



## Provider preparedness to care for sexual and gender minority adolescent and young adult cancer patients: A scoping review

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### ABSTRACT

**Objective:** The purpose of the current scoping review is to explore knowledge and gaps in the literature on the preparedness of health care providers (HCPs) to deliver cancer care that addresses the needs of sexual and gender minority (SGM) adolescent and young adult (AYA) patients diagnosed with cancer between ages 15–39 years.

**Methods:** We conducted two comprehensive searches on OVID MEDLINE, PsycINFO, and CINAHL in February 2022 and June 2024; examined the empirical literature on HCPs who treat SGM AYA cancer patients; characterized existing research; and evaluated each contribution.

**Results:** A total of thirteen articles were included in the final review. The reviewed studies varied widely in sample sizes ( $n = 6$  to  $n = 1253$ ), reflecting different methodological approaches: quantitative cross-sectional ( $n = 3$ ), qualitative ( $n = 4$ ), and mixed methods ( $n = 6$ ).

**Innovation:** The current scoping review piloted an innovative Quality Assessment (QA) Tool of Foundational Progress for SGM AYA Research to assess the quality of evidence, providing a new framework for evaluating and guiding future research.

**Conclusion:** The existing literature on provider preparedness to care for SGM AYA cancer patients is limited. Future studies are critically needed to improve providers' ability to holistically respond to the unique health care needs and concerns of this population.

### 1. Introduction

The proportion of U.S. adults identifying as LGBTQ+ has risen to 7.2 % in 2022, double the figure from a decade ago, with 19.7 % of 18- to 25-year-olds identifying as such [1]. This highlights the importance of understanding the challenges faced by adolescents and young adults (AYAs) with cancer, particularly those who are sexual and gender minorities (SGM) [2,3].

AYAs diagnosed with cancer between ages 15 and 39 face a wide array of biomedical and psychosocial challenges that are distinct from other age groups. In 2006, The National Institutes of Health (NIH) established the AYA Oncology Progress Review Group, revealing that

this age-defined patient population has not seen the same improvements in cancer survival rates as their pediatric and older adult counterparts [4]. Defining the AYA age range as 15 to 39 ensures that research comprehensively captures the challenges of cancer patients experiencing lagging survival outcomes.

SGM AYA cancer patients face compounded disparities, including higher cancer risks [5], lower prophylactic screening rates [6], fear of discrimination [7], internalized homophobia, increased substance use, and elevated psychological distress [8,9]. Despite these risks, SGM AYAs' concerns are frequently neglected in cancer care settings [10,11]. Recent evidence shows that SGM AYA cancer survivors report significantly greater unmet needs across all domains of psychosocial support

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compared to their non-SGM counterparts [12,13]. A recent community-led needs assessment underscores the importance of partnerships between community and academic institutions to improve cancer care delivery for SGM AYAs [14].

Prior studies reveal significant knowledge gaps among healthcare providers regarding SGM cancer patients. A national survey showed limited LGBTQ health knowledge and a strong desire for education [15]. Oncologists and primary care providers have expressed the need for more training to improve SGM patient care [16-18]. Current literature indicates that healthcare providers (HCPs) often lack the necessary knowledge, skills, and confidence, leading to patient dissatisfaction and discrimination in oncology settings [10,15,19-22]. Initiatives to integrate SGM health into medical education have begun, emphasizing its effectiveness, but further work is needed to ensure mandatory hands-on clinical skills training [23-26].

This scoping review aims to explore existing knowledge and identify gaps in HCP preparedness to address the biomedical and psychosocial needs of SGM AYA cancer patients. Our team used an innovative approach to evaluate the quality of available evidence by assessing both scientific rigor and SGM research quality with a new conceptual framework and quality assessment tool. Developed in prior studies and refined for this review, the framework informs a novel method for appraising SGM research, informing practice, and setting standards for future research.

## 2. Methods

In the current scoping review, we examined the empirical literature on HCPs who treat SGM AYA cancer patients by identifying and characterizing existing research focused on outcomes related to these providers and critically evaluating each contribution. We followed the Joanna Briggs Institute's (JBI) Scoping Review Methodology [27] to guide the review and used the PRISMA ScR format to report results [28].

### 2.1. Terminology

In this manuscript, the authors employed terminology that reflects both existing literature and the evolving language of AYAs with dynamic sexual orientations and gender identities. We used broad terms such as "sexual and gender minority" (SGM), "sexual orientation and gender identity" (SOGI), "lesbian, gay, bisexual, transgender, queer, plus" (LGBTQ+), and "queer" as they appeared during our review. Subgroups were specified with the most precise terms available.

While SGM is common among researchers and LGBTQ+ is embraced by the community, our interchangeable use reflects the literature reviewed. This ensures inclusivity and comprehensiveness in identifying trends and gaps, addressing diverse identities and contexts. The Human Rights Campaign's glossary was our primary reference for inclusive language [29].

We used "healthcare provider (HCP)" to refer to cancer care providers. Although terms like "clinician" or "healthcare professional" may become more prevalent, we adhered to the terminology used in the reviewed studies. Additionally, we used "patient" and "survivor" synonymously.

### 2.2. Information sources and search strategy

To begin, three members of the research team (C.K.C., H.L., and V.A.R.) facilitated the creation of search terms by using keywords and synonymous index terms within our research question, and by building upon extant reviews of health-related topics for SGM populations. The final list of search terms was determined by consensus agreement among all authors (Table 1). A research librarian (Y.G.) used the identified search terms to perform two comprehensive searches across three databases: OVID MEDLINE, PsycINFO, and CINAHL. The first search was conducted in February 2022 with no publication date restrictions, and

**Table 1**  
Search terms in scoping review.

	Search terms
1	Young Adult OR Adolescent OR adolescen* OR teen OR teenager* OR youth OR youths OR young adult* OR emerging adult* OR young women OR young men OR AYA OR AYAs OR childhood OR young adj5 (adult* OR girl* OR boy* OR women OR men OR female OR male OR patient* OR survivor) OR pediatric OR pediatric OR Pediatrics OR ((15-39 OR 15-16 OR 15-17 OR 15-18 OR 15-25 OR 18-25 OR 18-39 OR 19-24 OR 19-25 OR 19-26 OR 19-39 OR 20-39 OR 21-39 OR 25-39 OR 26-39) adj3 (year* OR age*)) [AYA population]
2	Neoplasms OR (cancer* OR carcinom* OR tumor* OR tumor* OR neoplas* OR malignan* OR metasta* OR myeloma* OR leukemia* OR lymphoma* OR sarcoma* OR melanoma*) OR (Cancer Survivors) [Cancer]
3	1 AND 2
4	Sexual and Gender Minorities OR Bisexuality OR Homosexuality OR Transsexualism OR Gender Identity OR (GLBT* OR LBGT* OR LGBT*) OR ((sexual OR gender) adj3 (dissident* OR minorit*)) OR (sexual orientation OR sexual reassignment) OR (lesbian* OR lesbian OR gay OR gays OR bisexual* OR asexual* OR pansexual* OR demisexual* OR androsexual* OR gynosexual* OR homosexual* OR "non-heterosexual*" OR transgender OR transsexual* OR queer OR queers OR intersex OR gender non-conforming OR gender affirming OR gender confirmation) OR (gender fluid OR sexually fluid OR agender OR genderless OR genderqueer* OR two-spirit) OR (gender expansive OR gender dysphoria) OR (women who have sex with women OR men who have sex with men) OR (women who love women OR men who love men) OR Sex Reassignment Procedures OR (transmasculine OR trans masculine OR transfeminine OR trans feminine OR nonbinary OR non-binary) [sexual gender minorities]
5	3 AND 4

the search was repeated in June 2024, covering publications from February 2022 to June 2024.

### 2.3. Inclusion and exclusion criteria

Eligible studies were those that met the following six inclusion criteria: (1) English language publication; (2) empirical study; (3) had clearly defined SGM-related study outcome(s), (4) focused on healthcare for cancer patients (5) focused on healthcare provision for AYA cancer patients diagnosed between the ages of 15 to 39 years (patients could be older at the time of the study), and (6) had clearly defined study outcome(s) focused on oncology healthcare providers (HCPs).

We included only translational research, which converts laboratory observations into healthcare interventions [30], to ensure our review features studies that inform and enhance clinical practices for healthcare providers serving this population. This focus allows us to highlight research with direct applicability to improving care for sexual and gender minority adolescent and young adult cancer patients.

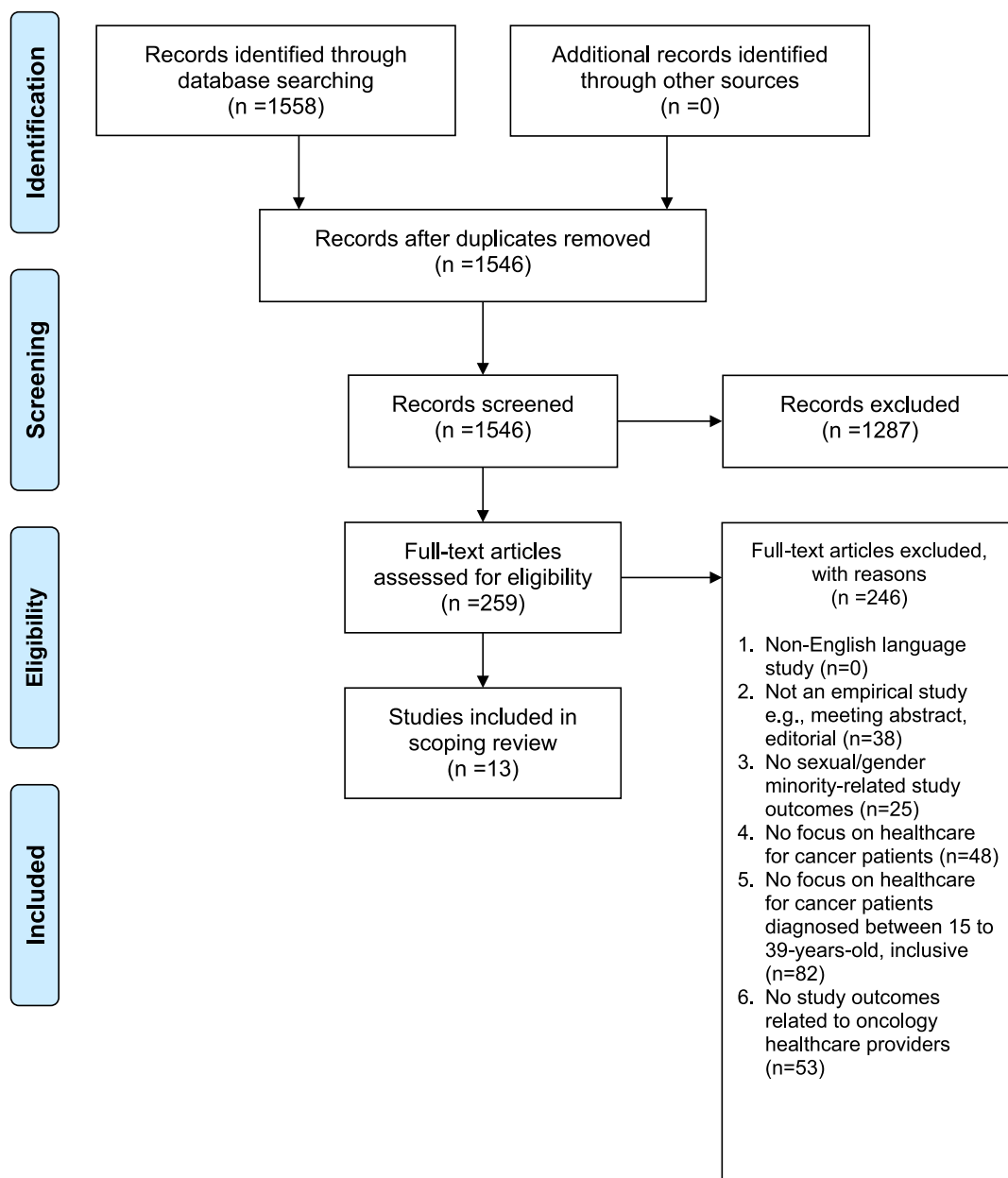
Non-empirical publications, such as meeting abstracts, editorials, or case reports were excluded. Studies with outcomes not relevant to cancer care providers serving SGM AYAs were also excluded.

### 2.4. Search procedures

Search results were compiled in Covidence (Covidence, Melbourne, Australia). Titles and abstracts were independently screened by two of five reviewers (C.K.C., E.C., H.L., M.E.R., & V.A.R.). Disagreements were resolved through discussion or by consulting a third reviewer. Six reviewers (C.K.C., E.C., H.L., M.E.R., N.J.L., & V.A.R.) then conducted full-text screening in a similar manner.

Of the initial 1558 articles, duplicates ( $n = 12$ ) and those not meeting inclusion criteria during title and abstract review ( $n = 1287$ ) were removed, leaving 259 unique articles for full-text review (Fig. 1). During full-text review, 246 articles were excluded for the following reasons: (1) not empirical studies ( $n = 38$ ); (2) no sexual/gender minority-related outcomes ( $n = 25$ ); (3) not focused on cancer patient healthcare ( $n = 48$ ); (4) not focused on patients aged 15-39 ( $n = 82$ ); (5) no oncology healthcare provider outcomes ( $n = 53$ ).

Following full-text screening, 13 articles were included for data



**Fig. 1.** Prisma diagram of search results and excluded articles. From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:<https://doi.org/10.1371/journal.pmed1000097>

extraction and review, five from the initial February 2022 search and eight from a subsequent June 2024 search. Despite the small body of literature, the past two years have generated a 160 % increase in studies on oncology healthcare providers' preparedness to care for SGM AYAs.

### 2.5. Quality of the evidence

The quality of the evidence was assessed in two steps that harnessed the rigor and credibility of traditional critical appraisal while enhancing with special considerations for the literature on the SGM population. First, to evaluate the scientific quality of resulting studies inclusive of their rigor and trustworthiness, the authors employed *Joanna Briggs Institute (JBI) critical appraisal tools* for cross-sectional studies and qualitative studies [31,32]. Each publication was evaluated by four team members in accordance with JBI guidelines.

Thereafter, SGM research quality was appraised by piloting a new conceptual framework and corresponding quality assessment tool that

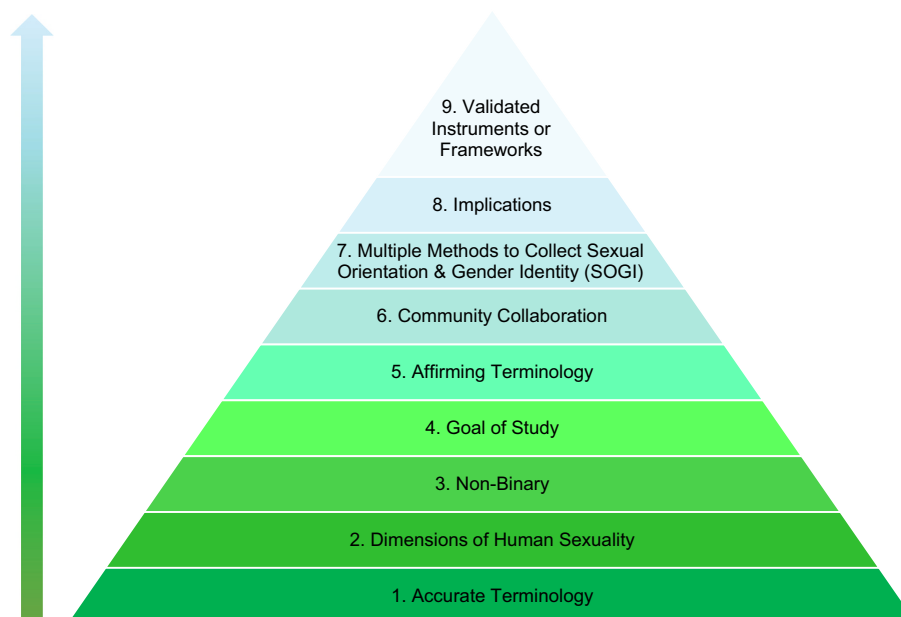
the authors developed and previously used to appraise the literature on disparities in patient outcomes for SGM AYAs [33] (Fig. 2). For each publication, four team members indicated the presence or absences of each of nine domains within the framework. Table 3 displays the SGM Quality Assessment tool which includes description of the criteria to be met within each of its nine domains.

## 3. Results

### 3.1. Study characteristics

Of the final 13 resulting studies included in this scoping review, 11 were conducted in the USA [14,34-43], one in the UK [44], and one in Australia [45]. Three studies used quantitative study designs [34,36,37], four were qualitative [35,38,39,44], and six used mixed methods [14,40-43,45].

The resulting studies had a wide range of sample sizes ( $n = 6$  to  $n =$



**Fig. 2.** Conceptual framework of foundational progress in sexual and gender minority (SGM) and adolescent and young adult (AYA) research derived from Levin et al.'s (2022) schema for assessing sex, gender identity, and sexual orientation in oncofertility research by presenting nine essential domains for high-quality research studies that capture SGM AYAs.

1253), which reflect varying study designs and outcomes of interest (Table 2). The largest study sample was utilized by Banerjee et al.'s [34] quantitative cross-sectional survey focused on oncology HCPs' communication behaviors related to LGBTQ+ patient care, as well as Banerjee et al.'s [35] qualitative study of the same sample, which investigated HCPs' perspectives on encouraging the collection of patients' SOGI. Of the 13 studies, 11 used samples comprised of HCPs [14,34-37,39-44] and two used patient samples [38,45] to gain insights into provider-patient interactions and identify gaps in LGBTQ+ cancer care. Among the 11 studies with healthcare provider samples, two studies [14,37] also included patients or survivors as part of their sample.

Only two of the resulting 13 studies [36,43] asked respondents to estimate the number of LGBTQ+ patients they see for clinical care. In both cases, respondents were asked to estimate the overall number of patients they see each week and the percentage of these patients who identify as LGBTQI [43] and LGBTQ [36], respectively.

### 3.2. Provider knowledge of AYA SOGI

Banerjee and colleagues [34] evaluated SGM knowledge of 1253 healthcare providers at Memorial Sloan Kettering Cancer Center, revealing significant gaps as only 5 % answered all seven LGBTQI knowledge items correctly. Similarly, Sutter et al.'s [36] survey of 78 HCPs at the H. Lee Moffitt Cancer Center found a positive correlation between knowledge of SGM health and the belief that understanding SOGI is crucial, despite also finding low levels of overall knowledge of SGM health.

Shetty et al. [43] conducted a survey of 108 oncology providers at the H. Lee Moffitt Cancer Center, finding that less than one-third felt well-informed about SGM health needs, with over 50 % non-responsive to knowledge questions. Zayhowski et al. [39] studied 21 genetic counselors at Stanford University School of Medicine, highlighting their poor preparedness to serve SGM patients despite awareness of unique risk factors.

### 3.3. Provider attitudes and behaviors when caring for SGM AYAs

In a study at H. Lee Moffitt Cancer Center, Shetty et al. [43] reported

that while 94 % of 102 providers expressed comfort treating SGM patients, only 26 % routinely inquired about patients' SOGI. Banerjee et al. [35] at Memorial Sloan Kettering Cancer Center identified effective communication strategies to promote SOGI disclosure, including the use of preferred pronouns and direct questions. Sampson et al. [42] surveyed 351 oncology allied health professionals, revealing significant knowledge gaps, particularly concerning the care of transgender and nonbinary patients. Providers highlighted institutional barriers, such as outdated medical records, as significant obstacles to delivering inclusive care.

### 3.4. Provider education on caring for SGM AYAs with Cancer

Seven of the resulting studies point to the pressing need for enhanced education on SGM AYA cancer care, calling for the integration of LGBTQ+ health topics into medical curricula, and the removal of institutional barriers. Shetty et al. [43] reported that 78 % of 84 providers at the H. Lee Moffitt Cancer Center advocated for increased LGBTQ+ health education in professional schools. Banerjee et al. [35] recommended increasing awareness of LGBT-friendly resources to foster trust, while Zayhowski et al. [39] stressed the need for targeted training for genetic counselors. Gannon et al. [44], focusing on pediatric oncology, identified the necessity for both individual HCP education and organizational changes to ensure psychological safety and improve patient care.

Block et al. [37] developed the LOvE-ECHO training, an interactive web-based module, demonstrating the potential of online training to improve competencies. Pecoriello et al. [41] evaluated the LOvE-ECHO module, revealing significant improvements in reproductive health communication. Additionally, Kano et al. [40] evaluated the SGM Cancer CARE workshop, showing improved knowledge and confidence among early-career researchers and healthcare providers.

### 3.5. Quality of the Evidence

Following guidance from previous literature reviews, we rated JBI appraisal scores as follows: scores above 70 % were classified as high quality, scores between 50 and 70 % were considered medium quality, and scores below 50 % were deemed low quality. In our scoping review,

**Table 2**  
Summary of articles ( $n = 13$ ).

Publication	Location	Study Sample	Design	Outcomes of Interest
Banerjee et al. (2020)	USA	<ul style="list-style-type: none"> <li>Physicians (<math>n = 187</math>)</li> <li>Advance practice professionals (<math>n = 981</math>)</li> <li>Psychologists (<math>n = 41</math>)</li> </ul>	Qualitative	<ul style="list-style-type: none"> <li>Communication strategies to encourage SGM patients to disclose SOGI: direct questions regarding sexual orientation, use of the term "partner," and use of correct pronouns.</li> <li>Communication and structural/administrative challenges faced by health care providers (HCPs) in providing care: HCP's own fears and biases, transgender patient care, insurance issues, and procedural challenges for SGM patients.</li> <li>Recommendations from oncology HCPs to improve their care delivery for SGM patients: more provider-based training, improving awareness of SGM-friendly resources, establishing trusting relationships, and not assuming sexuality or gender identity.</li> </ul>
Banerjee et al. (2018)	USA	<ul style="list-style-type: none"> <li>Physicians (<math>n = 187</math>)</li> <li>Advance practice professionals (<math>n = 153</math>)</li> <li>Nurses (<math>n = 828</math>)</li> <li>Others (<math>n = 41</math>)</li> </ul>	Quantitative	<ul style="list-style-type: none"> <li>5 % of participants demonstrated comprehensive understanding by correctly answering all 7 knowledge items, while approximately half of participants correctly answered 3 out of 7 items.</li> <li>The influence of enhanced SGM health-care knowledge on open communication behaviors with transgender patients was mediated by positive beliefs regarding SGM health care, adjusting for profession, religious orientation, gender identity, sexual orientation, and the presence of SGM friends or family members.</li> </ul>
Block et al. (2022)	USA	<ul style="list-style-type: none"> <li>Experts</li> <li>LGBTQ AYA</li> <li>ECHO Team</li> <li>Web developer</li> <li>LOvE ECHO learners</li> <li>*No mention of a sample size in the study</li> </ul>	Quantitative	<ul style="list-style-type: none"> <li>Development of LOvE ECHO module, a web-based training module for oncology health professionals aimed at improving reproductive and sexual health care for LGBTQ AYA patients.</li> <li>Educational content includes instructional lessons, a glossary of terms, narrated presentations, and interactive case studies.</li> <li>Opportunities for learners to test their knowledge through interactive cases and action plans.</li> </ul>
Gannon et al. (2022)	UK	<ul style="list-style-type: none"> <li>Pediatric oncologist (<math>n = 3</math>)</li> <li>Clinical nurse specialist (<math>n = 2</math>)</li> <li>Speech and language therapist (<math>n = 1</math>)</li> <li>Occupational therapist (<math>n = 1</math>)</li> <li>Psychologist (<math>n = 1</math>)</li> </ul>	Qualitative	<ul style="list-style-type: none"> <li>Themes in LGBTQ+ cancer care: Benefits and harms of disclosure, barriers and facilitators, and knowledge confidence.</li> <li>Importance of appropriate language and varied sources of knowledge, including third-party experts.</li> <li>Dynamics in care: Influence of third-party experts, parental-carer relationships, individual patient focus, and visibility of LGBTQ+ affirming materials.</li> </ul>
Ghazal et al. (2024)	USA	<ul style="list-style-type: none"> <li>Patient (<math>n = 31</math>)</li> <li>Survivor (<math>n = 36</math>)</li> <li>Healthcare professional (<math>n = 8</math>)</li> <li>Caregiver/supportive loved one (<math>n = 7</math>)</li> <li>Non-profit professional (<math>n = 2</math>)</li> <li>Prefer not to disclose (<math>n = 1</math>)</li> <li>*Participants (<math>n=56</math>) were able to choose more than one option.</li> </ul>	Mixed methods	<ul style="list-style-type: none"> <li>Unmet needs of sexual and gender diverse (SGD) AYAs: Sexual health, gender affirmation, financial stability, and emotional support.</li> <li>Gaps in quality of community-based care: Emotional support, advocacy, provider communication, and LGBTQI2S+ affirmation.</li> <li>Improvement needed in provider communication, space creation, and peer connection; strengths in self-compassion and LGBTQI2S+ affirmation.</li> </ul>
Kano et al. (2023)	USA	<ul style="list-style-type: none"> <li>Clinicians and researchers (<math>n = 104</math>)</li> </ul>	Mixed methods	<ul style="list-style-type: none"> <li>The SGM Cancer CARE workshop pilot included four foundational modules: epidemiology and population-level research, clinical cancer research, behavioral science interventions, and community-based participatory approaches.</li> <li>Pre- and post-module tests showed a statistically significant improvements in knowledge across multiple research areas.</li> <li>Participants reported increased confidence in conducting SGM cancer research.</li> </ul>
Pecoriello et al. (2023)	USA	<ul style="list-style-type: none"> <li>Allied Health Professional (AHP) from one of the following professions: nurses, psychologists, physician's assistants, or social workers (<math>n = 37</math>)</li> </ul>	Mixed methods	<ul style="list-style-type: none"> <li>Oncofertility module posttest results indicated Improvements in understanding fertility risks and addressing challenges of LGBTQ AYA patients.</li> <li>Provider-patient relationships may be strengthened by creation of safe spaces and enhanced understanding of fertility relevance.</li> <li>Learner feedback resulted in three emergent themes from open-ended responses highlighting relationship strengthening, safe space creation, and improved fertility understanding.</li> </ul>
Rolle et al. (2022)	USA	<ul style="list-style-type: none"> <li>Trans individuals who had received genetic counseling within the last ten years (<math>n = 6</math>)</li> </ul>	Qualitative	<ul style="list-style-type: none"> <li>Five themes on experiences of trans patients accessing genetic counseling emerged across three categories</li> <li>Anticipatory anxiety: (1) anxiety for the consult: concern before meeting with a healthcare provider</li> <li>Interactions with the genetic counselor during counseling session: (b) importance of addressing disruptions of familial relationships and emotional support systems, and (c) essential to use inclusive language during sessions.</li> <li>Medical management concerns of patients regarding cancer genetic counseling: (4) impact on gender affirmation journey and (5) lack of appropriate cancer risk information for trans patients.</li> </ul>
Sampson et al. (2023)	USA	<ul style="list-style-type: none"> <li>Advanced practice registered nurse (<math>n = 26</math>)</li> <li>Licensed clinical social worker (<math>n = 47</math>)</li> <li>Master of social work (<math>n = 11</math>)</li> <li>Nurse practitioner (<math>n = 32</math>)</li> <li>PsyD (<math>n = 12</math>)</li> <li>Registered nurse (<math>n = 109</math>)</li> </ul>	Mixed methods	<ul style="list-style-type: none"> <li>Allied Health Professionals (AHPs) were placed into high (16.8 %), moderate (38.2 %), and low knowledge groups (45 %).</li> <li>AHPs in the high knowledge group reported statistically significantly higher confidence in the knowledge of the health needs of all LGBTQ AYAs than the moderate and low groups.</li> </ul>

(continued on next page)

Table 2 (continued)

Publication	Location	Study Sample	Design	Outcomes of Interest
		<ul style="list-style-type: none"> <li>• Other (<math>n = 23</math>)</li> <li>• Prefer not to answer (<math>n = 2</math>)</li> </ul>		<ul style="list-style-type: none"> <li>• AHPs in the high knowledge also group showed greater confidence in the knowledge of the reproductive health needs of patients who identify as gay or lesbian, bisexual, or queer.</li> <li>• Four qualitative themes on challenges treating LGBTQ AYAs: 1) Patients' SOGI disclosure: who knows, who does not know, who should know, 2) fertility: who is interested, 3) reservations about treating the LGBTQ AYA population, and 4) Lack of supportive infrastructure (e.g. inadequate intake forms) and LGBTQ-friendly environments.</li> </ul>
Shetty et al. (2016)	USA	<ul style="list-style-type: none"> <li>• Physicians (<math>n = 70</math>)</li> <li>• Physician assistants (<math>n = 9</math>)</li> <li>• Advanced registered nurse practitioners (<math>n = 17</math>)</li> <li>• Other (<math>n = 3</math>)</li> <li>• Missing (<math>n = 9</math>)</li> </ul>	Mixed methods	<ul style="list-style-type: none"> <li>• 26 % of participants actively inquired about patients' sexual orientation when collecting patient history.</li> <li>• 28 % of participants felt well-informed on health needs of SGM population.</li> <li>• 36 % of participants felt the need for mandatory education on SGM cultural competency at their institution.</li> </ul>
Sutter et al. (2020)	USA	<ul style="list-style-type: none"> <li>• Physician assistant (<math>n = 26</math>)</li> <li>• Advanced registered nurse practitioner (<math>n = 35</math>)</li> </ul>	Quantitative	<ul style="list-style-type: none"> <li>• Majority of advanced practice providers (APPs) reported being comfortable treating LGB (93.6 %) and transgender (87.2 %) patients.</li> <li>• APPs reported less confidence in knowledge of LGB (68.0 %) and transgender (53.8 %) health needs.</li> <li>• Although less than half of APPs believed education should be mandatory (44.9 %), 79.5 % were interested in education about SGMs' unique health needs.</li> </ul>
Ussher et al. (2023)	Australia	<ul style="list-style-type: none"> <li>• Certified registered nurse anesthetist (<math>n = 6</math>)</li> <li>• Anesthesiologist assistant (<math>n = 5</math>)</li> <li>• Prefer not to answer (<math>n = 6</math>)</li> </ul> LGBTQI AYA cancer patients or those had undergone medical intervention related to cancer risk	Mixed methods	<ul style="list-style-type: none"> <li>• 25.0 % of AYAs reported high distress and 38.2 % reported very high distress.</li> <li>• Theme 1 Identities in flux: 1) cancer disrupts developing identities and involvement with LGBTQI communities, 2) internalized prejudice impacts identities, 3) cancer facilitates identities and embodiment.</li> <li>• Theme 2 Invisibility within cancer care: 1) navigating disclosure among cis-heteronormative assumptions 2) discrimination and paternalistic cancer care 3) cis-heteronormative within cancer information.</li> <li>• Theme 3 Precarious social support for LGBTQI AYAs with cancer: 1) social support during cancer is helpful for LGBTQI AYAs 2) LGBTQI AYAs navigate limited support 3) finding cancer peer support networks is difficult for LGBTQI AYAs.</li> </ul>
Zayhowski et al. (2019)	USA	<ul style="list-style-type: none"> <li>• Online survey participants (<math>n = 95</math>)</li> <li>• Semi-structured interview participants (<math>n = 19</math>)</li> </ul>	Qualitative	Health topics and concerns related to cancer genetic counseling sessions with transgender patients included: <ul style="list-style-type: none"> <li>• Documentation systems are not inclusive or clear.</li> <li>• Genetic counselors feel unprepared for these sessions.</li> <li>• Gender-affirming hormones impact risk assessment.</li> <li>• Genetic testing affects gender-affirming surgical decisions.</li> <li>• Transgender patients present at younger ages to clinic and pathogenic variants allow for insurance coverage for gender affirming surgeries.</li> </ul>

JBI appraisal results for the thirteen selected articles indicated that all were of high quality, meeting more than 70 % of the criteria.

The three quantitative cross-sectional studies achieved a perfect score, meeting 100 % of the JBI criteria [34,36,37]. The four qualitative studies displayed some variability, with JBI scores ranging from 70 % to 100 % [35,38,39,44]. For the six mixed-methods studies, the quantitative components consistently met 100 % of the JBI criteria, whereas the qualitative components scored slightly lower, ranging from 80 % to 90 % [14,40-43,45]. Overall, the most commonly missed JBI criteria for qualitative studies were those related to situating the researcher within a cultural or theoretical framework and addressing the reciprocal influence between the researcher and the research process.

The results from piloting our SGM Quality Assessment (QA) tool (Table 3) indicate that all studies published after 2022 employed multiple methods for collecting Sexual Orientation and Gender Identity (SOGI) data, relevant to their research objectives [14,38,40-42,45]. Additionally, these studies, along with two other studies [36,37], utilized instruments or frameworks validated for SGM AYA populations. These emerging trends suggest a progressive enhancement in the quality of SGM-related research within the literature.

## 4. Discussion

Research on the preparedness of HCPs to deliver quality cancer care to SGM AYAs is limited. Extant reviews have focused on health outcomes for SGM AYA cancer patients [33] and SGM cancer patients of all ages [46]. No reviews have focused on outcomes related to oncology healthcare providers' preparedness to care for SGM AYA patients. The current scoping review addresses this critical gap by examining the preparedness of providers to deliver quality care to this unique and vulnerable population. A modest total of thirteen eligible articles were included in our review, exposing substantial gaps in providers': (1) knowledge of AYA SOGI; (2) attitudes and behaviors when caring for SGM AYAs; and (3) education on caring for SGM AYAs with cancer.

### 4.1. SOGI Categorization, Measurement, and Documentation

A key finding of our study is the urgent need for improved categorization, measurement, and documentation of Sexual Orientation and Gender Identity (SOGI) data. Only two [36,43] of the 13 studies asked HCPs to estimate the number of LGBTQ+ patients they see. The National Academies' 2022 consensus study emphasized the importance of high-quality information on SGM populations in research, surveys, and medical records [47]. Standardizing vocabulary for SGM AYA patients

**Table 3**  
Quality Assessment Tool for Foundational Progress in Sexual and Gender Minority (SGM) Adolescent and Young Adult (AYA) Research (n = 13).

INSTRUCTIONS: Please indicate whether the following criteria are met by inputting 1, 0, or N/A with: Yes = 1, No = 0, Not Applicable = N/A	Banerjee (2018)	Banerjee (2020)	Block (2022)	Gannon (2022)	Ghazal (2024)	Kano (2023)	Pecoriello (2023)	Rolle (2022)	Sampson (2023)	Shetty (2016)	Sutter (2020)	Ussher (2023)	Zayhowski (2019)
<b>1. ACCURATE TERMINOLOGY</b> Utilizes accurate sexual orientation and gender identity (SOGI) terminology for the current cohort of SGM	1	1	1	1	1	1	1	1	1	0	1	1	1
<b>2. DIMENSIONS OF HUMAN SEXUALITY</b> Correctly utilizes 3 dimensions of human sexuality (i.e. sex, sexual orientation, and gender identity) as they relate to the study	1	1	1	1	1	1	1	1	1	0	1	1	1
<b>3. NON-BINARY</b> Utilizes more than 2 categories to identify sexual orientation and gender identity	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>4. GOAL OF STUDY</b> Focuses study endpoint(s) on the well-being or care of SGM adolescent and young adult (AYA) cancer patients	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>5. AFFIRMING TERMINOLOGY</b> Utilizes affirming SOGI terminology that is relevant to the current cohort of SGM	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>6. STAKEHOLDER COLLABORATION</b> Discloses collaboration with SGM patients and/or stakeholders on research activities in research methods or authors' affiliation	0	0	1	1	1	1	1	0	1	0	0	1	1
<b>7. MULTIPLE METHODS TO COLLECT SOGI</b> Captures SOGI via methods that offer both closed-ended and open-ended response options	0	0	1	N/A	1	1	1	1	1	N/A	0	1	N/A
<b>8. IMPLICATIONS</b> Offers practice or policy implications that address SGM health	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>9. VALIDATED INSTRUMENTS OR FRAMEWORKS</b> Utilizes study tools and theorizations that are validated for SGM AYAs	0	0	1	N/A	1	1	1	1	1	0	1	1	N/A
<b>% of Relevant Criteria Met:</b>	67 %	67 %	100 %	100 %	100 %	100 %	100 %	89 %	100 %	50 %	78 %	100 %	100 %

in electronic medical records (EMRs) is essential.

Given the fluid nature of SOGI identities, it is essential to implement workflows that regularly solicit and update SOGI data [48], particularly for nonbinary and transgender patients who may undergo transitions that impact their treatment and survivorship. The lack of SOGI assessment for AYA cancer patients is concerning. Without comprehensive SOGI data, HCPs miss opportunities to understand patients' unique needs. Routine inquiries about SOGI can mitigate physicians' discomfort and facilitate updates. Although some academic centers have begun incorporating SOGI data into EMRs, progress has been slow [49].

Evidence supports offering patients multiple response formats for SOGI disclosure, including non-standard options [50]. Patients who choose not to disclose their SOGI may miss opportunities for holistic care [51]. Reasons for non-disclosure include providers not asking, internalized stigma, and the belief that health and LGBTQ+ identity are unrelated [51,52]. Providers often avoid SOGI discussions due to inadequate training, which negatively impacts patient care [52]. Prior research has identified barriers and facilitators for SOGI data collection in community oncology practices [53], suggesting that increasing training and infrastructure to support SOGI data collection, enhance provider knowledge, and foster affirming patient interactions can be beneficial to SGM AYAs [48,53-55].

#### 4.2. Knowledge, Attitudes, and Beliefs on SGM AYAs

Reliable SOGI data collection will enable researchers to identify disparities and unmet biomedical and psychosocial needs among SGM AYAs, addressing a significant literature gap. HCPs' knowledge of SGM health risks and care needs positively influences their attitudes and beliefs about SGM AYAs [36,43]. This finding aligns with literature on the impact of social determinants of health on LGBTQ+ cancer patients [56,57]. Another key finding highlights the need to distinguish between the needs of gender-diverse and sexually-diverse AYAs, as their cancer care experiences differ [58-62]. Further research is needed on HCPs' implicit biases and the effect of anti-implicit bias training on clinical care for SGM AYAs [63].

Targeted policies at federal, state, local, and organizational levels are necessary to promote affirmative clinical care strategies for SGM AYA cancer patients. These policies should address concerns about healthcare interactions, including non-medical staff and physical environments, which impact SGM AYAs' healthcare experiences.

#### 4.3. Training for Health Care Providers

Training providers to deliver SGM AYA patient-centered care within cis-heteronormative healthcare systems is critical [63]. Incorporating such training into medical education, residency, fellowship, and continuing education is essential [64]. However, few fellowship programs address disparities in care for SGM AYA cancer patients [65]. Developing curricula that address the distinct cancer concerns of gender-diverse and sexually diverse SGM AYAs is urgently needed. Sampson et al. [42] found lower confidence among health professionals in discussing the needs of transgender and nonbinary AYA cancer patients compared to other LGBTQ+ subgroups.

In recent years, the development and implementation of the online "LOVE ECHO," self-described as an "LGBTQ+ cultural competency training module for oncology allied health professionals," has shown significant results in improving HCPs' reproductive health knowledge and communication skills for LGBTQ+ AYAs [37,41]. This curriculum includes didactic and interactive lessons, case examples, and planning support to integrate new knowledge into practice. This transdisciplinary approach addresses the needs of various healthcare providers interacting with SGM AYAs.

Nonetheless, it is crucial to shift away from the achievement-oriented concept of "cultural competency," and instead advance "cultural humility" and "structural intersectionality" in provider training

[66,67]. Cultural humility involves a lifelong commitment to learning and responding to dynamic patient environments, rejecting the notion of achieving competence in understanding cultures outside one's own. Structural intersectionality focuses on disparities rooted in systemic inequalities, ensuring organizations address the underlying causes of health disparities [68,69].

#### 4.4. Strengths and Limitations

This scoping review effectively highlights the current limitations in the empirical literature on HCPs' preparedness to care for SGM AYA cancer patients. One major limitation was the small number of eligible studies ( $n = 5$ ), which hindered meaningful comparative analyses. Additionally, one study [43] dating back to 2016 with data from 2015 may overrepresent outdated aspects. Given the evolving nature of SOGI categories, this could affect relevance. Jackson Levin et al. [70] emphasized the challenges in defining and operationalizing SGM categories in oncofertility practice with AYAs, advocating for the integration of queer theory insights to ensure inclusive SOGI assessments [48].

Despite these limitations, this review significantly contributes to the field and supports Pacey et al.'s [71] call for inclusive, innovative, and interdisciplinary cancer research with SGM. Our interdisciplinary team, including researchers with professional expertise in AYA oncology and embodied knowledge from lived experiences of minoritized SOGI and/or AYA cancer [71-73], engaged in a meaningful discussion despite the scarce findings.

#### 4.5. Innovation

We developed and piloted an innovative Quality Assessment (QA) Tool of Foundational Progress for SGM AYA Research, a conceptual framework addressing gaps in SGM AYA oncology research. Rooted in critical queer theory, the QA tool challenges traditional heteronormative research approaches, capturing the fluid nature of SOGI. Inspired by Kath Browne's work, "Queer Insights" critiques rigid frameworks in SOGI research [74], emphasizing the need for practices acknowledging the fluidity of sexuality and gender identity.

Adapted from a previously developed framework by our third co-author in an AYA-focused mixed methods study [33,75-77], our team refined the QA tool through extensive literature review, discussions, and presentations. This framework was operationalized into the QA tool through presentations at the 2023 Global AYA Cancer Congress [78] and the 2024 SGM Cancer CARE Workshop at MD Anderson Cancer Center [79].

The QA tool's development involved an iterative process with experts in the field, ensuring its relevance and applicability, and an earlier version of the QA tool was used to evaluate disparities in cancer care among SGM AYAs, demonstrating its practical utility and impact [33]. Feedback from attendees during poster presentations at these conferences was instrumental in shaping the final tool. These engagements ensured that the QAT reflects a consensus-driven approach that integrates diverse perspectives and expert insights. The QAT operationalizes Kat Browne's "Queer Insights" model [74,80] through three core pillars: defining the population, measuring the population, and translating research into clinical services. Each pillar comprises specific criteria to improve research methodologies with SGM populations, promoting a nuanced and inclusive approach to SOGI assessment of relevance to AYA oncology [48].

Presented in Fig. 2, the framework's criteria collectively establish a benchmark for critical appraisal of SGM AYA studies, thereby offering a valuable instrument for assessing the quality of research in the field as displayed in Table 3. Specifically, the conceptual framework of foundational progress in SGM AYA research comprises nine criteria: 1. *Accurate terminology* ensures the use of current and appropriate language to describe sexual and gender minorities. 2. *Dimensions of human sexuality* involves understanding and correctly applying the three domains of sex,



gender identity, and sexual orientation. 3. *Non-binary* encourages the recognition of more than two identities to describe SGM. 4. *Goal of the study* requires focus on SGM adolescent and young adult cancer patients. 5. *Affirming terminology* ensures the use of language that resonates with the current SGM cohort. 6. *Community collaboration* emphasizes collaboration with SGM patients and stakeholders throughout the research process. 7. *Multiple methods to collect SOGI* involves capturing SGM identity using both closed-ended and open-ended response options. 8. *Implications* require offering practice and policy recommendations for SGM health. 9. *Validated instruments or frameworks* involves using tools validated for SGM AYAs.

This QA tool's innovation lies in its comprehensive and intersectional approach to evaluating research quality concerning SGM populations. By integrating essential aspects of quality SGM oncology care informed by current evidence, the QA tool sets a new standard for inclusivity and rigor in research. Its application not only enhances the quality of SGM AYA research but also fosters a more equitable and understanding environment for SGM individuals in clinical settings.

## 5. Conclusion

This scoping review is the first to highlight the limited literature on HCP preparedness for SGM AYA cancer care. It systematically identified and synthesized existing studies on HCPs' experiences and needs in this area and piloted a new Quality Assessment Tool for SGM AYA research. Future studies should address the growing interest in SGM AYA oncology and the structural forces driving inequities for this population. Structural changes and provider training are essential to ensure high-quality care and mitigate health disparities for LGBTQ+ AYAs.

## Ethics approval

Not applicable.

## Consent to participate

Not applicable.

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## CRedit authorship contribution statement

**Christabel K. Cheung:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Validation, Visualization, Writing – original draft, Writing – review & editing. **Haelim Lee:** Formal analysis, Investigation, Methodology, Validation, Writing – original draft, Writing – review & editing. **Nina Francis-Levin:** Formal analysis, Writing – original draft, Writing – review & editing. **Eunju Choi:** Formal analysis, Writing – review & editing. **Yimin Geng:** Data curation, Investigation. **Bria N. Thomas:** Validation, Visualization, Writing – review & editing. **Valentina A. Roman:** Formal analysis. **Michael E. Roth:** Conceptualization, Formal analysis, Writing – review & editing.

## Declaration of competing interest

The authors have no conflicts of interest.

## Data availability

Not applicable.

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