Editor's key points

- Trans patients had much lower rates of screening for cervical, breast, and colorectal cancer compared with cis patients. The differences persisted even after adjustment for age, income quintile, and number of visits to the practice.
- There were very low rates of breast cancer screening among trans patients assigned male at birth, likely owing to providers and patients being unaware of the relevant breast cancer screening guidelines. The finding of lower rates of colorectal cancer screening among the trans population is somewhat surprising, as colorectal cancer screening involves organs not related to biological sex or gender identity.
- In discussions with trans patients about how to improve screening rates, patients indicate that in some cases they have made an informed decision not to proceed with screening because of the gender dissonance it invokes. Improved shared decision making might be a more appropriate quality improvement goal than increasing cancer screening rates. Engaging trans patients in practice quality improvement efforts will help challenge assumptions and provide better care to the trans population.

Cancer screening rates among transgender adults

Cross-sectional analysis of primary care data

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Abstract

Objective To compare rates of cervical, breast, and colorectal cancer screening between patients who are transgender and those who are cisgender (ie, nontransgender).

Design Cross-sectional study.

Setting A multisite academic family health team in Toronto, Ont, serving more than 45 000 enrolled patients.

Participants All patients enrolled in the family health team who were eligible for cervical, breast, or colorectal cancer screening. Patients were identified as transgender using an automated search of the practice electronic medical record followed by manual audit.

Main outcome measures Screening rates for cervical, breast, and colorectal cancer calculated using data from the electronic medical record and provincial cancer screening registry. Screening rates among the transgender and cisgender populations were compared using χ^2 tests, and logistic regression modeling was used to understand differences in screening after adjustment for age, neighbourhood income quintile, and number of primary care visits.

Results A total of 120 transgender patients were identified as eligible for cancer screening. More than 85% of transgender patients eligible for breast cancer screening were assigned male at birth. Transgender patients were less likely than cisgender patients (n = 20 514) were to be screened for cervical (56% vs 72%, *P* = .001; adjusted odds ratio [OR] of 0.39; 95% CI 0.25 to 0.62), breast (33% vs 65%, *P* < .001; adjusted OR = 0.27; 95% CI 0.12 to 0.59), and colorectal cancer (55% vs 70%, *P* = .046; adjusted OR = 0.50; 95% CI 0.26 to 0.99).

Conclusion In this setting, transgender patients were less likely to receive recommended cancer screening compared with the cisgender population. Future research and quality improvement activities should aim to understand and address potential patient, provider, and system factors.

Les taux de dépistage du cancer chez les adultes transgenres

Une analyse transversale de données des soins primaires

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Résumé

Objectif Comparer les taux de dépistage des cancers colorectal, du col et du sein chez des patients transgenres par rapport à des patients cisgenres (c.-à-d. non transgenres).

Type d'étude Une étude transversale.

Context Une équipe universitaire multisite de santé familiale de Toronto, en Ontario, qui regroupe plus de 45 000 patients.

Participants Tous les patients inscrits auprès de l'équipe de santé familiale qui étaient admissibles au dépistage des cancers colorectal, du col et du sein. Les patients ont été identifiés comme transgenres à l'aide d'une recherche automatisée dans les dossiers médicaux électroniques de la clinique, suivie d'une vérification manuelle.

Principaux paramètres à l'étude Les taux de dépistage des cancers colorectal, du col et du sein, calculés à partir des données des dossiers médicaux électroniques et du registre provincial sur le dépistage du cancer. Les taux de dépistage pour les transgenres et les patients cis ont été comparés à l'aide du test de χ^2, et la modélisation d'une régression logistique a permis de comprendre les différences de dépistage après ajustement pour l'âge, le niveau (quintile) de revenu du quartier et le nombre de visites à l'établissement de soins primaires.

Résultats Au total, 120 patients transgenres ont été considérés comme admissibles au dépistage du cancer. Parmi ces derniers, plus de 85 % avaient été déclarés de sexe mâle à la naissance. Par rapport aux patients cisgenres (n = 20 514), les transgenres étaient moins susceptibles de subir un dépistage pour le col utérin (56 % c. 72 %. P = .001; rapport de cotes [RC] ajusté de 0.39; IC à 95 % 0.25 à 0.62), pour le sein (33 % c. 65 %, P = .001; RC ajusté = 0.27; IC à 95 % 0.12 à 0.59) et pour le cancer colorectal (55 % c. 70 %, P = .046; RC ajusté = 0.50; IC à 95 % 0.26 à 0.99).

Conclusion Dans ce contexte, les patients transgenres étaient moins susceptibles que les cisgenres de recevoir les différents dépistages du cancer recommandés. Les recherches et les efforts futurs pour améliorer la situation devraient chercher à comprendre et à corriger les facteurs éventuels qui relèvent des patients, des soignants et du système.

Points de repère du rédacteur

- Les taux de dépistage des cancers colorectal, du col et du sein sont beaucoup plus bas chez les patients transgenres que chez les patients cis (non transgenres). Cette différence persiste même après ajustement pour l'âge, le niveau de revenu (quintile) et le nombre de consultations.
- Le taux de dépistage du cancer du sein est particulièrement bas chez les patients transgènes à qui on a assigné un sexe mâle à la naissance, probablement parce que les responsables du dépistage ignoraient les directives pour le dépistage de ce type de cancer chez ce type de patients. Par ailleurs, l'observation d'un taux de dépistage du cancer colorectal plus bas chez les transgènes est plutôt surprenante puisque ce type de cancer concerne des organes qui n'ont rien à voir avec le sexe biologique ou l'identité sexuelle.
- Lors de discussions avec des patients trans sur la façon d'améliorer les taux de dépistage, ceux-ci ont indiqué que, dans certains cas, ils avaient eux-mêmes décidé de ne pas subir de dépistage en raison de la dissonance de genres qu'elle évoque. La prise de décision partagée pourrait s'avérer un objectif d'amélioration de la qualité plus approprié qu'une augmentation des taux de dépistage. En amenant les patients trans à participer aux efforts pour améliorer la qualité de la pratique, on contribuera à remettre en question les suppositions et à offrir de meilleurs soins à la population trans.

For decades, gender has been viewed as a binary construct by the health care community and society at large. Population surveys estimate, however, that between 0.3% and 0.5% of adults identify as transgender (trans), an umbrella term that includes but is not limited to people who identify as genderqueer, genderfluid, and gender nonbinary, and whose gender identities challenge societal gender norms.[1,2] In this article, we use trans as an inclusive term for all of the above. Trans individuals have a gender identity or expression that is different than the sex that was assigned to them at birth. In contrast, cisgender (cis) individuals have a gender identity that matches the sex that was assigned to them at birth.

Trans adults often live on the margins of society and face challenges related to employment, income, housing, threat of violence, and mental health and emotional well-being.[3] At the same time, trans individuals also experience challenges accessing trans-competent and affirming health care.[3-6] There is limited information available about the health outcomes and quality of health care received by the trans population.[7] Very few studies have assessed cancer screening rates among the trans population despite a relatively high prevalence of known risk factors for cancer and underscreening including high-risk sexual behaviour, smoking, and poverty.[3,8]

Providing appropriate cancer screening services to the trans population can be particularly challenging, as appropriateness depends on an individual's natal and current anatomy, as well as where individuals are at with regard to their gender transition. Gender transition can include social transition (eg, living in their authentic [felt] gender, name change, gender marker change), medical transition (cross-gender hormones or hormone blockers), and surgical transition (gender-affirming surgeries). A survey from Ontario estimated that about 40% of trans people were living full time in their authentic (felt) gender and, among these individuals, approximately one-third had changed their gender marker on their health insurance card.[9] Cancer screening initiatives that largely rely on the gender recorded in patients' health records to determine screening eligibility might misclassify trans individuals who have updated their gender markers. For example, trans individuals assigned female at birth who have changed their gender marker to male might inadvertently be excluded from cervical screening recall efforts. Hormonal treatment with estrogen for individuals assigned male at birth might put them at risk of breast cancer. Surgical transition can include hysterectomy or mastectomy, both of which change cancer screening eligibility.

Since 2014, our practice in Toronto, Ont, has used mailed letters and telephone calls to recall patients overdue for breast, cervical, and colorectal cancer screening.[10] Clinicians noted that trans patients' eligibility status was often misclassified. This experience prompted us to embark on a quality improvement initiative to understand and improve cancer screening rates among the trans population in our practice. We describe the first phase of this work, which had 2 objectives. First, we sought to identify the trans population in our practice and which of these patients were eligible for screening. Second, we aimed to calculate screening rates for cervical, breast, and colorectal cancers among the trans population and compare these with the cis population in our practice.

Methods

Setting

The St Michael's Hospital Academic Family Health Team (SMHAFHT) is a large interprofessional primary care organization with 6 clinical practice sites located in the inner city of Toronto, serving approximately 45 000 enrolled patients. The SMHAFHT has a long-standing commitment to caring for populations that face barriers to accessing high-quality health care services, including the LGBTQ2S (lesbian, gay, bisexual, transgender, transsexual, queer, questioning, and 2-spirit) community.

Study design

We conducted a cross-sectional comparison of cervical, breast, and colorectal cancer screening rates among trans and cis patients enrolled at SMHAFHT as part of a local quality improvement initiative to understand and improve cancer screening rates among patients who identify as trans. The protocol was formally reviewed by institutional authorities at St Michael's Hospital and, as a quality improvement initiative, deemed to neither require research ethics board approval nor written informed consent from participants.

Identifying trans patients

An electronic medical record (EMR) search and chart audit were completed between June and July 2016 to identify trans patients enrolled in the practice. Our definition of *trans* was broad and included all patients for whom there was chart documentation that their sex assigned at birth did not match their authentic (felt) gender. This included but was not limited to patients who self-identified as transgender or gender nonbinary. We conducted an EMR search that was designed to be sensitive but not specific. We searched the cumulative patient profile for common terms used in trans health (eg, *gender dysphoria, male-to-female [MTF], female-to-male [FTM], trans*) and searched for medications commonly prescribed for transitioning (eg, estrogen). The search strategy for identifying potential trans patients in the EMR is available at **CFPlus**.* A manual chart audit of all patients identified in the EMR search was performed by D.S. to

*The **search strategy for identifying potential trans patients in the electronic medical record** is available at **www.cfp.ca**. Go to the full text of the article online and click on the **CFPlus** tab.

determine whether patients were clearly documented as identifying as trans. If documentation was unclear, D.S. contacted the patient's physician or nurse practitioner to clarify. Patients confirmed as trans were coded in the EMR patient profile using ICD-9 code 302.85 for gender identity disorder, the only ICD-9 or ICD-10 code available in our system related to gender dysphoria.

Cancer screening eligibility and receipt

We defined eligibility for cervical, breast, and colorectal cancer screening using the Sherbourne Health guidelines and the Cancer Care Ontario guidelines (**Table 1**).[11,12] Sherbourne Health is a primary care clinic in Toronto that focuses on the care of trans individuals. Centre staff have worked with members of the trans community to develop comprehensive primary care guidelines, last updated in 2015, that are used by providers across Canada.

We identified trans patients eligible for cervical and breast cancer screening by manual chart audit. For patients in the relevant age brackets, D.S. determined assigned sex at birth, previous relevant surgeries, and duration of estrogen therapy and used these to determine cancer screening eligibility. If needed, D.S. contacted the patient's physician or nurse practitioner to clarify eligibility factors. We identified trans patients eligible for colorectal cancer screening and cis patients eligible for any cancer screening using data from a provincial registry maintained by Cancer Care Ontario, the governmental agency responsible for improving cancer services. This registry determines eligibility using patient sex denoted on a patient's health card, age, previous surgeries, and history of relevant cancer.[13]

For both trans and cis populations, we identified whether eligible patients received relevant screening tests using data from the practice EMR and data obtained through the provincial registry. Screening rates were calculated as of July 2016. We limited our study to patients who were formally enrolled with a family health team physician (90% of patients served) because the provincial cancer screening registry provides information only on enrolled patients.

Other variables

We determined age from the EMR and used age as a categorical variable in our analysis. For cis patients, assigned sex at birth was assumed to be the same as the sex reported on the patient's health insurance card. For trans patients, assigned sex at birth was determined by manual chart audit. We obtained patient postal codes from the practice EMR and used them to derive patients' neighbourhood income quintiles using a Postal Code Conversion File provided by Statistics Canada based on the 2006 Canadian census. We used appointment data to determine the number of visits to the family practice between April 1, 2015, and March 31, 2016.

Analysis

We used χ^2 tests to compare patient demographic characteristics (age, assigned sex at birth, neighbourhood income quintile) and health service use (number of visits) between the trans and cis populations eligible for any screening. We also examined potential differences between the 2 populations separately for each type of cancer screening. We calculated crude rates for cervical, breast, and colorectal cancer screening for the cis and trans populations and compared them using χ^2 tests. For breast and colorectal cancer screening, we also examined rates stratified by assigned sex at birth.

We ran separate logistic regression models for cervical, breast, and colorectal cancer to calculate the odds of trans patients being screened compared with cis patients before and after adjustment for age, neighbourhood income quintile, and number of visits. We hypothesized a priori that these 3 variables were potential confounders based on existing research in the cis population.[14,15] Bivariate analyses confirmed that these variables were differently distributed between the trans and cis populations and were also associated with cancer screening. We limited the model to 3 covariates to avoid overfitting. All analyses were run using SAS, version 9.4.

Table 1. Definitions for identifying patients eligible and up-to-date for cancer screening based on trans care guidelines[11] and provincial cancer screening guidelines[12]

TYPE OF CANCER SCREENING	ELIGIBLE PATIENTS	DEFINITION OF *UP-TO-DATE FOR SCREENING*	EXCLUSIONS
Cervical	Assigned female at birth, aged 21 to 69 y	Received a Papanicolaou test in the previous 36 mo	Previous total hysterectomy or cervical cancer
Breast	Assigned female at birth, aged 50 to 74 y Assigned male at birth, aged 50 to 74 y taking estrogen for > 5 y	Received a mammogram in the previous 24 mo	Previous mastectomy or breast cancer
Colorectal	Adults aged 50 to 74 y	Received either FOBT in the previous 24 mo or flexible sigmoidoscopy in the previous 5 y or a colonoscopy in the previous 10 y	Previous colon cancer or colectomy

FOBT—fecal occult blood testing.

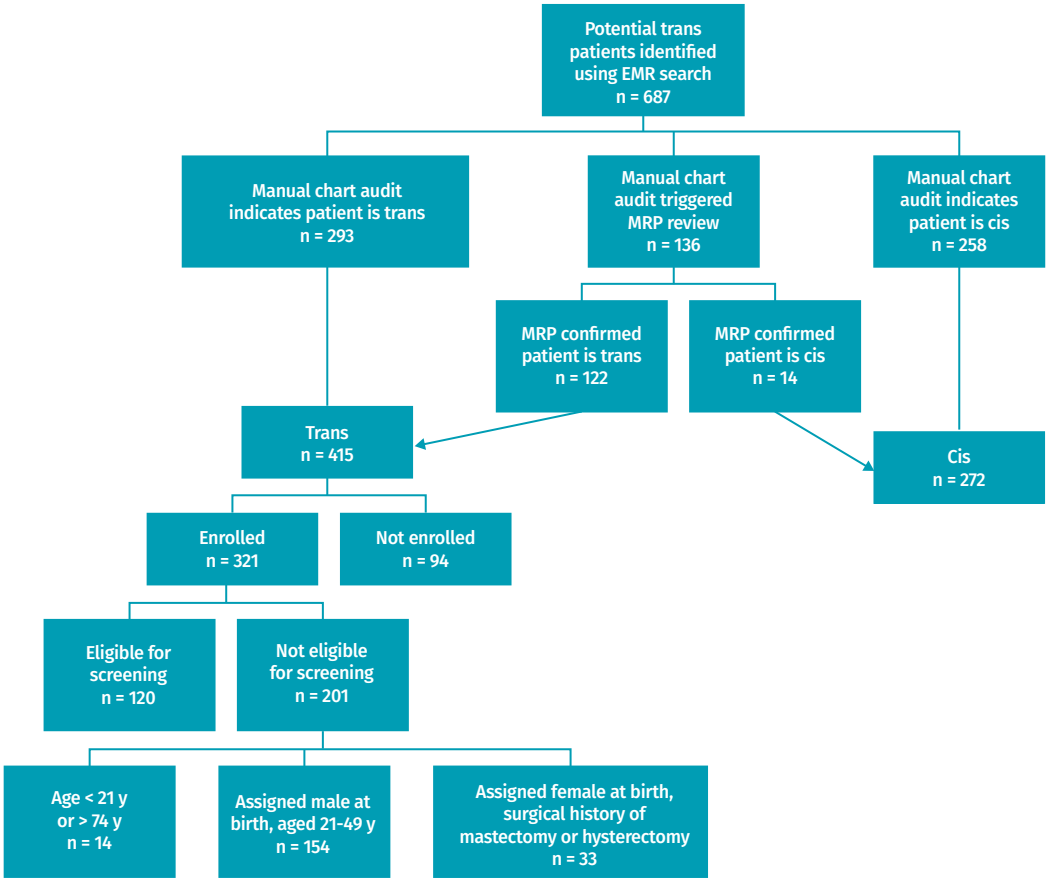
Results

Our initial EMR search identified 687 potential trans patients, of which 415 were verified as trans. Common populations incorrectly identified as trans by the EMR search included cis females who had previously had a relevant surgery (eg, chest reconstruction) and cis females taking estrogen therapy (eg, postmenopausal hormone replacement therapy). Of the 415 trans patients, 321 were formally enrolled with a family health team physician (representing approximately 1% of all enrolled patients) and of these, 120 were eligible for cancer screening (**Figure 1**). Compared with the cis population eligible for cancer screening, the trans population was more likely to be younger, live in a lower income quintile, and have visited the practice in the preceding year (**Table 2**).

Crude screening rates among the trans population were significantly lower than in the cis population for cervical cancer (56% vs 72%, $P=.001$), breast cancer (33% vs 65%, $P<.001$), and colorectal cancer (55% vs 70%, $P=.046$) (**Table 3**). More than 85% of trans patients eligible for breast cancer screening and approximately 75% of trans patients eligible for colorectal cancer screening were assigned male at birth. Breast and colorectal cancer screening rates were similar between trans patients assigned female at birth and trans patients assigned male at birth (results not shown).

Regression modeling demonstrated that, even after adjustment for age, income quintile, and number of visits, trans patients had significantly lower odds of being screened for cervical (adjusted odds ratio [OR] of 0.39, 95% CI 0.25 to 0.62), breast (adjusted OR=0.27,

Figure 1. Process for identifying trans patients eligible for cervical, breast, or colorectal cancer screening



EMR—electronic medical record, MRP—most responsible provider (physician or nurse practitioner).

95% CI 0.12 to 0.59), and colorectal cancer (adjusted OR=0.50, 95% CI 0.26 to 0.99) (**Table 4**).

Discussion

In this cross-sectional analysis conducted within a primary care organization, we found that trans patients had much lower rates of screening for cervical, breast, and colorectal cancer compared with cis patients. The differences persisted even after adjustment for age, income quintile, and number of visits to the practice. In our setting, there were very few trans patients eligible for breast cancer screening who were assigned female at birth because most of these patients had had mastectomies. However, we found that less than one-third of patients who were assigned male at birth but who were between the ages of 50 and 74 and who had received at least 5 years of estrogen therapy had received recommended screening for breast cancer. The low cancer screening rates for trans patients occurred in the context of a primary care practice with a well-developed recall system for patients overdue for screening.[10]

Table 2. Demographic characteristics for rostered patients eligible for cancer screening

CHARACTERISTICS	TRANS PATIENTS (N = 120), N (%)	CIS PATIENTS (N = 20 514), N (%)	*P* VALUE*
Age, y			<.001
• 21-29	38 (32)	1931 (9)	
• 30-39	33 (28)	4083 (20)	
• 40-49	11 (9)	3215 (16)	
• 50-59	23 (19)	5892 (29)	
• 60-74	15 (13)	5393 (26)	
Assigned sex at birth			.361
• Female	91 (76)	14 787 (72)	
• Male	29 (24)	5727 (28)	
Neighbourhood income quintile†			.009
• 1 (lowest)	41 (36)	5213 (27)	
• 2	25 (22)	3146 (16)	
• 3	16 (14)	3254 (17)	
• 4	17 (15)	3253 (17)	
• 5 (highest)	14 (12)	4706 (24)	
No. of primary care visits in the previous 1 y			<.001
• 0	23 (19)	4741 (23)	
• 1	14 (12)	3888 (19)	
• 2-3	23 (19)	5948 (29)	
• 4-10	49 (41)	5217 (25)	
• ≥11	11 (9)	720 (4)	

*Calculated using χ^2 tests.
†Data were missing for 7 trans patients and 942 cis patients.

The low cervical cancer screening rate among trans patients in our study is similar to estimations from patient self-report[16] and a chart audit done in an American primary care clinic.[17] Many trans patients assigned female at birth do not perceive a need to have a Papanicolaou test[16] and might be unaware or misinformed about Pap testing guidelines.[18] Additionally, trans patients assigned female at birth might avoid Pap testing, as seeking this test out and having a pelvic examination might exacerbate symptoms of gender dysphoria. Feeling welcome in the health care setting[19] and perceived provider competency and sensitivity[18] are 2 other factors that might influence cancer screening rates among the trans population.

We found very low rates of breast cancer screening among trans patients assigned male at birth, but our rates were higher than Ontario estimates gathered from patient self-report.[16] Unlike cervical and breast cancer screening in trans patients assigned female at birth, breast cancer screening for trans patients assigned male at birth could be perceived as gender affirming. We hypothesize that the low rates of screening among trans patients assigned male at birth are likely owing to providers and patients being unaware of the relevant breast cancer screening guidelines. The relatively low rates of breast and cervical cancer screening might also relate to eligible trans patients being excluded from primary care and population-based cancer screening recall efforts as a result of a discrepancy between the sex marker in their health care records and the expected sex in program algorithms.

Our finding of lower rates of colorectal cancer screening among the trans population is somewhat surprising, as colorectal cancer screening involves organs not related to biological sex or gender identity. The differences we observed might relate to unmeasured confounders including individual-level income and housing.[15] Alternatively, providers and patients might be focused on other health care concerns. To our knowledge, there are no other studies comparing colorectal cancer screening rates between trans and cis populations.

Strengths and limitations

Our study has both strengths and limitations. Most existing literature on cancer screening among the trans population groups trans patients together with lesbian, gay, bisexual, and queer patients. In contrast, our study specifically examined screening rates among the trans population, enabling us to highlight issues unique to this group. We also assessed screening rates for 3 types of cancer, which provides a comprehensive lens on preventive care elements relevant to trans primary care.

Table 3. Trans and cis patients eligible for and receiving cancer screening

TYPE OF CANCER SCREENING	TRANS PATIENTS (N = 120)		CIS PATIENTS (N = 20 514)		
	NO. ELIGIBLE FOR SCREENING TEST	SCREENED, %	NO. ELIGIBLE FOR SCREENING TEST	SCREENED, %	*P* VALUE*
Cervical	86	56	13 683	72	.001
Breast	30	33	5265	65	< .001
Colorectal	38	55	11 247	70	.046

*χ^2 statistic comparing percentage screened among cisgender versus transgender patients.

Table 4. Unadjusted and adjusted ORs comparing likelihood of trans individuals being screened for cancer compared with cis individuals

TYPE OF CANCER SCREENING	UNADJUSTED OR (95% CI)	ADJUSTED OR* (95% CI)
Cervical	0.46 (0.30 to 0.72)	0.39 (0.25 to 0.62)
Breast	0.28 (0.13 to 0.60)	0.27 (0.12 to 0.59)
Colorectal	0.51 (0.27 to 0.99)	0.50 (0.26 to 0.99)

OR—odds ratio.
*Adjusted for age, neighbourhood income quintile, and number of visits.

Our study was conducted at 1 primary care organization but includes data from 6 clinics geographically spread out in an urban centre. Our sample is sizable given the prevalence of the trans population and is comparable with other studies covering our provincial jurisdiction.[16] Our study does not rely on self-report, which is subject to bias, but rather data collected through an EMR search, manual chart audit, and the provincial cancer registry. Our study might have misclassified trans patients if they had not come out to their primary care provider or if the provider or patient chose not to document gender identity or gender transition in the "problem list" in the EMR (the section that allows for ICD coding). Finally, in our study, we did not assess whether patients declined screening after having a discussion with their primary care provider; however, most jurisdictions are unable to account for this when assessing cancer screening rates.

Conclusion

We found that trans patients were less likely to receive recommended screening for cervical, breast, and colorectal cancer in comparison with the cis population. More research is needed to understand related patient and provider factors and how these can be addressed. For example, we need to understand how we can mitigate feelings of gender dissonance evoked by the Pap test for trans patients assigned female at birth. Trans patients likely need to be educated about cervical and breast cancer screening guidelines, and providers need education specific to breast cancer screening among patients assigned male at birth. The Canadian Cancer Society offers cancer screening information and considerations for LGBTQ patients that might be useful (**convio.cancer.ca/site/PageServer?pagename=SSL_ON_HCP_HCPGen_LGBTQClients**). Crucially, we need to ensure that health care institutions provide competent and affirming care to trans patients and that providers receive adequate training to meet the unique health care needs of this population.

Primary care practices are in a unique position to address relevant practice and system factors. In our own clinics, we recently took steps to make our waiting rooms more welcoming to gender-diverse patients—for example, by displaying positive-space posters[20] and ensuring access to gender-neutral bathrooms. We have provided front-line clerical staff involved in patient registration with in-service training on providing gender-inclusive and sensitive care. We have developed a registry of patients who have a diagnosis of gender dysphoria by assigning them a specific ICD-9 code that can be searched using our EMR. We are developing an EMR tracking form that summarizes trans patients' cancer screening eligibility and enables us to integrate trans patients into our cancer screening recall efforts. We currently track cervical, breast, and colorectal cancer screening rates and are committed to monitoring screening rates among our trans population as additional quality indicators. We have begun speaking to our trans patients about how we can improve screening rates and are learning that in some cases they have made an informed decision not to proceed with screening because of the gender dissonance it invokes. Improved shared decision making might be a more appropriate quality improvement goal than increasing cancer screening rates. We are hopeful that engaging trans patients in our practice quality improvement efforts will help us challenge our assumptions and provide better care to the trans population.

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Contributors

Dr Kiran, Ms Davie, and **Dr Lofters** conceived the study. **Dr Kiran, Ms Davie, Ms Hranilovic, Dr Pinto,** and **Dr Lofters** designed the study. **Ms Davie, Mr Singh,** and **Ms Hranilovic** were involved in the data collection. **Ms Davie** conducted the analysis. All authors interpreted the data. **Dr Kiran** drafted the manuscript and all authors provided feedback on the draft. All authors approved the final submitted manuscript.

Competing interests

None declared

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