Pediatric oncology clinician communication about sexual health with adolescents and young adults: A report from the children’s oncology group

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Abstract

Background: Sexual health (SH) is an important concern for adolescents and young adults (AYAs). This study determined current SH communication practices, barriers, and additional resources needed among pediatric oncology clinicians who treat AYAs.

Methods: A cross-sectional survey was developed by the Children’s Oncology Group (COG) AYA Committee and sent to pediatric oncologists (n = 1,987; 85.9%) and advanced practice providers (APPs, n = 326; 14.1%) at 226 COG institutions. Responses were tabulated and compared using tests of proportion and trend.

Results: The sample comprised 602 respondents from 168 institutions and was proportionally representative (468 oncologists [77.7%], 76 APPs [12.6%], 58 unidentified [9.6%]; institutional and provider response rates 74.3% and 26.2%, respectively). Almost half of respondents (41.7%) reported no/small role in SH care. Medical topics were discussed most often, including contraception (67.2%), puberty (43.5%), and sexual activity (37.5%). Topics never/rarely discussed included gender identity (64.5%), sexual orientation (53.7%), and sexual function (50.3%). Frequently cited communication barriers included lack of time, low priority, perceived patient...
1 | INTRODUCTION

Exploring sexuality while navigating physical, social, and emotional changes is a normative developmental task of adolescence and young adulthood. This holds true for adolescents and young adults (AYAs) with cancer, who are at increased risk for sexual health (SH) concerns and adverse sexual and reproductive health outcomes during treatment and survivorship. As part of comprehensive cancer care, these vulnerable patients require sexual and reproductive health education that is medically accurate and developmentally appropriate, along with access to relevant clinical services.

Participation in risky SH behaviors, such as using unreliable or inconsistent contraception, is common among adolescents but may carry more serious consequences for AYAs with cancer. Research demonstrates AYA patients and survivors engage in unsafe sexual behaviors at similar or higher rates than healthy peers. Additionally, AYA survivors are more likely to experience sexual dysfunction and decreased libido, which negatively impact intimate relationships, sexual satisfaction, and self-esteem. Furthermore, AYAs have concerns that influence romantic relationships and body image, such as social disclosure of cancer history, feeling different from peers, and potential infertility.

Despite these needs, little is known about communication between oncologists and AYAs concerning SH beyond fertility, including counseling on safe sex practices and contraception during therapy, and assessing sexual dysfunction. In part, communication deficits in SH stem from poor clinician insight into psychosexual issues experienced by AYAs who, in turn, express desire for such conversations. A qualitative study shows key barriers to clinician-led SH communication include lack of education/training, knowledge and communication skills, low awareness of specific issues faced by AYAs during and following cancer treatment, and lack of competency in managing identified problems.

Currently, SH communication practices between pediatric oncology clinicians and AYAs are not well described. To address this gap on a national scale, we surveyed pediatric oncologists and advanced practice providers (APPs) in the Children’s Oncology Group (COG) to determine clinician perspectives on SH communication practices, barriers, the need for additional education/training and resources, and preferred modalities for their delivery. The overall goal was to identify opportunities for developing provider-directed interventions to improve SH communication between pediatric oncology clinicians and AYAs treated at COG institutions.

2 | METHODS

This multicenter, cross-sectional survey was deemed exempt by the Institutional Review Board at Connecticut Children’s.

2.1 | Participants

Study participants were pediatric oncologists and APPs who provide care for AYA oncology patients (ages 15–29 years old) and are members of COG. Surveys were sent to pediatric oncologists (n = 1,987; 85.9%) and advanced practice providers (APPs, n = 326; 14.1%) at 226 COG institutions identified through COG clinician listservs. Anticipating potential challenges in clinician recruitment to a survey study, we aimed to achieve more than 60% representation of COG institutions. Non-participants were those who were invited but did not respond; consequently, no descriptive information is available for this group.
2.2 | Sexual health survey

Members of the Sexual Health Task Force of the COG AYA Oncology Discipline Committee, including pediatric oncology physicians, APPs, nurses, and psychologists, developed the survey content. The survey included 18 questions regarding individual attitudes and current practices in SH communication (4), barriers to SH communication (1), optimal education and resource needs and preferred modalities of delivery (4), perceived value of SH discussions with AYAs (2), and demographics (7) (Appendix 1). Question format included multiple choice, Likert scale, and rank order.

Prior to administration, the COG AYA, Nursing, Cancer Control and Supportive Care, and Outcomes and Survivorship Committees reviewed the survey. The survey underwent pilot testing with five clinicians to determine comprehension, acceptability, and estimated time for completion and thus feedback resulted in minimal changes. The survey took 5–10 min to complete.

The survey was administered via the Research Electronic Data Capture (REDCap) platform. Personalized links were emailed to potential participants, with follow-up emails to non-responders at 2, 4, and 6 weeks as per the Dillman Method. The survey remained open for 6 months between March and September, 2019. Participant personal information (name and email address) was confidential and was not associated with survey responses.

2.3 | Data analyses

Survey responses were tabulated and compared between physicians and APPs using Pearson’s Chi-squared test, Fisher’s exact test, or test of trend as appropriate. All analyses were performed using the Statistical Analysis System (SAS) statistical software package, version 9.4. All reported \( p \) values are two-sided and \( \leq 0.05 \) was considered to be statistically significant.

3 | RESULTS

3.1 | Participant characteristics

The sample comprised 602 respondents (468 oncologists [77.7%], 76 APPs [12.6%], and 58 unidentified [9.6%]), representing 168 institutions (provider and institutional response rates were 26.2% and 74.3%, respectively) (Table 1). Participants with known provider type reflected the overall COG cohort with 86.0% physicians and 14.0% APPs. Most were female (67.0%) and had 16–20 years of pediatric oncology experience (56.5%). Compared with APPs, physicians were more likely to report male gender \( (p < 0.001) \). (Continues)
Compared with physicians, APPs reported caring for more AYAs patients between 15 and 29 years old ($p = 0.003$), working in a setting with upper age limit $\geq 25$ years for pediatrics ($p = 0.003$), and having formal training in AYA SH issues ($p = 0.033$). Most respondents completed all questions (544, 90.4%). Comparison of clinician responses based on self-identified gender revealed no significant differences regarding barriers to SH communication on specific SH subtopics or role in discussing SH.

### 3.2 Clinician communication practices

Of 599 participants with known provider type, 251 (41.9%) reported having no/small role in SH care (Table 2). Approximately 80% of both oncologists and APPs combined reported that either an oncologist or APP, as opposed to other team members, should take primary responsibility for addressing SH with AYAs. Nearly a third (31.4%) waited until patients were between 16 and 18 years old to start SH conversations. Figure 1 illustrates frequency of SH discussions by topic.

### 3.3 Communication barriers

Prevalent barriers reported across all SH topics included lack of time, perceived patient discomfort, and presence of a parent/guardian (Table 3). When compared with physicians, APPs were more likely to report communication barriers about sexually transmitted infections (STIs) (60.5% vs. 48.1%, respectively; $p = 0.044$) but less likely for body image (50.0% vs. 64.7%, respectively; $p = 0.014$).

### 3.4 Education and resource needs

Participants reported on education/resource needs and preferred modalities for acquiring information. (Table 4) Whereas approximately one third of providers cited barriers to addressing contraception and approximately half reported barriers to addressing puberty and STIs, more than 75% of respondents reported barriers to discussing gender identity, sexual orientation, and sexual function. APPs were more likely to report the need for further education on STIs (35.5% vs. 15.4%; $p < 0.001$) and how to take an SH history (40.0% vs. 20.4%; $p < 0.001$), whereas physicians were more likely to report the need for further education on body image (49.1% vs. 31.6%; $p = 0.004$) and how to build a local network of SH specialists (47.0% vs. 34.7%; $p = 0.047$). Respondents expressed a strong desire for improved online information and resources (Table 5).

### 4 DISCUSSION

This study represents the first large-scale survey of pediatric oncology clinicians on perceived SH communication practices with the goal of identifying education/resource needs to improve SH conversations. While many participants reported playing a minimal role in SH communication with AYAs, the majority identified themselves as the clinician who should be responsible for ensuring these conversations take place. When such discussions do occur, clinicians are more apt to focus on the medical aspects of SH, such as contraception, puberty, and STI risk, rather than sexual function, sexual orientation, and gender identity. Participants expressed a need for further education and guidelines on screening, management, and communication about SH in AYA patients. These findings highlight the existing gaps in clinical knowledge and practice, thereby informing future clinician-centered education strategies and areas needing further research. They also serve as a contemporary initial benchmark for future comparison.

This study indicates the discussions of SH with AYAs during and post-cancer treatment do not occur with the frequency and depth recommended by the American Academy of Pediatrics (AAP), the National Comprehensive Cancer Network (NCCN), and the American Society of Clinical Oncology (ASCO)$^{17,20,21,22,23}$ Our results align with previous studies examining AYAs recall of SH discussions, showing low frequency.$^{22,24}$ When SH is addressed in the oncology setting, it is often entangled in or simply subsumed by discussion of fertility risk.$^{25}$ In contrast, this study carefully delineated individual SH concepts.

Nearly 42% of participants acknowledged having little to no role in discussing SH with AYAs. These concerning findings suggest many AYAs are not given the opportunity to address key SH concerns, as prior research makes clear AYAs are highly unlikely to initiate conversations regarding SH.$^{24}$ Interestingly, physicians and APPs each demonstrated strong preferences for ownership of these conversations as opposed to assigning the responsibility to social work or psychology, which highlights an encouraging desire to address SH as part
**TABLE 2** Current sexual health communication practices

| How much of a role do you play in the discussion of sexual health care with your AYA patients? | All participants n = 602 | Physician n = 468 | APP n = 76 | p value |
|---|---|---|---|---|
| No role | 20 (3.3) | 13 (2.8) | 5 (6.6) | 0.96b |
| Small role | 231 (38.6) | 180 (38.5) | 27 (35.5) | |
| Moderate | 199 (33.2) | 158 (33.8) | 21 (27.6) | |
| Major/very major role | 149 (24.9) | 117 (25.0) | 23 (30.3) | |
| Unknown* | 3 | 0 | 0 | |

Who should take primary responsibility for discussing sexual health with AYA patients?

| Oncologist | 380 (63.5) | 306 (65.4) | 35 (46.1) | <0.001c |
| Oncology APP | 112 (18.7) | 68 (14.5) | 33 (43.4) | |
| Social work | 10 (1.7) | 10 (2.1) | 0 | |
| Oncology nurse | 14 (2.3) | 11 (2.4) | 1 (1.3) | |
| Endocrinologist | 9 (1.5) | 5 (1.1) | 3 (3.9) | |
| Psychologist | 28 (4.7) | 27 (5.8) | 1 (1.3) | |
| Child life specialist | 1 (0.2) | 1 (0.2) | 0 | |
| Patient navigator | 3 (0.5) | 3 (0.6) | 0 | |
| Other | 41 (6.9) | 37 (7.9) | 3 (3.9) | |
| Unknown* | 4 | 0 | 0 | |

At what age do you tend to start discussing sexual health with your AYA patients?

| Not discussed | 38 (6.4) | 33 (7.1) | 3 (3.9) | 0.022c |
| Before age 13 years | 58 (9.7) | 43 (9.2) | 10 (13.2) | |
| Age 13–15 years | 296 (49.5) | 219 (46.8) | 48 (63.2) | |
| Age 16–18 years | 188 (31.4) | 157 (33.5) | 14 (18.4) | |
| After age 18 years | 18 (3.0) | 16 (3.4) | 1 (1.3) | |
| Unknown* | 4 | 0 | 0 | |

*The unknown/decline categories were excluded from the calculation of percentages.

bTest of trend.

cFisher's exact test.

**FIGURE 1** Frequency of clinician conversations with AYAs on specific sexual health topics. These data include physicians and APPs combined.

Discussion Frequency of SH Sub-Topics

- Contraception
- Puberty
- Sexual Activity
- Sexually Transmitted Infections
- Romantic Relationships
- Body Image
- Sexual Function
- Sexual Orientation
- Gender Identity

Never/Rarely | Sometimes/Only When Patient Asks | Often
of comprehensive cancer care and presents an opportunity for more communication training. 

About one third of participants reported not initiating SH conversations with patients less than 16–18 years old, which...
TABLE 5 Clinician-identified resource needs (n = 602)

| Resource needs                                      | All participants |
|-----------------------------------------------------|------------------|
| Written pamphlets or booklets                       |                  |
| Very helpful or extremely helpful                   | 263 (48.1)       |
| Somewhat helpful                                    | 162 (29.6)       |
| Not at all helpful or slightly helpful              | 122 (22.3)       |
| Unknowna                                           | 55               |
| Online information and resources                    |                  |
| Very helpful or extremely helpful                   | 414 (75.8)       |
| Somewhat helpful                                    | 110 (20.1)       |
| Not at all helpful or slightly helpful              | 22 (4.0)         |
| Unknowna                                           | 56               |
| Video-based education modules                       |                  |
| Very helpful or extremely helpful                   | 261 (47.7)       |
| Somewhat helpful                                    | 186 (34.0)       |
| Not at all helpful or slightly helpful              | 100 (18.3)       |
| Unknowna                                           | 55               |

The unknown/decline categories were excluded from the calculation of percentages.

likely results in missed opportunities for patient education, as the average age of sexual debut in the United States is 16 years.26 Nearly half (46.8%) of all high school students have a history of sexual intercourse, with only 59.1% reporting condom use during their last sexual encounter.26 These data underscore the need for educating clinicians about AYA sex practices and introducing such conversations in a developmentally appropriate manner. Clinicians may also benefit from learning how to partner with psychology, social work, and other supportive care colleagues in providing appropriate SH care.

AYAs with cancer face increased risk for sexual dysfunction during and after treatment.6-9 Several studies indicate that over 30% of childhood cancer survivors go on to experience sexual dysfunction.27-29 Compared with older adults, SH problems are often more severe and distressing in AYAs as many childhood cancer survivors experience delays in dating, marriage, and sexual debut.3,30,31,32,33 When cancer is diagnosed during adolescence, survivors are more likely to experience impaired sexual function and decreased libido compared with those diagnosed early in childhood.6-8 Despite this, sexual function was reported as never/rarely discussed by half of the clinicians in this study. This is particularly concerning because dysfunction tends not to improve over time, therefore, patients may suffer these complications indefinitely if not addressed.34

Clinician-reported barriers to SH communication identified here are similar to those reported in prior qualitative research in AYAs, fertility-focused communication studies, and studies exploring subspecialty pediatric clinician communication in cystic fibrosis and perinatally diagnosed HIV.24,35,36,37 Research in adult cancer populations illustrates similar barriers to patient-clinician SH communication as reported by medical oncologists.38 Based on these findings, interventions developed to improve pediatric oncology clinician-AYA SH communication may also benefit medical oncologists caring for AYAs as well as clinicians of non-cancer AYA population. In this study, over 40% of participants identified the presence of a parent/family member as a barrier to conversations about sexual activity, highlighting the need for clinicians to speak to AYAs alone. While communication barriers reported by physicians and APPs were consistent across most SH topics, there were some differences, suggestive of variances in training background. When compared with physicians, APPs were more likely to report communication barriers about STIs but less likely about body image. These findings are important when considering potential provider-directed education interventions.

While “lack of knowledge” was not often identified as a barrier to communication on specific SH topics with AYAs, more than 50% of participants expressed the need for further education in the areas of sexual function and gender identity/sexual orientation, and more than 30% reported a need for more education on body image, sexual activity/safe sex practices, and contraception. Based on these findings, we anticipate further clinician education will help to improve clinician knowledge, comfort, and communication on SH topics relevant to the AYA patient. Education efforts may also help to address the barrier of “low priority” by highlighting the significance SH has for an AYA patient’s overall well-being. Improving clinician knowledge of gender identities and sexual orientation and how SH needs may differ is an important step in ensuring all conversations are inclusive and not heteronormative. These findings suggest many clinicians are aware of some SH topics but are uncomfortable or ill-prepared for adequate discussion about other pertinent aspects of SH.17 This is not surprising given that most physician knowledge about SH is acquired during general pediatrics residency with minimal structured education on SH during pediatric hematology/oncology fellowship training.39,40 Future intervention strategies should emphasize AYA-reported communication needs and the importance of clinicians initiating conversations.24 Participants identified published guidelines and online education modules as the preferred modalities for supplemental SH education. While published screening recommendations exist for sexual dysfunction screening and SH communication with AYA cancer patients and survivors, they are limited in scope and detail, thereby creating opportunities for improvement.20,21,41

Participants also identified online modules as a preferred modality for SH education. Benefits of this approach include
accessibility, efficacy, cost-effectiveness, and learner flexibility and interactivity; however, such strategies must be carefully designed to focus on improvement in clinician practice and patient outcomes. This strategy has worked successfully in the setting of oncology education for nursing and other allied health professionals, as well as for oncologists regarding gender minority health care needs.

This study has several strengths and some limitations. Significant strengths include a relatively large, proportionally representative sample of approximately 600 clinicians from 168 COG institutions, inclusion of both pediatric oncologists and APPs, a contemporary survey that carefully delineated multiple SH topics other than fertility, and solicitation of preferences that can assist in the development of provider-directed educational interventions. Although our participant response rate was lower than desired in this non-incentivized survey, it falls within the range of physician response rates observed in previous survey studies (12%–50%). Our results could represent a “best case scenario” because non-participants may have had less interest in, and felt even less prepared to address AYA SH than did participants. We were unable to fully assess the representativeness of our sample because, to protect confidentiality, we could not collect demographic data on non-participants. Nevertheless, the large absolute number of participants, coupled with a high institutional response rate and distribution of provider type that reflects the pool of invited COG clinicians, our results are likely valid and generalizable. Finally, this survey does not capture the quality of the current SH conversations taking place between clinicians and AYAs. Prior qualitative research supports there is room for improvement and further research is warranted.

This study emphasizes a need for further clinician education in SH communication with AYAs, which includes the development of more detailed practice guidelines that could be disseminated through COG and the creation of educational strategies, namely through e-learning modalities, that will expand access for the busy clinician. Screening strategies should be tailored to the AYA patient to identify those most at risk for SH problems, which may then be tested in the cooperative group research setting. Additional analyses exploring the individual characteristics of clinicians more likely to report SH communication with AYAs may be helpful in intervention development.

ETHICAL APPROVAL STATEMENT
This study was deemed exempt by the Institutional Review Board at Connecticut Children’s (IRB # 18–154) prior to commencing this study.

ETHICS STATEMENT
This study was deemed exempt by the Institutional Review Board at Connecticut Children’s.

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CONFLICT OF INTEREST
The authors have no conflict of interest.

AUTHOR CONTRIBUTION
Natasha Frederick: conceptualization, data curation, formal analysis, methodology, project administration, writing-original draft, writing-review and editing. Kristin Bingen: conceptualization, formal analysis, methodology, writing-review and editing. Sharon Bober: conceptualization, formal analysis, methodology, writing-review and editing. Brooke Cherven: conceptualization, formal analysis, methodology, writing-review and editing. XinXin Xu: formal analysis, writing-review and editing. Lingyun Ji: formal analysis, writing-review and editing. David R. Freyer: conceptualization, data curation, methodology, formal analysis, writing-review and editing.

DATA AVAILABILITY STATEMENT
The data that support the findings of this study are available from the corresponding author upon reasonable request.

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REFERENCES
1. Murphy D, Klosky JL, Reed DR, et al. The importance of assessing priorities of reproductive health concerns among adolescent and young adult patients with cancer. Cancer. 2015;121:2529–2536.
2. Maslow B-S, Morse CB, Schanne A, et al. Contraceptive use and the role of contraceptive counseling in reproductive-aged women with cancer. Contraception. 2014;90:79–85.
3. Murphy D, Klosky JL, Termuhlen A, et al. The need for reproductive and sexual health discussions with adolescent and young adult cancer patients. Contraception. 2013;88:215–220.
4. Rosenberg AR, Bona K, Ketterl T, et al. Intimacy, substance use, and communication needs during cancer therapy: a report from the “Resilience in Adolescents and Young Adults” study. J Adolesc Health. 2017;60:93–99.
5. Klosky JL, Foster RH, Li Z, et al. Risky sexual behavior in adolescent survivors of childhood cancer: a report from the childhood cancer survivor study. Health Psychol. 2014;33(8):868-877.

6. Ford JS, Kawashima T, Whitton J, et al. Psychosexual functioning among adult female survivors of childhood cancer: a report from the childhood cancer survivor study. J Clin Oncol. 2014;32:3126-3136.

7. Stinson JN, Jibb LA, Greenberg M, et al. A qualitative study of the impact of cancer on romantic relationships, sexual relationships, and fertility: perspectives of Canadian adolescents and parents during and after treatment. J Adolesc Young Adult Oncol. 2015;4:84-90.

8. Thompson AL, Long KA, Marsland AL. Impact of childhood cancer on emerging adult survivors’ romantic relationships: a qualitative account. J Sex Med. 2013;10(Suppl 1):65-73.

9. Cherven B, Sampson A, Bober SL, et al. Sexual health among adolescent and young adult cancer survivors: a scoping review from the Children’s Oncology Group Adolescent and Young Adult Oncology Discipline Committee. CA Cancer J Clin. 2021;71(3):250-263.

10. Quinn GP, Vadvaramplil ST, Bell-Ellison BA, et al. Patient-physician communication barriers regarding fertility preservation among newly diagnosed cancer patients. Soc Sci Med. 2008;66:784-789.

11. Quinn GP, Murphy D, Knapp CA, et al. Coping styles of female adolescent cancer patients with potential fertility loss. J Adolesc Young Adult Oncol. 2013;2:66-71.

12. Knapp CA, Quinn GP, Murphy D. Assessing the reproductive concerns of children and adolescents with cancer: challenges and potential solutions. J Adolesc Young Adult Oncol. 2011;1:31-35.

13. Thompson K, Dyson G, Holland L, et al. An exploratory study of oncology specialists’ understanding of the preferences of young people living with cancer. Soc Work Health Care. 2013:52:166-190.

14. Klosky JL, Simmons JL, Russell KM, et al. Fertility as a priority among at-risk adolescent males newly diagnosed with cancer and their parents. Support Care Cancer. 2015;23:333-341.

15. Gorman JR, Bailey S, Pierce JP, et al. How do you feel about fertility and parenthood? The voices of young female cancer survivors. J Cancer Surviv. 2012;6:200-209.

16. Frederick NN, Reklitis CJ, Blackmon JE, et al. Sexual dysfunction in young adult survivors of childhood cancer. Pediatr Blood Cancer. 2016;63:1622-1628.

17. Frederick NN, Campbell K, Kenney LB, et al. Barriers and facilitators to sexual and reproductive health communication between pediatric oncology clinicians and adolescent and young adult patients: The clinician perspective. Pediatr Blood Cancer. 2018;65(8):e27087.

18. Cunningham CT, Quan H, Hemmeligarn B, et al. Exploring physician specialist response rates to web-based surveys. BMC Med Res Methodol. 2015;15:32.

19. Dillman DA, Smyth JD, Christian LM. Internet, phone, mail, and mixed-mode surveys: the tailored design method (ed 4). NJ, Hoboken: John Wiley; 2014.

20. Marcell AV, Burstein GR, Committee On A. Sexual and reproductive health care services in the pediatric setting. Pediatrics. 2017;140(5):e20172858.

21. Coccia PF, Pappo AS, Beaupin L, et al. Adolescent and young adult oncology, version 2.2018, NCCN Clinical Practice Guidelines in Oncology. J Natl Compr Canc Netw. 2018;16:66-97.
40. ACGME Program Requirements for Graduate Medical Education in Pediatrics, Accreditation Council for Graduate Medical Education. 2019.

41. Children’s Oncology Group Long-term follow-up guidelines for survivors of childhood, adolescent, and young adult cancers, (ed 5). Monrovia, CA. 2018.

42. Sinclair P, Kable A, Levett-Jones T. The effectiveness of internet-based e-learning on clinician behavior and patient outcomes: a systematic review protocol. JBI Database System Rev Implement Rep. 2015;13:52-64.

43. Vadaparampil ST, Gwede CK, Meade C, et al. ENRICH: a promising oncology nurse training program to implement ASCO clinical practice guidelines on fertility for AYA cancer patients. Patient Educ Couns. 2016;99:1907-1910.

44. Seay J, Hicks A, Markham MJ, et al. Web-based LGBT cultural competency training intervention for oncologists: Pilot study results. Cancer. 2020;126:112-120.

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