for gender diverse youth (Kraschel et al., 2022), impacting equitable access to care, and the number of providers who can legally provide this care in the United States.

GDY are a particularly vulnerable patient population due to increased incidence of depression, anxiety, suicidal ideation and suicide attempts (Colizzi et al., 2014; Herman et al., 2019; Moyer et al., 2019). However, research also demonstrates decreased rates of these mental health conditions in GDY who are supported in their identities (Green et al., 2021; Olson et al., 2016). Pediatricians and other primary care providers are often the first health care professionals that a family comes to for guidance in caring for a gender diverse

child or adolescent. This creates a critical position to promote healthy and positive outcomes for gender diverse youth.

The American Academy of Pediatrics endorses the current standard of care, also referred to as gender-affirming care, as described in its policy statement and technical report on office-based care for LGBTQ youth (Rafferty, 2018). As a result, pediatricians and pediatric subspecialists should understand the general approach to providing this standard care and provide appropriate support and referrals when a patient endorses gender dysphoria and/or desire for these resources. Referrals often include seeking a pediatric gender clinic, commonly based in pediatric endocrinology or adolescent medicine, as well as behavioral health referrals. With the increasing demand for clinical services for gender diverse youth, experts in gender-affirming care recognize a gap in medical education at all levels. Medical providers in adolescent medicine, family medicine, and psychiatry have also recognized this education gap (Vance et al., 2020). There is currently no widely distributed pediatric endocrine-based curriculum reviewing gender-affirming care for gender diverse youth, nor is there a curriculum encompassing ethical considerations. When building educational curriculum for this vulnerable patient population, it is vital to include ethical principles such as pediatric patient autonomy and justice, which are incorporated into these modules for the learner's consideration and reflection.

## 2. Methods

### 2.1. Curriculum development

Members of the Pediatric Endocrine Society (PES) Transgender Special Interest Group (SIG), in collaboration with members of the PES Ethics SIG and Education Committee, designed a module-based curriculum for medical trainees and clinical providers to review multiple aspects of gender affirming care. There are 5 modules, largely based on the 2017 Endocrine Society Clinical Practice Guideline (Hembree et al., 2017), and they are divided into the following sections:

- Caring for Gender Diverse Youth (CFGDY) Modules
  - Module 1: Terminology, Creating an Environment of Inclusion, Caring for Non-Binary Youth, Ethical Principles
  - Module 2: Non-medical and Medical Management of the Pre-Pubertal/ Early Pubertal Gender Diverse Child
  - Module 3: Medical Management of the Pubertal Gender Diverse Adolescent
  - Module 4: Surgical Options
  - Module 5: Psychosocial Considerations

Each module includes ethical considerations that are relevant to the topics presented in that module, including beneficence, non-maleficence, autonomy, justice, open future, and best interests, and propose some possible approaches to addressing these concerns. In addition, at the conclusion of each module, there are 4–8 questions reviewing the module content, which

provides an interactive component for learners to review knowledge gained. These questions focus on the known epidemiologic and medical aspects of caring for gender-diverse youth, based on the current literature. We did not specifically ask knowledge questions about the ethical considerations, as there is not always a clear right or wrong answer in these topic areas.

## 2.2. Participant recruitment

This study received IRB approval at Oregon Health & Science University (OHSU) and the University of Michigan. Participants were recruited through their affiliations with PES, the Association of Pediatric Program Directors (APPD) or if they were trainees or faculty at the two lead institutions. One recruitment email was sent to each affiliate's listserv, with an estimated 115 total individual email addresses. Any individuals in medical training, or who have completed medical training, were eligible to participate, including medical students, residents, fellows, and attending/faculty physicians, with an emphasis placed on recruiting medical trainees. Participants were required to be English speaking.

## 2.3. Surveys and curriculum administration

After providing informed consent to participate in the study, participants received a baseline multiple choice survey through REDCap, which included professional demographics, education level and experience, previous gender-health training, and confidence in knowledge and skills in providing this care. The end of the baseline survey included 20 knowledge-based questions regarding care of gender diverse youth. Participants did not receive a score for the knowledge questions. Following completion of the baseline survey, participants were given access to the 5-part electronic module series in PDF format. Participants were given 30 days to review modules in a self-guided method, taking an estimated 2 h to read and review embedded practice questions. The modules did not need to be reviewed in a single session as participants were able to retain and save the PDF file.

After completing the modules, participants were then asked to complete a REDCap-based follow-up survey. This survey included the same knowledge-based questions from the baseline survey and participants had access to the modules while taking the survey. Again, scoring was not reported directly to the participant. Once the follow-up survey was completed, participation in the study concluded. Participants were able to retain modules for their personal reference following study participation.

## 2.4. Analysis

Data analysis to demonstrate change in knowledge after review of CFGDY modules was done with McNemar's exact test in collaboration with biostatistician. Two by two tables designed for each question compare number of participants who answered the question correctly in both baseline and follow up; incorrect at baseline then correct at follow up (knowledge gained); correct baseline then incorrect at follow up (knowledge lost); and incorrectly in both baseline and follow up surveys (no learning).

### 3. Results

Out of approximately 115 email invitations that were sent, 88 individuals responded to recruitment materials distributed through PES, APPD and during their OHSU and Michigan pediatric endocrinology clinical rotations between May 2020 and September 2021 (Fig. 1). Participants were from at least 24 different institutions. Forty-seven (53 % of recruited individuals) consented to study participation. Ninety-one percent ( $n = 43$ ) started the baseline survey, including one participant who only completed demographic information without knowledge questions (this incomplete data was excluded when analyzing baseline survey). Twenty-five participants accessed the modules. Twenty-one participants (50 % of those who completed the baseline survey) completed the follow up survey after reviewing the modules.

Of the participants that completed the baseline survey, 55 % were fellows and 62 % identified pediatric endocrinology as their main area of expertise (Fig. 2A and Fig. 2B). Sixty-four percent of participants reported receiving gender-affirming education at some point in their medical training, while 71 % reported receiving cultural competency training that included gender diversity at some point in their medical training. Ninetyfive percent of the participants reported encountering gender diverse patients in their practice, with 64 % providing pediatric gender-affirming care. At baseline, only 24 % reported their training program had a curriculum specific to gender-affirming care.

When reflecting on their experience in providing this care, 43 % of participants disagreed or strongly disagreed they felt confident in their knowledge of pediatric gender-affirming care, and only 33 % agreed or strongly agreed that they were satisfied with their education thus far. Only 33 % of participants agreed or strongly agreed that they were confident in their ability to provide gender-affirming care for pediatric patients, despite 79 % strongly agreeing or agreeing that they plan to provide gender affirming care to pediatric patients as part of their future clinical practice.

At baseline, most participants could identify the definition of a non-binary person (98 %), and all participants identified the various aspects of gender transition, methods of promoting inclusion of gender diverse individuals in a clinical setting, and ways to create a welcoming and inclusive clinic environment. <70 % of participants correctly answered questions regarding options for pubertal suppression other than GnRH agonists (Knowledge Question [KQ] 9), general approach of initiating gender affirming hormones in adolescents (KQ 11), monitoring of masculinizing medications (KQ 13), risks and benefits of various forms of estradiol treatment (KQ 14), anticipated timing of effects of feminizing treatments (KQ 15), and the impact of various gender-affirming hormone surgeries on fertility (KQ 18; Table 1).

McNemar's exact test was performed on data of the 21 participants who completed both baseline and follow up surveys to demonstrate change in individual participant knowledge. Fourteen knowledge questions were analyzed (Table 2). Six questions were not analyzed as all 21 participants answered knowledge questions 2–5, 10 and 20 correctly at baseline and follow up. Data from eleven questions demonstrate that at least one participant (range 1–11)

improved their knowledge and corrected incorrect baseline response. Three questions show this difference was statistically significant (McNemar's exact test  $p < 0.05$ ). These questions covered monitoring serum effects of oral conjugated estrogen, timing of physical effects of estrogen and phalloplasty's impact on fertility (Table 2).

#### 4. Discussion

At baseline, many participants indicated that they planned to provide gender-affirming care to pediatric patients as part of their future clinical practice, but the majority did not feel satisfied with the education they had received during medical training and did not feel confident in their knowledge of pediatric gender-affirming care. At baseline, participants showed general knowledge of terminology, creating a welcoming environment, caring for non-binary youth, and some of the basics regarding managing pre-pubertal youth. However, the baseline data demonstrates a lack of knowledge around some specific aspects of the medical management of pubertal adolescents, as well as surgical interventions. Given the nature of ethical topics, there were no questions presented to learners to assess their knowledge on ethical issues specifically, as there is not always a clear right or wrong answer. These ethical issues were presented more for consideration by the learner.

Upon completion of the 5-part CFGDY module series, participants showed significant improvements in the questions related to pubertal blockade in gender diverse children and surgical interventions. Being able to provide guidance to patients regarding medical and surgical interventions is critical in building competency in gender-affirming care. This study's data demonstrates that participants gained knowledge in pediatric gender-affirming care by reviewing the modules in a self-guided asynchronous learning model.

While other curriculums exist that have a focus on the care of gender diverse youth (Safer and Eriksson, 2016), this is the first curriculum by pediatric endocrinologists focused on the care of gender diverse youth (GDY) with a unique perspective on ethical implications of this care. The goal of the pediatric endocrinologists who designed the modules was to ground the content in the 2017 practice guidelines to promote standardization of care, in addition to providing ethical considerations in caring for this vulnerable patient population.

This curriculum advances existing resources by outlining much of the nuanced details of medical management to support providers caring for GDY. The unique aspect of ethical considerations helps provide additional perspective that would be invaluable to anyone engaging in gender affirming care, particularly within the pediatric patient population. Additional strengths of the modules included its self-guided design, allowing learners the flexibility to incorporate the material with other asynchronous learning tools that accompany clinical education.

The recruiting and distribution of the educational modules occurred early in the COVID-19 pandemic, when many medical educators were working to convert in-person educational opportunities to virtual plat-forms, to support efforts to minimize trainee exposures during that difficult and uncertain time. Travel for visiting student and resident rotations was also significantly impacted. A variety of educators indicated strong interest in having access

to these resources, to help support trainee-directed education and to supplement in-person clinical activities.

With the recent rapid rise in proposed legislature that could limit access to gender-affirming care for gender diverse youth, these modules may provide access to necessary education for providers in non-restrictive states, who may see an influx of patients seeking access to this critical care.

#### 4.1. Limitations

Despite the baseline and follow up survey only requiring 5–15 min of time, one limitation is the modules were a larger time commitment of roughly 2 h of self-guided learning and likely contributed to participant attrition. Medical trainees have many demands including clinical commitments in addition to synchronous and asynchronous education materials and didactics. A 2-hour self-progressing module review may be intimidating for some learners, however asynchronous learning provides more flexibility. Based on IRB approval, recruitment required individualized invitations to interested participants, which may have delayed response and decision to participate in study. This participation recruitment likely created some selection bias of individuals specifically interested in gender-affirming care.

In addition, the individuals who completed the follow-up survey may have been individuals who were more comfortable and knowledgeable with this care at baseline, which may have caused the follow-up results to be more favorable. Participants' satisfaction with the curriculum was not assessed as the primary objective was to demonstrate knowledge gained by reviewing modules.

Transgender medicine is an area of on-going research, and recommendations are evolving over time. For this curriculum, we have focused our education on the 2017 Endocrine Society Guidelines, as these were the most updated guidelines at the time. The authors recognize that there are a variety of other professional organization guidelines that also support this care (Hembree et al., 2017). These additional resources will be key for providers to utilize in their work with gender diverse youth, including the World Professional Association of Transgender Health (WPATH) Standards of Care, version 8 (Coleman et al., 2022), as well as the University of California San Francisco (UCSF) Transgender Care and Treatment Guidelines (UCSF Gender Affirming Health Program et al., 2016). Future versions of the module series would be easily updated by our special interest group's education subcommittee to incorporate the changing recommendations in this ever-evolving field.

## 5. Conclusion

This is the first medical education curriculum addressing gender-affirming care created by pediatric endocrinologists, which is grounded in the Endocrine Society practice guidelines, and has a unique perspective on ethical considerations. This study demonstrates learners gained knowledge upon completion of the module series. Although originally conceptualized for pediatric endocrinology trainees and faculty, these modules could be incorporated into fellowship curriculum as well as resident and medical student rotations



in pediatric endocrinology or adolescent medicine, to augment clinical experiences trainees will have with gender diverse youth.

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## Data availability

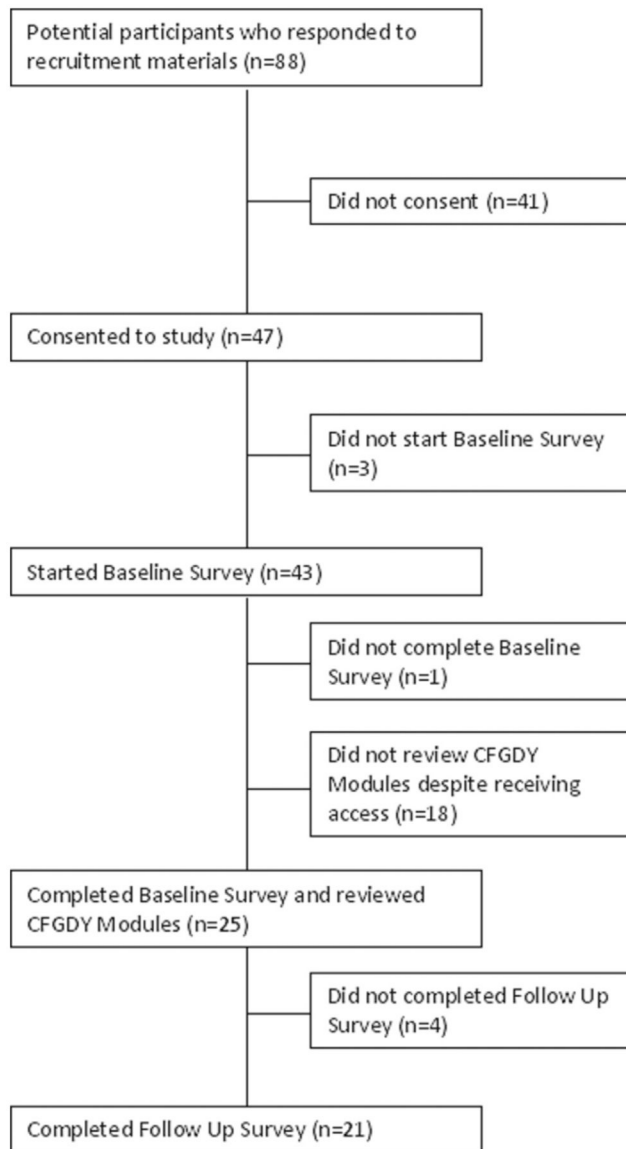
Data will be made available on request.

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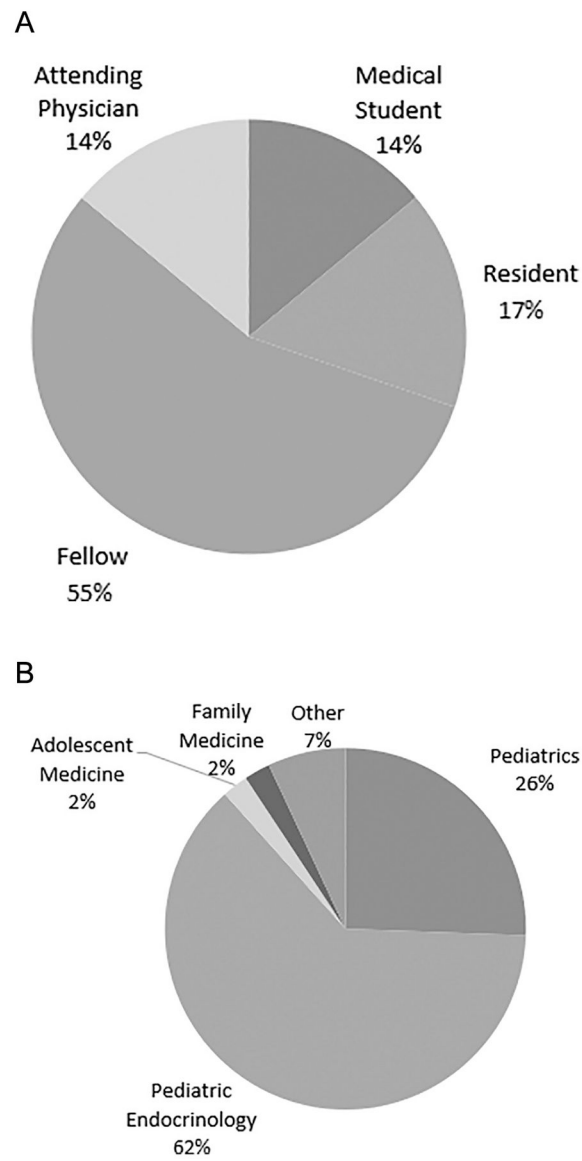
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**Fig. 1.**  
Study recruitment and retention.



**Fig. 2.** Demographics of study participants who completed Baseline Survey ( $n = 42$ ) A. Participants by level of training B. Participants by specialty.

**Table 1**

Correct answer to baseline and follow up knowledge questions.

	Knowledge Question (KQ)	Baseline (n = 42)	Follow-Up (n = 21)
Module 1: Terminology, Creating an Environment of Inclusion, Caring for Non-Binary Youth, Ethical Principles	1	41 (98 %)	20 (95 %)
	2	41 (100 %)	21 (100 %)
	3	42 (100 %)	21 (100 %)
	4	41 (100 %)	21 (100 %)
Module 2: Non-medical and Medical Management of the Pre-Pubertal/Early Pubertal Gender Diverse Child	5	41 (98 %)	21 (100 %)
	6	31 (76 %)	21 (100 %)
	7	41 (98 %)	20 (95 %)
	8	30 (71 %)	19 (91 %)
	9	28 (67 %)	20 (95 %)
	10	41 (98 %)	21 (100 %)
Module 3: Medical Management of the Pubertal Gender Diverse Adolescent	11	19 (45 %)	15 (71 %)
	12	34 (81 %)	20 (95 %)
	13	28 (67 %)	19 (91 %)
	14	16 (38 %)	18 (86 %)
	15	18 (43 %)	19 (91 %)
Module 4: Surgical Options	16	34 (81 %)	20 (95 %)
	17	30 (71 %)	20 (95 %)
Module 5: Psychosocial Considerations	18	20 (48 %)	18 (86 %)
	19	40 (95 %)	21 (100 %)
	20	39 (93 %)	21 (100 %)

**Table 2**

Participant responses on baseline and follow up surveys.

Knowledge Question	Baseline + Follow up Correct	Baseline Incorrect + Follow up Correct	Baseline Correct + Follow up Incorrect	Baseline + Follow Up Incorrect	McNemar's Exact Test*
1	20	0	1	0	1.000
6	16	5	0	0	0.063
7	20	0	1	0	1.000
8	13	6	1	1	0.125
9	16	4	0	1	0.125
11	9	6	1	5	0.125
12	16	4	0	1	0.125
13	13	6	1	1	0.125
14	7	11	2	1	0.023
15	9	10	0	2	0.002
16	19	1	0	1	1.000
17	16	4	1	0	0.375
18	10	8	1	2	0.039
19	20	0	1	0	1.000

\* Statistical significance  $p < 0.05$ .