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Research Article

Anal Cancer Screening Attitudes and Practices in Maryland Healthcare Providers: Implications for National Trends

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ABSTRACT

Background: Anal cancer incidence is increasing in the US. Though formally established national anal cancer screening guidelines are nonexistent, many providers advocate screening to avoid late disease presentation. This study assesses the knowledge, attitudes, and practices of anal cancer screening among providers to identify the degree of variation and barriers to screening.

Methods: Healthcare providers from two academic medical centers and a statewide community primary care group were surveyed using a questionnaire adapted from the National Survey of Primary Care Physicians' Recommendations and Practice for Cancer Screening. Descriptive statistics were performed to explore providers' responses and Fisher's exact test to explore variation.

Results: 86 providers completed the questionnaire (response rate 24.2%): 81.4% physicians, 18.6% advanced practitioners. 48.2% of respondents perform anal cancer screening. 5.8% correctly identified all high-risk patient factors. "HIV+ patient" was identified most frequently as high-risk (93.5%), "organ transplant recipient" (42.9%) least frequently. Anal pap test was the most recommended first-line screening test (76.6%) followed by digital anorectal exam (19.2%), HPV test (8.5%), and high-resolution anoscopy (HRA) (6.4%). Clinical evidence (72.3%) and national guidelines (70.2%) were most influential in guiding providers' screening recommendations. Lack of qualified screening providers (34.1%), lack of patient follow-up after positive test results (22.7%), and patient non-compliance to initial screening (15.9%) were identified as "usual" barriers.

Conclusions: Anal cancer screening attitudes and practices vary among providers. Development of national practice guidelines that define a multidisciplinary team approach from primary care anal cancer screening to specialist referral for HRA may reduce screening variability.

Background

The incidence of anal squamous cell carcinoma in the United States has been increasing by 2.2% each year over the past decade, with a reported 2017 incidence rate of 1.8/100,000 person-years [1, 2]. Despite its lower incidence compared to that of other malignancies, anal cancer nevertheless poses substantial morbidity, with a 5-year overall survival rate of 66.4% [1]. The increasing incidence of anal cancer has been attributed to the rise of immunocompromised patient populations, such as those chronically-infected with human immunodeficiency virus (HIV), as well as recipients of solid organ transplants [3-5]. Other reported risk factors for anal cancer include: smoking, men who have sex with men (MSM), history of abnormal cervical exam, and history of human papilloma virus (HPV)-related disease; history of anal

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condyloma or vulvar condyloma/dysplasia are markers of sexual risk behavior and are therefore considered indirect risk factors for anal cancer [6]. Anal cancer incidence is even higher among patients with multiple risk factors. The incidence of anal cancer for HIV-negative MSM patients is 5/100,000 person-years, while the incidence for HIV-positive MSM patients has been reported as high as 168/100,000 person-years [7, 8].

Despite these concerning trends, anal cancer screening practices remain controversial. There are currently no formally established national consensus guidelines in the United States for routine anal cancer screening, due in part to the lack of studies demonstrating clinical benefits from routine screening. Though the United States has yet to establish a national consensus guideline, there is evidence to suggest that some US providers are screening high-risk patients. Regional societies like the New York State Department of Health AIDS Institute recommend annual examinations of the anus in all HIV-infected adults, as well as anal cytology screening for HIV-positive MSM and HIV-infected women with a history of HPV-related lesions [2]. Other organizations like the HIV Medicine Association of the Infectious Diseases Society of America (IDSA) have recommended routine anal cancer screening for all HIV-infected people with genital warts, MSM, and women with a history of abnormal cervical pap tests via anal Pap test [9]. Non-HIV societies like the American Society of Colon and Rectal Surgeons (ASCRS), the National Comprehensive Cancer Network (NCCN), the Centers for Disease Control and Prevention (CDC), and the American Society of Transplantation (AST) have made no recommendations for routine screening in the general or high-risk populations. Due to the lack of standardized practice measures, some providers and organizations have advocated screening in the interest of avoiding late presentation of disease. However, these screening practices may be subject to wide variation.

Although a few studies have sought to assess anal cancer screening beliefs and practices of providers or patients, all of them were limited in the screening modality assessed (ex. anal cytology only) or the patient population (ex. MSM patients only) examined [4, 10]. This study is the first to adapt questions from a nationally validated, NCI-based cancer screening questionnaire to assess healthcare providers' knowledge, attitudes, practices, and barriers of anal cancer screening. Inclusion of academic and community healthcare providers with diverse training backgrounds in primary care, infectious diseases, and organ transplantation in our study allowed for a more comprehensive investigation of the current practice and perceptions of anal cancer screening and its modalities.

Methods

I Survey methods and study cohort

This study was reviewed and approved by the Institutional Review Board of the Johns Hopkins University School of Medicine. Healthcare providers from academic and community practice settings were invited to participate in our anal cancer screening knowledge, attitudes, and practices survey study. Eligible respondents were licensed physicians (MD), nurse practitioners (NP), and physicians' assistants (PA) with active licenses to practice medicine and patient care. We selected healthcare providers practicing in HIV primary care, infectious diseases, solid organ transplantation, and primary care specialties, as we wanted to assess their level of anal cancer screening awareness given their patient populations. Providers were sampled from four sources including multiple clinics at two academic medical centers and a regional primary care group distributed throughout Maryland and the District of Columbia. Web-based surveys using anonymous links were distributed via available electronic mailing lists to providers. An introductory page described the study objectives, response confidentiality, and consent to participate in the study. Follow-up reminder emails to complete these online surveys were sent to providers every three weeks for three months. Due to their survey distribution policy, the regional community physicians group received only one follow-up reminder four weeks after initial distribution.

II Survey design

An anal cancer screening knowledge, attitudes, and practices survey questionnaire was developed using questions adapted from the colorectal cancer portion of the *National Survey of Primary Care Physicians' Recommendations and Practice for Breast, Cervical, Colorectal, & Lung Cancer Screening* (National Cancer Institute; NCI), an NCI-led survey to identify cancer screening practices in primary care physicians practices [11]. The full-length survey contained items in the following categories:

1. provider characteristics,
2. anal cancer screening beliefs/patient risk assessment,
3. anal cancer screening practices and recommendations, and
4. anal cancer screening barriers.

Survey items included a combination of multiple-choice questions, Likert-type scale questions, and occasional free-text (see Supplement A). Our 29-item anal cancer screening questionnaire items were reviewed by colorectal surgeons and infectious disease physicians with extensive anal cancer screening expertise at our institution to ensure up-to-date content and comprehensibility. The questionnaire was circulated using the web-based Qualtrics® survey platform [12]. Those who did not perform anal cancer screening were offered an abbreviated survey consisting of items pertaining to provider characteristics and patient risk factor assessment, while omitting anal cancer screening questions.

III Data analysis

Descriptive statistics were performed to characterize healthcare providers' knowledge, attitudes, and practices on anal cancer screening and their self-reported barriers to screening. Subset analysis comparison of providers in academic versus community practice settings were assessed using Pearson's $X1^2$ test or Fisher's exact test for categorical variables. P-values < 0.05 were considered statistically significant. All statistical analysis was performed using Stata, version 14.0 (StataCorp, College Station, Texas, USA).

Results

I Healthcare provider and respondent characteristics

A total of 86 healthcare providers (24.2%) completed the web-based questionnaire (Table 1). Response rates from each of the four sampled

sites varied widely, ranging from 14.4% to 92.3%. A total of 49 providers completed the full-length survey. 80.6% of providers in community primary care completed the abbreviated survey because they do not screen for anal cancer in their practice. The majority of respondents were female (64.0%), had a median age of 45.0 years, and a median number of 12.5 years of medical practice. Respondents were primarily physicians (81.4%) practicing in primary care (50.0%). A little less than half (48.2%) of respondents acknowledged performing anal cancer screening in their clinical practice. Compared to healthcare providers at community practice settings, providers working at academic settings were more likely to be in non-primary care specialties ($p<0.001$) and to perform anal cancer screening ($p=0.010$). Of responding providers who screen for anal cancer, 88.9% see patients with abnormal cervical exams, 77.8% see MSM patients, 63.9% see patients with detectable HPV, 55.6% see patients living with HIV, 52.8% see patients who are organ transplant recipients, 50.0% see patients with vulvar condyloma/dysplasia, and 38.9% see patients with anal condyloma.

Table 1: Characteristics of healthcare providers in academic and community clinic settings.

Characteristics	Total n = 86	Academic 60 (69.8)	Community 26 (30.2)	*P*
Gender				0.024
Male	31 (36.0)	17 (28.3)	14 (53.9)	
Female	55 (64.0)	43 (71.7)	12 (64.0)	
Age (years)				0.611
30 - 49	57 (66.3)	41 (68.3)	16 (61.5)	
50- 69	24 (27.9)	15 (25.0)	9 (34.6)	
≥70	5 (5.8)	4 (6.7)	1 (3.8)	
Medical Training Level				0.550
Medical doctor	70 (81.4)	17 (70.8)	20 (76.9)	
Advanced practice[a]	16 (18.6)	7 (29.2)	6 (23.1)	
Medical Specialty				<0.001
Primary care provider	43 (50.0)	19 (31.7)	24 (92.3)	
Infectious diseases	26 (30.2)	24 (40.0)	2 (7.7)	
Transplant	17 (19.8)	17 (28.3)	0 (0.0)	
Years of medical practice[b]				0.259
0 – 5	11 (12.8)	10 (16.7)	1 (3.9)	
5 – 15	30 (34.9)	21 (35.0)	9 (34.6)	
≥15	45 (52.3)	29 (48.3)	16 (61.5)	
Clinical site				<0.001
Community primary care	36 (41.9)	14 (23.3)	22 (84.6)	
Organ transplant	17 (19.8)	17 (28.3)	0 (0.0)	
HIV primary care (academic)	24 (27.9)	21 (35.0)	3 (11.5)	
Infectious diseases division	9 (10.5)	8 (13.3)	1 (3.9)	
Perform anal cancer screening[b]				0.010
Yes	39 (48.2)	32 (58.2)	7 (26.9)	
No	42 (51.9)	23 (41.8)	19 (73.1)	

[a] Advanced practice = nurse practitioner (NP) and physician's assistant (PA)

[b] Missing data: Years of medical practice, n = 73; Perform anal cancer screening, n = 81

II Knowledge and attitudes of anal cancer screening

Healthcare providers were asked to select from a list of seven established risk factors for anal cancer that they considered as "high-risk" for anal cancer:

1. men who have sex with men (MSM),
2. HIV-positive,
3. history of anal condyloma,
4. history of vulvar condyloma,
5. abnormal cervical exam,
6. organ transplant recipient, and
7. HPV-positive alone (Figure 1).

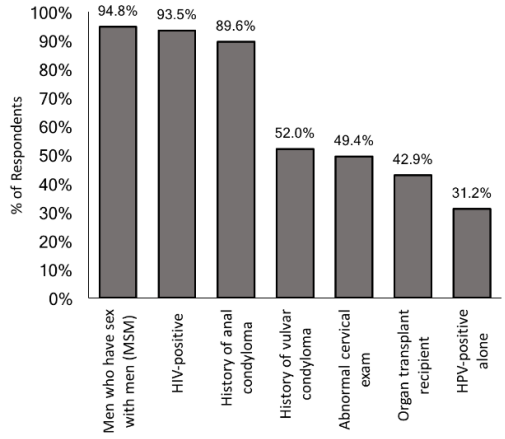

Figure 1: Provider identification of anal cancer patient risk factors (n = 77), 01/2017-03/2017. A majority of healthcare providers identified MSM as a patient risk factor for anal cancer, followed by HIV-positive status, history of anal condyloma, history of vulvar condyloma, history of abnormal cervical exam, organ transplant recipient, and HPV-positive alone.

History of anal condyloma or vulvar condyloma/dysplasia are markers of sexual risk behavior and are therefore considered indirect risk factors for anal cancer. "HPV-positive alone" refers to patients who are positive for high-risk HPV. A total of 5.8% of respondents correctly selected all seven anal cancer risk factors. "HIV-positive" was the most identified patient risk factor (93.5%), whereas "organ transplant recipient" (42.9%) and "HPV-positive alone" (31.2%) were the least identified patient risk factors. Among solid organ transplant providers, 70.6% of respondents identified "organ transplant recipient" as a patient risk factor for anal cancer. Providers practicing at academic settings were more likely to identify abnormal cervical exam as a risk factor for anal cancer compared to providers at community settings (60.8% vs. 26.9%, p = 0.005). "HIV-positive" was the most commonly identified risk factor by both academic and community physicians. Regarding perceived effectiveness of the four screening modalities in reducing anal cancer mortality for high-risk patients, 51.0% considered HRA to be "very effective," compared to 20.4% for anal pap test, 12.2% for HPV test, and 4.1% for DARE.

Table 2: Healthcare Provider Anal Cancer Screening Practices.

Screening Practices	TOTAL n = 48	Academic 41 (85.4)	Community 7* (14.6)	*p*
Who should be screened?				0.558
Almost no patients	3 (6.3)	3 (7.3)	0 (0.0)	
Symptomatic, high-risk	8 (16.7)	7 (17.1)	1 (14.3)	
All symptomatic patients	2 (4.2)	2 (4.9)	0 (0.0)	
Asymptomatic, high-risk	30 (62.5)	26 (63.4)	4 (57.1)	
Nearly all patients	5 (10.4)	3 (7.3)	2 (28.6)	
Discuss cancer risk with asymptomatic patients				0.297
Never	6 (12.5)	5 (12.2)	1 (14.3)	
<50% of the time	21 (43.8)	20 (48.8)	1 (14.3)	
>50% of the time	23 (25.0)	9 (22.0)	3 (42.9)	
Usually	5 (10.4)	4 (9.8)	1 (14.3)	
Almost always	4 (8.3)	3 (7.3)	1 (14.3)	
Recommend screening for MSM				1.000
Less likely	3 (6.25)	3 (7.3)	0 (0.0)	
More likely	45 (93.8)	38 (92.6)	7 (100.0)	
Discuss multiple screening tests[a]				0.608
Never	16 (34.8)	15 (37.5)	1 (16.7)	
Rarely	15 (32.6)	12 (30.0)	3 (50.0)	
Sometimes	9 (19.6)	8 (20.0)	1 (16.7)	
Usually	3 (6.5)	2 (5.0)	1 (16.7)	
Don't Screen	3 (6.5)	3 (7.5)	0 (0.0)	
Perform/supervise screening[a]				0.689
Never	8 (18.2)	8 (21.2)	0 (0.0)	
Rarely	9 (20.5)	8 (21.1)	1 (16.7)	
Sometimes	9 (20.5)	8 (21.1)	1 (16.7)	
Usually	18 (40.9)	14 (36.8)	4 (66.7)	

When is HRA recommended?				0.160
Almost never	7 (14.6)	5 (12.2)	2 (28.6)	
At least one positive test	30 (62.5)	27 (65.9)	3 (42.9)	
If multiple positive tests	4 (8.3)	2 (4.9)	2 (28.6)	
All high-risk patients	3 (6.3)	3 (7.3)	0 (0.0)	
All patients	4 (8.3)	4 (9.8)	0 (0.0)	

Abbreviations: *MSM*, men who have sex with men; *HRA*, high-resolution anoscopy.

[a]Missing data: Discuss multiple screening tests, n = 46; Perform/supervise screening, n =44

[*]Majority of community providers did not screen for anal cancer and therefore did not receive full-length survey.

III Anal cancer screening practices and recommendations

Of the 48 providers who responded to items pertaining to anal cancer screening practices and recommendations (Table 2), 62.5% of providers recommended screening asymptomatic, high-risk patients. 43.8% of providers discussed anal cancer risk with asymptomatic patients less than half the time. Respondents were most likely to discuss and recommend the anal pap test during initial counseling with their patients (76.1%) but "never" (34.8%) or "rarely" (32.6%) discussed multiple screening tests. The anal pap test was the preferred first-line screening test for high-risk patients (see Supplement B). If a patient had at least one positive test, 62.5% of respondents would recommend referral to HRA. For patients diagnosed with high-grade anal dysplasia, the provider self-reported preferred surveillance interval was 6 months (interquartile range [IQR]: 3-6). For patients diagnosed with anal cancer, the preferred surveillance interval was 3 months (IQR: 2-6).

IV Influential factors guiding screening recommendations

Of 47 respondents, 72.5% cited "clinical evidence" as "very influential," followed by "national guidelines" (70.2%) and "provider availability" (53.2%) (Figure 2). 48.9% and 42.6% of providers deemed "reimbursement by a third-party payer" and "cost" as "not influential," respectively. "Colleague practice" and "patient preference" had varying degrees of provider-perceived influence.

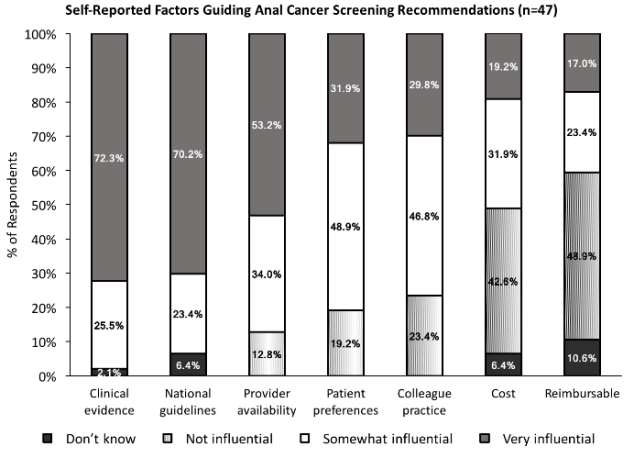

Figure 2: Self-reported factors guiding anal cancer screening recommendations (n=47), 01/2017-03/2017. Healthcare providers considered clinical evidence, national guidelines, and provider availability to be the top three "very influential" factors in guiding anal cancer screening recommendations.

V Anal cancer screening barriers

In terms of anal cancer screening barriers, 34.1% of respondents reported that shortage of qualified providers was "usually" a barrier, followed by lack of patient follow-up for positive tests (22.7%), and patient non-compliance to undergo initial screening (15.9%) (Figure 3).

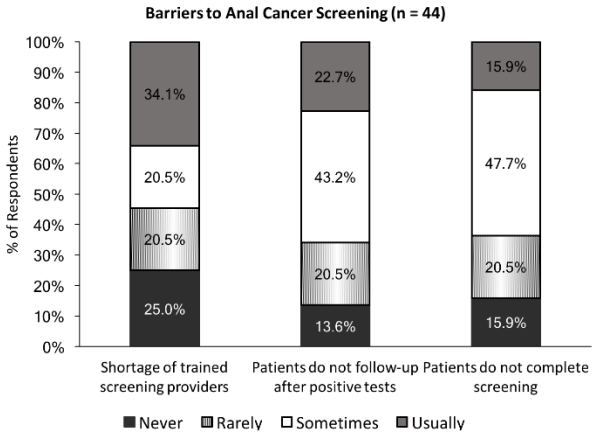

Figure 3: Barriers to anal cancer screening (n = 44), 01/2017-03/2017. Healthcare providers reported shortage of trained screening providers as usually the most common barrier to anal cancer screening. Patients not following-up after positive screening tests, and patients not completing any screening at all were additional barriers.

Discussion

Anal cancer is an increasingly important under-recognized clinical burden. Very little data currently exists on what providers are doing in a guidelines-poor environment. This study is the first to adapt questions from a nationally validated, NCI-based cancer screening questionnaire to assess knowledge, attitudes, practices, and barriers of anal cancer screening among healthcare providers. Our study demonstrates wide variation in anal cancer screening knowledge and practices, some of which may be attributable to the lack of national consensus screening guidelines. Anal cancer screening is not performed widely, especially among community providers. This finding is consistent with other peer-reviewed literature reporting screening rates from 22.0% to 54.2% [4, 13]. In our cohort, 73.1% of community providers responded that they do not perform anal cancer screening. This finding highlights potential issues in anal cancer screening that may be contributed by practice environment and/or resource availability. The community providers who participated in our survey were composed largely of those in primary care. Though community provider survey respondents did have high-risk patients comprising a portion of their medical practice, a majority of

these providers did not perform anal cancer screening. Primary care providers are often chiefly responsible for cancer screening and play pivotal roles in ensuring that patients are screened and referred appropriately to specialists for further management. Our study suggests that greater efforts to educate community providers on anal cancer screening, diagnosis, and management is warranted to prevent otherwise high-risk patients from being under screened.

Healthcare providers vary in their ability to identify patient risk factors for anal cancer. Although HIV infection was a commonly identified patient risk factor for anal cancer, providers did not recognize other immunocompromised patient factors such as organ transplant recipient. This inability to identify other immunocompromised patient factors raises potential concerns of underscreening in certain patient populations. Between academic and community providers, identification of patient risk factors for anal cancer largely showed no statistically significant difference. Only 5.8% of respondents successfully identified all seven risk factors for anal cancer, indicating a lack of general knowledge regarding disease risk factors. This knowledge deficit may have some consequential implications, as providers who do not consider anal cancer when assessing patient risk may be less likely to screen their patients, even when a patient may more susceptible to the disease. Such screening variation may also be due to lack of national consensus guidelines for anal cancer screening. Development of national practice guidelines that define a multidisciplinary team approach from primary care anal cancer screening to specialist referral for HRA could therefore reduce screening variability.

As with the assessment on provider knowledge and beliefs of anal cancer screening, provider practices and recommendations also varied. Although 62.5% of respondents considered screening asymptomatic, high-risk patients, a majority of respondents discussed cancer risk for asymptomatic patients less than half of the time. Potential reasons for this discrepancy include:

1. providers usually have limited time to see patients, so anal cancer screening may not be the highest priority topic for a specific clinic visit, and
2. providers may be able to identify some of their high-risk patients but have limited confidence in anal cancer prevention/screening practices without further data. Consistent with extant literature and society guidelines, anal pap test was the preferred modality for initial counseling discussions/recommendations and first-line screening [2, 4, 5, 9]. However, it is also worth noting that DARE has also been recommended by some societies like IDSA, given its ease of performance and ability to potentially detect other issues.

Interestingly, self-reported provider preferences for anal cancer surveillance intervals were slightly more frequent than those recommended by National Comprehensive Cancer Network (NCCN) guidelines [14]. Respondents preferred a median surveillance interval of 3 months for patients diagnosed with anal cancer, whereas NCCN guidelines recommend anoscopy every six months for three years and DARE and inguinal lymph node palpation 3-6 months for 5 years. The lack of published national guidelines for anal cancer screening may compel providers to screen more conservatively and thereby more frequently. Establishing better consensus and publication of national guidelines may allow for less frequent exams, an outcome that could unburden current providers or screeners.

Despite the lack of evidence-based anal cancer screening studies and national consensus guidelines, healthcare providers overwhelmingly selected clinical evidence (72.3%) and national guidelines (70.2%) as the top two "very influential" factors for guiding screening recommendations—a trend consistent with other anal cancer screening studies [13, 15]. Current anal cancer screening recommendations are largely based off of institutional or professional society recommendations. The New York State Department of Health provides recommendations for screening high-risk patient populations such as MSM patients and HIV-infected adults [16]. The American Society of Colon and Rectal Surgeons (ASCRS), NCCN, and IDSA do not comment on anal cancer screening for patients never diagnosed with anal cancer but do provide some recommendations for anal cancer treatment and post-treatment surveillance [9, 14 , 17]. The dearth of evidence-based studies has been a major impediment to the development of more national-level anal cancer screening guidelines. Our study findings not only add to the scarce literature, but also may provide the impetus for primary care, infectious disease, and cancer experts to discuss actionable, consensus-based guidelines. Ongoing studies like the ANCHOR randomized trial and SPANC prospective cohort will contribute further to clarifying the role of anal cancer screening in cancer prevention [18, 19].

In addition to more evidence-based studies and the development of national consensus guidelines, identification of provider-level barriers to screening suggests the need for a more streamlined approach to screening, referral, and health services resource allocation. Most survey respondents cited "shortage of qualified providers who perform screening" as a common barrier to screening that is worsened by the recognized learning curve particularly of secondary diagnostic modalities [5]. Shortage of providers qualified to perform anal cancer screening would negatively impact referral systems that allow for further screening and/or management of anal dysplasia or cancer. Referring providers may be less inclined to perform initial screening of patients if they do not know a provider to refer patients to should the initial test be positive.

Our study is subject to several limitations. As is the case with cross-sectional studies, the possibility for sampling bias is present. Providers were sampled based on availability of electronic mailing lists. That the response rates at the four sites ranged from 14.4% to 92.3% is unsurprising, as varying response rates can reflect different clinical practice environments and resource availability. Higher response rates were derived from provider groups who had easy access to anal cancer screening modalities, including HRA; these providers were more likely to be affiliated with academic institutions. Although 86 providers responded to our survey, only 49 providers were able to complete the full-length survey. Approximately half completed an abbreviated survey because they did not screen for anal cancer in their medical practice. Though this reduced sample size is a limitation, other published anal cancer studies have reported similar or smaller sample sizes [4, 13, 15]. The nature of a self-reported survey may lead to reporting bias rather than what is performed in actual practice. We believe the extent of this bias is limited given that no standard of care currently exists that would

dissuade practitioners from accurately describing their own practice. Our cohort of providers consisted of diverse clinician populations, which posed a challenge in terms of comparing survey results among different provider groups. We performed additional subanalyses stratified by clinician group to address this issue. However, our ability to ascertain data from a diverse provider population can also be considered a strength of this study as well.

Conclusion

Anal cancer screening knowledge, attitudes, and practices vary widely among providers. Our study is the first to adapt a nationally validated survey to assess the current state of anal cancer screening, its modalities, and its barriers among providers of different specialties and practice settings. Our study findings demonstrate the need for greater recognition of patient risk factors, awareness of available healthcare resources, and national consensus guidelines to aid providers in screening decision-making. Development of guidelines that streamline a multidisciplinary team approach from primary care anal cancer screening to specialist referral for HRA may reduce screening variability.

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Author Contribution

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Interpretation of data: S.Y.C., I.L.L., M.C., J.L.J., U.K.B., J.E.E., S.L.G., B.S., S.H.F.
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Critical revision: S.Y.C., I.L.L., M.C., J.L.J., U.K.B., J.E.E., S.L.G., B.S., S.H.F.
Final approval/accountability: S.Y.C., I.L.L., M.C., J.L.J., U.K.B., J.E.E., S.L.G., B.S., S.H.F.

Conflicts of Interest

Ulrike K. Buchwald is currently employed by Merck & Co, Whitehouse Station, NJ, USA.
None of the other co-authors report potential conflicts of interest.

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