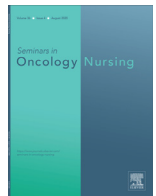




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## Cancer Screening and Prevention in the Transgender and Gender Diverse Population: Considerations and Strategies for Advanced Practice Nurses

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## ABSTRACT

**Objectives:** This discussion paper presents recent evidence regarding cancer screening and prevention among the transgender and gender diverse (TGD) community and highlights where and how advanced practice nurses (APNs), particularly those in primary care, can better contribute to closing the gap between healthcare disparities between TGD and cisgendered populations.

**Methods:** Relevant publications on the topic and professional guidelines and evidence have formed the basis for this discussion paper.

**Results:** TGD individuals are a vulnerable population with unique needs. They remain at risk of cancer and might be at greater risk of developing some cancers compared to cisgendered people but are underscreened. Barriers to gender-affirming care need to be addressed to improve access to prevention and screening services and improve the cancer care experiences and outcomes of TGD people.

**Conclusion:** APNs can work in collaboration with TGD individuals and the healthcare system to improve access to culturally safe cancer screening and more effective prevention of cancer and poor cancer outcomes.

**Implications for Nursing Practice:** APNs have the potential to improve access to cancer screening for TGD people by increasing their understanding of the needs of the population, providing culturally safe care, and advocating for more preventative care and cancer screening. With greater knowledge and understanding of the needs and preferences of TGD people both broadly and in relation to cancer screening and prevention, targeted interventions and care approaches can be implemented. APNs should also aim to conduct evaluations and research into cancer prevention and screening to build the currently limited evidence base and nursing knowledge in this important field.

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Within cancer care and the healthcare community at large, gender is frequently viewed as binary and is often confused or conflated with a person's sex. Based on cross-sectional studies, 0.3% to 4.5% of adults in the general population identify as transgender.<sup>1</sup> Transgender, or "trans," is an umbrella term that includes, but is not limited to, genders including nonbinary, genderqueer, and genderfluid (Table 1). (Note: Varied terms and acronyms are found in society and the literature representing gender and sexual identities. For consistency and inclusivity, the authors are using the term *transgender and gender diverse* [TGD] throughout this paper. The authors acknowledge that when referring to previously published literature slightly different terminology may have been used.) In general, TGD individuals continue to experience discrimination, threats, and violence as a result of widespread and long-standing prejudicial beliefs in many

communities and cultures and, as a result, often experience poorer physical, mental, and emotional health and well-being compared with cisgendered individuals. Added to this, TGD individuals continue to experience challenges and barriers to accessing gender-affirming health care.<sup>2–4</sup> Gender-affirming health care can include social, psychological, behavioral, or medical interventions that support and affirm an individual's gender identity.<sup>5</sup> Due to actual, historical, or anticipated discrimination, many TGD individuals might only voluntarily seek health care to access gender-affirming hormone therapy or surgery and may avoid engaging with the primary health sector for other health concerns including cancer screening. This may cause delays in cancer diagnosis and treatment and thus result in avoidable poorer outcomes and even death due to untimely detection and treatment. Due to limitations in data collection in population-level studies and a relatively small evidence base focused specifically on the TGD community, the prevalence of cancer in the TGD population is unknown. A study by Jackson and colleagues<sup>6</sup> examining the United States of America National Cancer Database found that TGD

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## Layperson Summary

### What we investigated and why

Cancer screening and prevention among transgender and gender diverse (TGD) individuals are areas of concern due to unequal access to healthcare and worse health outcomes. Recent evidence highlights the need for advanced practice nurses (APNs), particularly in primary care settings, to improve the situation. TGD individuals face unique challenges and remain underscreened for cancer despite being at risk, which in some cases can be greater than for non-TGD people. Barriers to appropriate care must be tackled to enhance access to preventive and screening services and improve cancer outcomes for TGD people.

### How we did our research

In this paper, we discuss evidence from recent relevant publications to provide readers with information and guidance regarding cancer prevention and screening for TGD people and where and how APNs can be best used.

### What we have found

Collaboration between APNs and TGD individuals within inclusive and empathic healthcare services is crucial to ensuring culturally safe cancer prevention and screening. APNs can play a pivotal role in advocating for increased preventative care and advocating for TGD-inclusive practices within healthcare systems. Understanding the specific needs and preferences of TGD individuals, especially related to cancer screening and prevention, is paramount.

### What it means

By tailoring interventions and care approaches accordingly, APNs can contribute significantly to closing gaps in access and outcomes. Further, APNs should engage in research and evaluations to expand the evidence base and nursing knowledge in this critical area. Through ongoing efforts, APNs can improve access to cancer screening and prevention for TGD individuals, ultimately enhancing their overall healthcare experience and outcomes.

patients were more likely to be diagnosed at a later stage, be less likely to receive treatment, and have worse outcomes for many types of cancers. This highlights the important gap that exists around cancer prevention and screening in the TGD community as well as opportunities for where advanced practice nurses (APNs) could contribute to supporting better care experiences and outcomes in this space. The purpose of this discussion paper is to present evidence regarding cancer screening, prevention, and early detection among the TGD community and demonstrate how APNs can contribute to improving the healthcare disparities experienced by TGD people.

APNs work in many healthcare settings around the world, but what precisely defines what an APN is in terms of their role, educational preparation, and registration, accreditation, or certification often differs by jurisdiction. This means that different countries have different names (or sometimes multiple names) for what could be understood as an advanced practice nursing role, including nurse practitioner, clinical nurse specialist, and advanced nurse practitioner. In most contexts, APNs are registered nurses who have completed further training and endorsement, often in an area of specialization that gives them a greater scope of practice and a range of available options for care provision.<sup>7,8</sup>

## Cancer Prevention

Cancer prevention and cancer screening are very similar concepts with a great deal of overlap in the literature both in terms of their focus and some of the interventions involved.<sup>9</sup> Here, the term “cancer prevention” is used to refer to predisease efforts to reduce the risk of developing cancer (carcinogenesis), while “cancer screening” is used to refer to efforts to identify existing cancers or precancerous cells. Between 30% and 60% of cancers are preventable, with prevention strategies focusing on mitigating modifiable risk factors, including tobacco, alcohol, physical activity, diet/nutrition, obesity and overweight, infections, environmental carcinogens, and radiation exposure.<sup>10</sup> A range of social determinants of health can affect TGD people in ways that are different to cisgendered people. This can increase their risk of developing cancer and negatively affect their participation in, and the appropriateness and effectiveness of, existing cancer prevention interventions.<sup>11–13</sup> This is particularly important considering recent evidence suggesting that behavioral risk factors are the greatest basis of the current global cancer burden, with smoking, unsafe sex, and alcohol use the three greatest contributors.<sup>10</sup> LGBT persons appear to have low participation in cancer prevention interventions, which could result in the development and progression of cancers, ultimately leading to increased risk of morbidity and mortality, especially when coupled with a greater likelihood to be hesitant, delay, or even avoid accessing care.<sup>12,14,15</sup> Nurses, and especially APNs, with their greater scope of practice and potential expertise in both primary health care, oncology, and care for gender and sexually diverse community members and other vulnerable groups, can champion and improve the provision of cancer prevention in many communities worldwide.<sup>14,16,17</sup>

Despite a relatively limited evidence base in terms of population-level and specific studies that focus on TGD people, it is widely reported that TGD people have a higher prevalence of tobacco use,<sup>18,19</sup> alcohol consumption,<sup>18,20,21</sup> and rates of sexually transmitted infections including human papillomavirus (HPV) and HIV,<sup>22</sup> often driven by social and economic determinants of health.<sup>23</sup> For example, in one recent study, experiencing transphobic discrimination was linked with increased odds of alcohol use disorder.<sup>24</sup> Alcohol consumption, while linked to carcinogenesis, is often studied in relation to the risk of more immediate physical and mental harm, with transgender men and nonbinary people in one study reporting increased likelihood of unprotected sex while drinking, which itself could pose a risk of contracting a carcinogenic infection such as HPV or HIV.<sup>25</sup> Understanding the particularities of TGD peoples' health

**TABLE 1**  
Glossary of Terms

Gender identity	Definition
Cisgender	A person whose gender identity aligns with their sex assigned at birth
Gender-fluid	A person who does not identify with a single gender or has a fluid gender identity
Genderqueer	Genderqueer people typically reject notions of static categories of gender and embrace a fluidity of gender identity and often, though not always, sexual orientation. People who identify as “genderqueer” may see themselves as being both male and female, neither male nor female or as falling completely outside these categories.
Nonbinary	Nonbinary people may identify as being both a man and a woman, somewhere in between, or as falling completely outside these categories. While many also identify as transgender, not all nonbinary people do.
Transfeminine	A person whose sex assigned at birth is male who identifies as feminine; often abbreviated to transfem or transfemme
Transmasculine	A person whose sex assigned at birth is female who identifies as masculine; often abbreviated to transmasc

Human Rights Campaign. <https://www.hrc.org/resources/glossary-of-terms>  
PFLAG National Glossary. <https://pflag.org/glossary/>

and wider experiences, and that the TGD community itself contains great diversity,<sup>18,26</sup> is vital to the provision of effective, inclusive, and appropriate health care including cancer prevention services.<sup>27</sup> In a study with 79 transgender/nonbinary/gender nonconforming participants that also included LGBTQ participants, empathetic, inclusive, and gender-affirming care was found to be critical to enhancing the uptake of preventive healthcare services, including those directed at preventing cancer.<sup>28</sup> Similar findings were reported by another study regarding alcohol counseling for TGD adults.<sup>29</sup> As highlighted by Usher and colleagues, inadequate knowledge regarding LGBTQ+ issues, preferences, experiences, and care means many care providers and policymakers are unable to effectively provide appropriate services, including cancer prevention interventions.<sup>30</sup>

As a minority group that has historically and continues to be marginalized and discriminated against in many contexts, there are both fewer existing cancer prevention activities that have been designed to target the needs and preferences of TGD people and significantly less research evidence to underpin their development and implementation. Thus, while there might be many examples of very established cancer prevention initiatives running at a variety of jurisdictional levels, relatively few (and in most contexts, none) are designed for TGD people. This means that while there might be excellent evidence that existing smoking cessation and physical activity programs are effective and accepted, for example, there is little to no information regarding how such programs might work for TGD people.

#### *Alcohol Reduction*

A recent scoping review with six included studies found no studies that involved medical or public health interventions for reducing alcohol consumption among transgender and nonbinary people. Five studies focused on trans women with additional vulnerabilities, and here alcohol use was reported on as secondary to minority stress or as a risk factor for HIV infection.<sup>31</sup> Here, the authors highlight that there is an overrepresentation of trans women in the literature on alcohol use among gender minorities with a large focus on recommendations directed toward improving safe sex practice through reducing alcohol consumption. While the review suggests that psychosocial alcohol reduction interventions adapted for use with TGD people might be promising, interventions developed for one population (eg, trans women) should not be assumed to work as well for others (eg, trans men and nonbinary people).<sup>31</sup> Here, APNs looking to provide alcohol reduction interventions for TGD people could benefit by ensuring that they have a sound understanding and knowledge of the TGD community and that person-centered care should still guide the delivery of preventive health messages.

#### *Smoking Cessation*

While an earlier scoping review found no evidence for tobacco cessation interventions for TGD young people,<sup>32</sup> a Canadian qualitative study sought to examine youth/young adult LGBTQ+ views regarding tobacco interventions and found that participants desired the following attributes from such programs—targeted to LGBTQ+ people; accessible location, time, availability, and cost; inclusivity, relatability, and emphasizing diversity; include LGBTQ+ peer support and counselling services; be integrated with other activities outside smoking; be positive, motivational, uplifting, and empowering; offer tangible coping mechanisms; and include rewards and incentives.<sup>33</sup> Mobile phone apps and social media campaigns were highlighted as potentially promising modes of including each of these attributes. As with many studies in gender and sexual diversity, the research included the broader LGBTQ+ community with 23 participants identifying as trans male or female and 10 as other gender.

#### *Breast Cancer*

A systematic review including 41 studies with meta-analysis found that while both female-to-male and male-to-female transgender people are at lower risk of developing breast cancer than cisgender women, they are at substantially greater risk compared with cisgender men.<sup>34</sup> The review also highlighted the absence of robust prevention guidelines for the TGD population, which supports the findings of a recent scoping review.<sup>35</sup>

#### *HPV/Cervical and Anal Cancer*

Transgender people can be at greater risk of developing cervical cancer due to a greater risk of HPV infection. While the majority of the literature appears to focus on HPV-related cervical cancer screening and prevention, anal cancers can also arise from HPV infection and risk of this might be related to risk factors more common among gender minority people.<sup>36,39</sup> One approach to preventive care for HPV-associated anal cancers among transgender women could be effectively integrating HPV vaccination with HIV preexposure prophylaxis (PrEP) delivery. This has been found to be acceptable to both patients and providers. However, barriers to implementation include a lack of focus on HPV in PrEP management.<sup>40</sup> If local barriers to implementation are addressed, APNs could integrate HPV vaccination with PrEP delivery to reduce the prevalence of HPV-related cancers.

#### *Socioeconomic Status*

There is understandably, but distressingly, very little evidence or inquiry about cancer screening and prevention for transgender people living in low-income and low- to middle-income countries as well as in countries or jurisdictions where gender and sexual diversity is illegal, highly discriminated against, and marginalized. In these settings, TGD people face massive barriers to accessing safe, effective care, and the services provided by healthcare teams are highly limited by issues of legality, safety, privacy, political disapproval, and religious doctrine. In El Salvador, where LGBT rights are poor, and discrimination and social marginalization remain high, self-screening HPV methods have been found to be acceptable by many transgender men.<sup>41</sup> As Ejaz and colleagues<sup>42</sup> highlight regarding HPV-associated anal cancer screening for men who have sex with men and transgender women in Pakistan, the feasibility of improving cancer prevention and screening services, particularly in lower-resource settings where stigma, discrimination, and social victimization are abundant and health system efficiency is lower, is strongly dependent on factors such as political will, funding, and broader antistigma and discrimination interventions.

#### **Cancer Screening**

There are many unknowns regarding how routine cancer screening recommendations should be applied to TGD persons receiving gender-affirming hormone therapy largely due to lack of healthcare and health services research.<sup>43</sup> It is essential to understand the complexities and experiences of people accessing (or not accessing) cancer screening. The World Professional Association of Transgender Health<sup>1</sup> (WPATH) recommends that practitioners provide comprehensive primary and secondary cancer prevention as part of routine primary care. However, it is important to note that evidence-based guidelines vary across the globe. Therefore, practitioners should use local guidelines when screening for cancer in TGD individuals.<sup>1</sup>

#### *Breast Cancer Screening*

The World Professional Association of Transgender Health<sup>1</sup> recommends that practitioners follow guidelines recommended for

cisgender women when considering the screening needs of TGD individuals on estrogen therapy. Practitioners also need to factor in the length of time on estrogen, dose, patient age, and the age when gender-affirming hormones were started.<sup>1</sup> Practitioners may also need to consider screening in transgender male patients. In lieu of specific guidelines, a recent systematic review supports periodic breast or chest examinations.<sup>34</sup> A systematic review demonstrated that breast cancer occurred at a younger average age in transmasculine individuals and was predominantly hormone receptor positive.<sup>44</sup> As there have been cases of malignancy before and after gender-affirming mastectomy, screening should be considered.<sup>45</sup> With more evidence needed to develop stronger guidance around breast screening for TGD people, APNs could also focus on providing preventative care, which would also likely contribute to reducing the risk of developing both breast cancer and other cancers.

### *Cervical and Anal Cancer Screening*

With significant disparity in HPV screening, transgender men and nonbinary patients, particularly, can experience greater challenges participating in HPV screening. The WPATH recommends that practitioners follow guidelines recommended for cisgender women for screening of cervical cancer; this includes those who have previously had a cervix. WPATH also advises following the same recommendations, including the recommendation not to screen for ovarian or endometrial cancer in TGD individuals with a uterus for those at the same risk as cisgender individuals.<sup>1</sup>

A systematic review of the barriers and facilitators to cervical cancer screening among transgender men and nonbinary people with a cervix identified significant disparities in cervical cancer screening uptake between gender minorities and cisgender women. Barriers included a lack of knowledge in cervical cancer risks in both the patients and the practitioner.<sup>38</sup> It is also important to note that cervical screening is not always associated with dysphoria and practitioners should not assume this to be a barrier. Alternatively, self-swabs for high-risk HPV may provide a more acceptable, evidence-based, alternative to Pap smears.<sup>38</sup>

A recent systematic review that included six studies noted that in the absence of high-quality evidence regarding the prevalence of HPV among transfeminine individuals (reported as ranging in studies from 8.3% to 20%), rigorous research is needed to underpin the development of preventive care guidelines for people at risk of developing neovaginal complications.<sup>37</sup> In another systematic review, which also highlighted both disparities regarding participation in HPV and cervical cancer screening among gender minority people, lack of provider knowledge of the relationship between gender minority status and cancer risk was pinpointed as an important barrier to access. This review also recommended that healthcare workers should increase their skills in conducting culturally safe examinations with gender-diverse people that maximize patient autonomy and also that self-swab kits might offer a promising approach.<sup>38</sup>

### *Other Cancer Screening*

There is little to no evidence for prostate, bowel, or skin cancer screening in TGD individuals.

### **Barriers Related to Cancer Prevention and Screening**

Lack of access to safe and inclusive care has been identified as a barrier for TGD individuals to access any form of health care. Clinical spaces that are not inclusive and do not provide safe care may lack organizational policies protecting TGD people; may have binary forms (documents that exclude genders beyond male and female), documents, and educational material; and gendered washrooms.<sup>46,47</sup> Lack of practitioner knowledge about transgender-specific healthcare

needs has also been identified as a barrier for lack of care in this population.<sup>48,49</sup> While these barriers contribute to a general lack of healthcare access they may also relate to the prevention and screening of cancer in the TGD population.

A systematic review by Sterling and Garcia<sup>50</sup> aimed to explore current guidelines and practice patterns of cancer screening in TGD patients and found very few specific cancer screening guidelines. This may lead to significant barriers in the prevention and screening of cancers in this population. Practitioners' lack of knowledge about LGBTQ-specific screening guidelines was also found to be a contributor to poor cancer screening rates in this population.<sup>51</sup> Furthermore, when practitioners made assumptions about individuals' gender identity and their sex assigned at birth, appropriate cancer screenings did not occur.<sup>52,53</sup>

### *Research and Guidelines Specific to the TGD Population*

A lack of specific research evidence and, thus, clear guidelines for cancer screening, particularly for TGD patients, negatively affects cancer screening uptake.<sup>58</sup> High-quality practice guidelines should be based on well-conducted and reported studies that focus on the TGD population and that ideally have included consumer engagement and input into their design and conduct. While this evidence base is increasing, especially in recent years, further evidence is needed from research and evaluation studies to contribute to the development of guidelines and policies that can guide clinical practice, including in the area of cancer prevention and screening. Specifically, within the TGD population, a lack of culturally competent care and screening guidelines can lead to delays in cancer diagnosis and treatment, resulting in decreased survival.<sup>59</sup> Together with an overall lack of practitioners providing safe and inclusive care, the availability of access to cancer screening becomes a concern. This highlights the importance of health promotion in the TGD population and the need for more guidelines and recommendations that are specific to the TGD population. [Table 2](#) presents some TGD specific recommendations that are available currently.

### **Implications for Nursing**

#### *Strategies to Improve Cancer Prevention/Screening in the Transgender Population*

APNs have the potential to improve access to cancer screening in the TGD population by increasing their understanding of the needs of the population, providing culturally safe care and advocating for more preventative care and cancer screening. APNs can recognize the need for cancer screening in these patients and provide them with education, self-care, and empowerment to improve screening rates.

#### *APN Education*

Nursing curricula and continuing education specific to TGD content continue to be lacking. A study from the United States found that only 2.12 hours of curriculum content in the undergraduate curriculum was dedicated to LGBT content, and of that, there is not even an estimate of how much of that time is dedicated to TGD-specific healthcare issues.<sup>60</sup> The amount of TGD content in APN curriculum is not known. Lack of general knowledge surrounding TGD health care is a barrier to cancer screening in this population. An integrative review found that practitioners' lack of knowledge about LGBTQ-specific screening guidelines was found to be a contributor to poor cancer screening rates in this population.<sup>51</sup> Strengthening APN curricula and continuing education to include up-to-date TGD content relevant to cancer prevention and screening is needed.

**TABLE 2**  
Guidelines/Resources on Cancer Screen and Prevention

Gender-affirming cancer screening guidelines for transgender and nonbinary clients Transgender/gender-nonconforming people and cancer	<a href="https://www.allianceon.org/resource/Gender-Affirming-Cancer-Screening-Guidelines-Transgender-and-Non-Binary-Clients">https://www.allianceon.org/resource/Gender-Affirming-Cancer-Screening-Guidelines-Transgender-and-Non-Binary-Clients</a> <a href="https://cancer-network.org/cancer-information/transgendergender-nonconforming-people-and-cancer/">https://cancer-network.org/cancer-information/transgendergender-nonconforming-people-and-cancer/</a>
Cancer care for transgender and gender nonconforming people: fact sheet for healthcare providers Breast cancer screening for transgender, gender-diverse, and nonbinary people	<a href="https://www.cancer.org/content/dam/cancer-org/cancer-control/en/booklets-flyers/cancer-care-for-transgender-and-gender-nonconforming-people.pdf">https://www.cancer.org/content/dam/cancer-org/cancer-control/en/booklets-flyers/cancer-care-for-transgender-and-gender-nonconforming-people.pdf</a> <a href="http://www.bccancer.bc.ca/screening/Documents/Breast-Screening-Transgender-Patients-Provider-Guide.pdf">http://www.bccancer.bc.ca/screening/Documents/Breast-Screening-Transgender-Patients-Provider-Guide.pdf</a>
Screening for cervical cancer in transgender men LGBT populations and cancer in the global context	<a href="https://transcare.ucsf.edu/guidelines/cervical-cancer">https://transcare.ucsf.edu/guidelines/cervical-cancer</a> <a href="https://link.springer.com/book/10.1007/978-3-031-06585-9">https://link.springer.com/book/10.1007/978-3-031-06585-9</a>

### Patient Education

There is a dearth of TGD patient information and education specific to cancer screening and prevention. One strategy to improve screening and preventative care while creating a safer and inclusive care environment is to review patient-facing documents and educational material for inclusivity.<sup>54</sup> Advocate for creating educational material and workshops tailored to their unique needs can help improve screening and prevention uptake. “Check-It-Out-Guys” is an example of a Canadian cervical screening campaign for transgender men (<https://www.rainbowhealthontario.ca/product/check-it-out-guys-pap-campaign-postcards/>), which has been quite successful in raising awareness about the need for cervical screening in this population.

### Self-Care and Self-Screening

Self-care, as defined by the World Health Organization,<sup>5p135</sup> is the “ability of individuals, families and communities to promote health, prevent disease, maintain health, and cope with illness and disability with or without the support of a health worker.” Allowing individuals to be involved in their care may increase access to cancer screening. It may reduce barriers, be more convenient for patients, allow for privacy, empower them, and facilitate greater patient control over their own health care and bodies.

One example of this could be self-screening for cervical cancer and HPV. HPV vaginal self-collection cervical screening is a high-performance test that can increase the reach of screening.<sup>55</sup> An increasing number of countries offer self-collected HPV cervical screening with increasing evidence to its advantage. Self-sampling effectively reaches underscreened women and can be a powerful strategy in low- and high-resource settings for all target ages.<sup>56</sup> Self-collected models examined in the literature are mostly in the primary care setting and driven by the practitioner. A study by Goldstein and colleagues<sup>57</sup> demonstrated a two-fold increase in the rates of adherence to cervical cancer screening when self-swabbing is introduced. Findings show that the global use of HPV self-sampling is still limited, with only 17 (12%) of countries with identified screening programs recommending its use.<sup>56</sup>

### Advocacy

APNs need to advocate for more policies that are relevant to the transgender population. These policies may be at an organizational, regional, national, or international level. Organizational policies can include inclusivity and safe space guidelines for staff, clients, and visitors to the organization. At a regional, national, and international level, APNs need to advocate for more access to gender-affirming health care for TGD individuals, cancer care guidelines with specific recommendations for their unique needs, and cross-national policy and positions to advance the state of cancer prevention, screening, and health care for TGD people more broadly. This is particularly important as many jurisdictions around the world remain inactive,

or even openly hostile toward the prospect of health and social equality for TGD people. More comprehensive recommendations for screening and prevention focusing on the unique healthcare needs and risks of TGD individuals are needed.<sup>50</sup>

### Conclusion

TGD individuals are a vulnerable population with unique but diverse needs. They remain at risk of cancer and are underscreened. Barriers to gender-affirming care need to be addressed to improve access to screening services. APNs can work in collaboration with TGD individuals and the healthcare system to improve access to culturally safe cancer screening and more effective prevention of cancer and improve cancer outcomes.

### 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.

### CRediT authorship contribution statement

**Erin Ziegler:** Conceptualization, Writing – original draft. **Toni Slotnes-O'Brien:** Writing – original draft. **Micah D.J. Peters:** Writing – original draft.

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