



Lessons from COVID-19 for sexually transmitted infections: Listening and learning from young adults and healthcare providers on sexual health communications dynamics and decisions in four states

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ABSTRACT

Objectives: To learn how the COVID-19 pandemic response could shape public health messaging for sexually transmitted infections (STIs), researchers conducted qualitative interviews with young adults in demographic groups experiencing disparate rates of STIs and healthcare providers in California, Florida, Louisiana, and Missouri.

Methods: Between October 2020 and October 2021, researchers interviewed 55 young adults and 49 providers about COVID-19 and STI information sources, perceived risk, and messaging. Young adults included Black/African American gay, bisexual, or other men who have sex with men (Black MSM); Latinx MSM; Black/African American transgender women; Latinx transgender women; and Black/African American cisgender women. Providers were medical doctors, doctors of osteopathy, nurse practitioners, physician assistants, and registered nurses.

Results: Half of young adults identified the Centers for Disease Control and Prevention and the news as primary trusted sources of COVID-19 information; for trusted STI information, they identified providers. Conversely, providers perceived that young adults receive sexual health information from the internet, peers, and social media. Nearly all young adults assessed their likelihood of contracting COVID-19 infection and STIs as low.

Conclusions: Communication efforts surrounding the novel coronavirus can help sexual healthcare providers improve messaging by aligning multiple, trusted sources of information to reduce message variability; increasing accountability for providers' critical role in affirming sexual health discussions; and supporting patient-driven communications to address individualized STI information needs.

Practice Implications: STI information should be presented in a simple, consistent manner from multiple credible sources—in particular, providers. Second, providers should promote patient-driven conversations that address young people's concerns and communicate with empathy in a non-judgmental fashion. Third, we can address young people's low-risk perception by emphasizing factors both within and outside of young adults' control that can facilitate an ongoing sexually healthy life.

1. Introduction

Youth and young adults 15–24 years old make up a quarter of the sexually active population but account for half of newly diagnosed sexually transmitted infections (STIs) in the United States [1]. Factors associated with high rates of STI acquisition among youth and young

adults include rapid social and emotional development [2–5], limited or unreliable sexual health education [6], barriers to accessing STI screening [7], and low condom use [8]. The threat of COVID-19 in 2020 and the accompanying safety precautions did little to lessen young people's desires for sexual interactions, and data suggest STI rates continued to grow [9–13].

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Young people often feel a sense of discomfort or embarrassment in talking about sexual health with their healthcare providers, which is also true of providers when it comes to discussing sexual topics with their patients [14]. Additionally, young people cite concerns around confidentiality as a reason they may not engage truthfully about their sexual health activity and healthcare needs [15]. Studies have published recommendations to improve communication between providers and patients to address sexual health service needs [16,17]. However, there is still an unmet need for improved sexual health communication, particularly among sexual, gender, and racial minority patient populations [18–20]. These concerns go hand-in-hand with the United States Department of Health and Human Services' STI National Strategic Plan 2021–2025, which includes a call to advance communications science that can address the STI epidemic [21].

Public health professionals working in the sexual health arena have struggled to curb the STI epidemic, largely due to STIs being a “neglected field of public health practice and research” [22]. Conversely, the COVID-19 pandemic has received extraordinary public health funding and attention. The swiftness and severity of the fallout of the novel coronavirus was unlike anything experienced in modern history. As a result, COVID-19 messaging permeated via public health guidance, federal, state, and local policies, third-party reports (e.g., peer-reviewed articles or grey literature), news media coverage, and social media.

To learn how the COVID-19 pandemic could guide novel approaches to addressing STIs among communities experiencing disparate rates of infection, the present study had three goals: to identify where sexually active young adults receive information about sexual health and COVID-19; understand how sexually active young adults perceive their likelihood of contracting STIs and COVID-19; and learn what resonant messages sexual healthcare providers and sexually active young adults report sharing and receiving.

2. Methods

Between October 2020 and October 2021, seven experienced interviewers from the study team conducted semi-structured virtual interviews with young adults and providers. Interviewers included young adults, previous youth clinic workers, and people with sexual health research experience. Participants were recruited from California, Florida, Louisiana, and Missouri because these states reported high rates of chlamydia, gonorrhea, or syphilis [23]. Further, the study targeted young adults experiencing the highest rates of STIs [24–27]: Black/African American gay, bisexual, or other men who have sex with men (Black MSM); Latinx MSM; Black/African American transgender women; Latinx transgender women; and Black/African American cisgender women. The study employed a purposive and snowball sampling method. Participant recruitment included emails to eligible participants, community health service organizations, patient advocate groups, affinity groups, and provider groups within AIDS Health Foundation's (AHF) network. Flyers, social media posts, and payment for referrals fortified the sampling approach. A market research firm was also contracted to support recruitment and enrollment. This study was reviewed and deemed exempt by Advarra Institutional Review Board.

Eligible young adults resided in one of the four study states, were 18–24 years old, a member of one of the demographic groups listed above, were sexually active in the last year, conversant in English, and reported seeing a provider for STI services in the previous two years. Enrolled providers included medical doctors, doctors of osteopathy, nurse practitioners, physician assistants, and registered nurses practicing for more than five years who provide direct sexual healthcare at least half the time.

The study team assembled an advisory board to enhance participant recruitment and data collection, as well as ensure the interpretation of the findings was informed by those knowledgeable about the populations and topics. These essential voices represented public health

Table 1

Number of participants by demographics and state.

	LA	FL	CA	MO	Total
Young Adults	8	16	21	10	55
Black MSM	3	4	4	3	14
Latinx MSM	0	7	10	0	17
Black Transgender Women	0	1	1	1	3
Black Cisgender Women	5	3	5	6	19
Healthcare Providers	4	25	7	13	49
Medical Doctor/Doctor of Osteopathy	2	24	4	3	33
Nurse Practitioner/Physician Assistant	1	1	3	10	15
Registered Nurse	1	0	0	0	1
Total	12	41	28	23	104

LA: Louisiana; FL: Florida; CA: California; MO: Missouri; MSM: Gay, Bisexual, or Other Men Who Have Sex with Men.

communications researchers, providers, patients, patient advocates, and online relationship experts.

Before the interview, an informed consent form was reviewed with all participants. Participants were asked to verbally confirm their understanding and consent to participate in the study and interview recording. Both the participant and the interviewer called into Zoom at the interview time. The video function was not used for any calls. Upon completing the 35-min interview, participants received a \$75 cash incentive. Interview guides are available for supplemental reading.

Researchers used the framework method for analysis, identifying a thematic framework based on the study's research questions. Principal investigators, the advisory board, and the analytic lead established the thematic framework and divided the data by research question among six analysts. Using a provided template, analysts prepared an analytic memo that indexed, charted, and mapped patterns and themes, examined differences by population, and linked related interview quotes.

3. Results

A total of 104 participants were interviewed: 55 young adults and 49 providers (Table 1). Among the young adults, 38 % (n = 21) were from California, 29 % (n = 16) Florida, 18 % (n = 10) Missouri, and 15 % (n = 8) Louisiana. A third of the young adults were Black cisgender women (35 %; n = 19), followed by Latinx MSM (31 %; n = 17), Black MSM (25 %; n = 14), Latinx transgender women (5 %; n = 3), and Black transgender women (4 %; n = 2). Among providers, 51 % (n = 25) were from Florida, 27 % (n = 13) Missouri, 14 % (n = 7) California, and 8 % (n = 4) Louisiana. Two-thirds of the providers were medical doctors or doctors of osteopathy (67 %; n = 33), followed by nurse practitioners or physician assistants (31 %; n = 15), and one registered nurse (2 %).

Table 2

Percentage of Total Mentions of Young Adults' Trusted Source of Information for COVID-19 and STIs.

Trusted Source	COVID-19 Young Adult Mentions	STIs Young Adult Mentions	STIs Provider Mentions
CDC	27 %	2 %	0 %
Healthcare Providers	3 %	29 %	4 %
News	22 %	0 %	0 %
Internet and “Official” Websites	12 %	15 %	29 %
Social Media	12 %	2 %	13 %
Family	6 %	2 %	6 %
Peers/Friends	2 %	6 %	19 %
School	4 %	6 %	9 %

STIs: Sexually Transmitted Infections; CDC: Centers for Disease Control and Prevention.

3.1. Sources of information for STIs and COVID-19

Young adults identified the Centers for Disease Control and Prevention (CDC) and the news as their primary trusted sources of information about COVID-19 prevention (Table 2). For STIs, young adults' primary trusted sources were providers. One young adult in California said, "I can say the main source is the doctor. I don't really like going to the Internet—sometimes you are reading something, and you start thinking [you have that infection], but it's not." A young adult from Missouri simply reported, "A doctor, I think they should be giving that information." Young adults also trusted "official" websites defined by patients as websites referred by their provider, science-based websites, or websites with a .org, .edu, or .gov top-level domain: "[The Florida Department of Health has] a section on their website which outlines how [STIs] can be transmitted and what bodily fluids transmit them and that's pretty much the same for the CDC," according to a Florida young adult. Young adults did not trust information posted on social media, as noted by a California young adult: "I love Twitter, but a lot of people get on Twitter and create opinions, and people run with that, and they take it as fact, but not backed up by anything that qualifies it as valuable." Similarly, according to a young adult in Louisiana:

"Of course, on social media, some people put out just to put out. It's mostly social media, I would say Facebook or Twitter. Now they have ways to tell you if something is false. My friends, they didn't really look into it, but there was false information through the pandemic about COVID all the time; we would see false information at least every week."

Conversely, providers perceived that their young patients were primarily getting their STI information from the internet, with one Florida provider saying, "Doctor Google. The internet is insane. People come in, more in outpatient settings, and they say I found this on [the] internet or WebMD." Another provider from Missouri said their patients get information from the internet "more than I realize." Providers also mentioned peers and social media as perceived main sources of information. Notably, providers were least likely to perceive their patients as receiving their STI information from providers themselves. According to a Missouri provider, patients get their information from three sources: "... probably school-based health classes, second would probably be their friends or their community center ... and then, finally, the internet seems to be more and more a source as well."

3.2. Young adults: assessment of likelihood of contracting STIs or COVID-19

Young adults were asked to assess the likelihood that they would get COVID-19 or an STI in the next year on a scale of 1–10, with one being "not at all" and 10 being "completely" (Table 3). Nearly all young adults assessed their likelihood of infection as low, averaging 3.5 and 2.8 for COVID-19 and STIs, respectively. When probed about the reason for their risk rating, young adults attributed their perception of a lower likelihood of infection to their ability to limit their exposure and take safety precautions. According to a Florida young adult, "[STIs are] kind of same reason with COVID—you can never be 100 % sure, you can always wear a condom, but that doesn't necessarily mean you will 100 % prevent it every time." Young adults stated that trust of their

Table 3

Young Adults' Self-Reported Likelihood of Infection from COVID-19 or STIs On a Scale of 1–10, with One Being Not at All and 10 Being Completely.

Likelihood of Infection Rating	COVID-19 N (Column %)	STIs N (Column %)
1–3	27 (49 %)	39 (71 %)
4–6	24 (44 %)	10 (18 %)
7–8	3 (5 %)	4 (7 %)
9–10	1 (2 %)	2 (4 %)

STIs: Sexually Transmitted Infections.

sexual partner influenced their assessment of their likelihood of getting an STI in the next year. According to a California young adult, "I have sex with a certain few men that I feel are clean and telling me the truth."

Despite being able to take precautions, many young adults felt uncertainty about COVID-19 exposure compared to STI exposure, citing an inability to trust and control the actions of others. This uncertainty and lack of control were cited as contributing factors in their rating of the likelihood of acquiring COVID-19 or STIs. For a few young adults, invulnerability permeated their perceived risk of both COVID-19 and STI exposure. For example, one young adult in California reported, "If I was going to get it, I would have gotten it by now," and another California young adult similarly said, "I haven't gotten it so far, and I feel like I've been risqué about what I'm doing." In addition, a Missouri young adult reported that their "pretty strong immune system" would prevent COVID-19: "I don't really see myself getting COVID. I now have a pretty strong immune system. I don't see it happening anytime soon."

3.3. Young adults: taking precautions for STIs and COVID-19

More young adults reported taking STI precautions than COVID-19 precautions. Some named wearing masks and using hand sanitizer as their approach to COVID-19 prevention as well as frequent handwashing and social distancing. A California young adult noted their consistent mask use due to other people being inconsistent:

"In the last month, I have made sure to wear my mask every time leaving the house, not just when around other people, because I notice a lot of people take their masks off, and then they are less likely to put them back on when others are around."

Many young adults reported using condoms in the past year to prevent STIs. According to a Louisiana young adult, "I have made sure I have my own condoms just in case anything happens." Other STI prevention behaviors included frequent STI testing ("Whenever I have had sex with somebody, you just want to know you are being safe by wearing condoms, as well as getting tested before and afterwards"), limiting sexual partners ("Another thing I do is not to have more than two partners"), and using HIV pre-exposure prophylaxis (PrEP).

3.4. Young adults: interactions with providers

Young adults were asked to rate their satisfaction with their most recent provider interaction about sexual health on a scale of 1–10, with one being "not at all satisfied" and 10 being "completely satisfied." The average rating was eight. According to a Florida young adult, "My provider [is] awesome. I love them. They deal with my complaints ... They reassure me, that although I know this information, sometimes I forget, and they diminish that human stigma. I give them a 10—a 20." Young adults who rated their care eight and higher cited the following characteristics of their encounters: feeling comfortable asking questions and talking with their non-judgmental provider, addressing their sexual healthcare needs, and learning something new. Black cisgender women were more likely to describe feeling comfortable with their provider compared to Black MSM or Latinx MSM. Relatedly, a few young adults wished their providers were more like them—gay, transgender, or that they "look like" them. For example, a Florida young adult said, "I am comfortable enough to talk with him about my sexual health and have open conversations. Maybe I would give him 10 if he was gay."

Although most young adults interviewed stated that nothing important was missing from their provider discussions, some wanted more information specific to their needs, like HIV PrEP, details about human papillomavirus, laymen's clarification of asymptomatic HIV, and how to talk to past or future partners. A Florida young adult said, "He just said 'use condoms,' [it was the] same old stuff. I had more questions to ask. They just didn't pay attention to ask." And a California young adult said, "Probably one thing I would've liked to discuss with my provider would be how to implement more safe sex practices in my sexual health life."

3.5. Providers: conversations with young adult patients

Providers were asked about their sexual health conversations with patients, shifts in messaging due to COVID-19, and how telemedicine has changed sexual health communication. Many providers described their conversations with patients as “straightforward” and “educational.” A Missouri provider explained, “I try to be very succinct with the information that we provide. We want to give our patients all of the information that we can so that the patients can make informed decisions themselves.” According to a California provider, “Directness is one of my approaches; just naming and explaining what their diagnosis is.” Yet, many providers were also cognizant of the importance of creating a supportive, non-judgmental environment for conversations to take place. According to a Florida provider “It is hard for some people to open up about sexual health. But, when you create a good rapport with the patient, you can make a big difference.” Further, some providers reported the commitment to listen closely and tailor the sexual health conversations to their patients’ needs. Two providers noted the importance of reducing patients’ guilt about STIs: “Most of the time they have some guilt associated. You don’t have to browbeat them about it,” said one California provider. Similarly, a Florida provider stated, “Try to allow them to open up. If they end up having an STI, there is a lot of guilt. [I’m] not here to judge; [I’m] here to treat.”

Providers were split on whether having sexual health conversations was harder during the pandemic—some stated conversations were more challenging, and others reported they were not. According to a Louisiana provider, “[COVID-19] has made it harder for people to access health services.” Conversely, a Missouri provider said:

“I don’t think it’s harder for us. We’re seeing patients in the clinic all day, every day; we’re busier than ever. I don’t think COVID has affected us. We are able to meet face-to-face with our patients to have that conversation in person, as well as at home with electronic information and handwritten information.”

A Florida provider referred to COVID-19 as a blessing for STI discussions: “The blessing, I mean it’s like we’re all germophobic now ... so I think it’s easier to have these conversations now because we’re all already so preoccupied with germs ... I think it’s easier for my patients to ask questions ... [and] it is easier for me to bring it up because we’re all kind of on the defense [with] COVID, so I think the conversations are easier to have, not harder.”

The inherent constraints of holding visits via telemedicine were a top reason for citing difficulty with sexual health conversations, followed by the challenges of hosting in-person visits during the pandemic. According to a Florida provider, “Most of telemedicine is a knock-off punch list—like medication refill. [I’m] not able to reinforce important questions as much as in-person.” However, the advent and increased uptake of telemedicine during the pandemic created opportunities for increased access. According to a Missouri provider, “Patients are more comfortable talking from their homes in their own setting. In order to see me, they have to go through the hospital process, which creates reluctance/embarrassment. Telehealth doesn’t create many barriers.”

3.6. Providers: message recommendations

Providers were asked, “Where and for whom do you perceive the biggest need for better sexual health messaging?” Some mentioned young adults of lower socioeconomic status need better sexual health messaging. According to a Missouri provider, “Some people don’t know that condoms are effective ... In lower socioeconomic or class areas—they have less education and [the] highest [STI] and pregnancy rates.” While “socioeconomic status” was the nomenclature used by many providers, suggested disparities included inadequate access, health literacy, confidence in the healthcare system, and social norms related to health-seeking behaviors. According to a Louisiana provider:

“With the COVID pandemic, there was more popular discussion about system and structural factors that played in COVID: structural

racism [and] capitalism, or all these things that are in the broader public conversation. I think that’s just an important piece of the consciousness-raising with sex because even with medical education, I think that [we] can protect our patients better because we can understand the structural reasons for why they are doing things, and if we can address those things, it can help. It’s not as simple as someone keeps getting chlamydia or missing their testing appointments. Participating in whatever advocacy activities we can do that connects to the broader ways that capitalism, structural racism impact patient outcomes.”

Some providers reported greater STI knowledge among gay, queer, transgender, and White populations. Many providers observed disparities in STI knowledge and behaviors among key groups. They suggested a need for better sexual health messaging that addresses systemic issues perpetuating disparities among those of lower socioeconomic status, younger individuals, immigrants, and Black individuals.

Drawing on COVID-19 messaging, providers suggested STI messaging should be simple, rapidly deployed, and consistent across multiple credible sources so that other messages do not crowd out or confuse audiences. “There was a lot of bungling with the COVID messaging. So, what we were reminded of is how consistent the message has to be. For any kind of health-related topic, the health literacy of the public is very low, or you have to assume it’s very low, and you have to make messaging clear and consistent,” said a California provider. A few providers found success encouraging young adults to take ownership in protecting others to prevent disease. According to a Missouri provider:

“This whole concept of germ/disease mentality/discussion—it is now part of the psyche in a generation of kids in a way that has never been before. The way disease can be present and visible, there are ways we can protect yourself and others by using prevention measures. That messaging—disease prevention and ownership could be applied to STI education.”

Similarly, a Louisiana provider noted the importance of focusing on the community: “I think people feel or have felt this sense of empowerment when they understand the science behind something they feel they are doing something right ... And I wonder how that might land with patients that you’re not just protecting yourself, you’re protecting your community.”

Some providers reported there were no lessons to be learned from COVID-19, with two providers saying that any messaging would be ineffective. A Florida provider offered some hope despite the concern:

“I don’t know—the best thing I can say is try and be able to explain things. Like with COVID, I try and explain the vaccine, and if I break it down, that helps. If we can give messages from people they trust and truly explain things. Sometimes, people will believe what they want to, regardless of the information. So have people they trust and break [it] down in ways they can understand and hope for the best.”

4. Discussion and conclusion

4.1. Discussion

Providers and young adults had sharply contrasting views on where young adults access health information. Providers believed their patients primarily get their information from the internet, peers, and social media, whereas young adults reported providers as their ideal source for information. Young adults also named “official” websites as primary sources, with peers and social media being some of the least trusted sources. There appears to be an opportunity for providers to further embrace the role of trusted source of STI information. While studies have found young people use social media for health information [28, 29], our findings align with studies that suggest young people feel the health information on social media is generally untrustworthy [29,30].

When asked about the likelihood of acquiring COVID-19 or an STI in the next year, nearly all young adults assessed their risk as low. Adolescents’ tendency to underestimate various risks, including those related to STIs and COVID-19, aligns with our understanding of the

neurobiological underpinnings of young people's behavior reported in the literature [3–5]. Further, greater certainty about infection status and a feeling that they could control or limit their exposure influenced young adults' lower self-reported risk assessments.

4.2. Limitations

As with any research, the results of this study should be interpreted within the parameters of the study's limitations. Individuals who chose to participate in this study may represent a population that was more interested in or familiar with the subject area or had different experiences than those who declined to participate. A concerted effort was made to recruit transgender women by leveraging trusted AHF transgender clinic contacts, high-touch individual outreach from the project leadership and advisory board's networks, and targeted recruitment via a market research firm. Several issues can hinder participation for marginalized groups, including issues of mistrust, logistical and confidentiality concerns, lack of awareness, and psychosocial/emotional concerns. Despite the effort, only five transgender women completed the interview.

Further, interviews for this study were conducted between October 2020 and October 2021. During this period, the risk of COVID-19, infection rates, availability of rapid tests and a vaccine, access to essential services, and policies varied. Finally, the number of participants in each state varied, and some demographic groups had too few responses to make comparative statements.

4.3. Conclusion

Although our study was conducted during the peak of COVID-19, we are presenting our findings in what we hope is the denouement of this pandemic. Newly published studies have analyzed COVID-19 messaging during its early stages and presented corrections to communication missteps. COVID-19 reinforced what we know about young adults' assessment of their vulnerability: they will continue to perceive low risk. However, our interviews with young adults and providers reveal opportunities to improve sexual health messaging by including concerted efforts to align multiple, trusted sources of information to reduce message variability; increase accountability for providers' critical role in affirming sexual health discussions; and support patient-driven communications to address individualized information needs on prevention, transmission, testing, and treatment.

4.4. Practice implications

Respondents from our study offered a series of potential lessons from the COVID-19 pandemic to inform sexual health messaging approaches. First, we must present STI information in a simple, consistent manner from multiple credible sources—in particular, providers. Second, providers should promote patient-driven conversations that address young people's concerns and communicate with empathy in a non-judgmental fashion. Third, we can address young people's low-risk perception by emphasizing factors both within and outside of young adults' control that can facilitate an ongoing sexually healthy life. Applying these three lessons from COVID-19 may help young people, providers, and the larger public health community curb the STI epidemic.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.pec.2024.108607](https://doi.org/10.1016/j.pec.2024.108607).

References

- [1] Centers for Disease Control and Prevention. Sexually transmitted disease surveillance 2021. US Department of Health and Human Services. 2023. (https://www.cdc.gov/std/statistics/2022/2021-STD-Surveillance-Report-PDF_ARC_HIVED-2-16-24.pdf) [accessed 13 November 2024].
- [2] Byrnes JP. The development of decision-making. *J Adolesc Health* 2002;31(6): 208–15. [https://doi.org/10.1016/s1054-139x\(02\)00503-7](https://doi.org/10.1016/s1054-139x(02)00503-7).
- [3] Casey BJ, Jones RM. Neurobiology of the adolescent brain and behavior: Implications for substance use disorders. *J Am Acad Child Adolesc Psychiatry* 2010;49(12):1189–201. <https://doi.org/10.1016/j.jaac.2010.08.017>.
- [4] Szucs LE, Pampati S, Li J, Copen CE, Young E, Leonard S, et al. Role of the COVID-19 pandemic on sexual behaviors and receipt of sexual and reproductive health services among U.S. high school students — Youth Risk Behavior Survey, United States, 2019–2021. *MMWR Suppl* 2023;72(1):55–65. <https://doi.org/10.15585/mmwr.su7201a7>.
- [5] American Psychological Association. Literature review report: Youth risk perception and decision-making related to health behaviors in the COVID-19 era. 29 January 2021. (<https://www.apa.org/topics/covid-19/youth-risk-perception.pdf>) [accessed 13 November 2024].
- [6] Lindberg LD, Kantor LM. Adolescents' receipt of sex education in a nationally representative sample, 2011–2019. *J Adolesc Health* 2022;70(2):290–7. <https://doi.org/10.1016/j.jadohealth.2021.08.027>.
- [7] Shannon CL, Klausner JD. The growing epidemic of sexually transmitted infections in adolescents: a neglected population. *Curr Opin Pediatr* 2018;30(1):137–43. <https://doi.org/10.1097/MOP.0000000000000578>.
- [8] Youth STIs: an epidemic fuelled by shame. *Lancet Child Adolesc Health* 2022;6(6): 353. [https://doi.org/10.1016/S2352-4642\(22\)00128-6](https://doi.org/10.1016/S2352-4642(22)00128-6).
- [9] Cocci A, Giunti D, Tonioni C, Cacciamani G, Tellini R, Polloni G, et al. Love at the time of the Covid-19 pandemic: preliminary results of an online survey conducted during the quarantine in Italy. *Int J Impot Res* 2020;32(5):556–7. <https://doi.org/10.1038/s41443-020-0305-x>.
- [10] Shilo G, Mor Z. COVID-19 and the changes in the sexual behavior of men who have sex with men: Results of an online survey. *J Sex Med* 2020;17(10):1827–34. <https://doi.org/10.1016/j.jsxm.2020.07.085>.
- [11] Nadarzynski T, Nutland W, Samba P, Bayley J, Witzel TC. The impact of first UK-wide lockdown (March–June 2020) on sexual behaviors in men and gender diverse people who have sex with men during the COVID-19 pandemic: a cross-sectional survey. *Arch Sex Behav* 2023;52(2):617–27. <https://doi.org/10.1007/s10508-022-02458-6>.
- [12] Ellis E.G. Covid-19 can't stop people from looking for love (or hookups). *Wired*. 12 March 2020. (<https://www.wired.com/story/dating-apps-coronavirus-covid-19/>) [accessed 13 November 2024].
- [13] Plescia M., Ruebush E. In the shadows of COVID-19, a devastating epidemic rages on. *Health Affairs*, 13 July 2020. (<https://www.healthaffairs.org/content/forefront/shadows-covid-19-devastating-epidemic-rages>) [accessed 13 November 2024].
- [14] Zhang X, Sherman L, Foster M. Patients' and providers' perspectives on sexual health discussion in the United States: a scoping review. *Patient Educ Couns* 2020; 103(11):2205–13. <https://doi.org/10.1016/j.pec.2020.06.019>.
- [15] Hoopes AJ, Benson SK, Howard HB, Morrison DM, Ko LK, Shafii T. Adolescent perspectives on patient-provider sexual health communication: a qualitative study. *J Prim Care Community Health* 2017;8(4):332–7. <https://doi.org/10.1177/2150131917730210>.
- [16] Pask EB, Wu QL. Let's (not) talk about sexual health: how sexual communication apprehension with healthcare providers and peer communication influence intentions to protect sexual health. *Patient Educ Couns* 2024;126. <https://doi.org/10.1016/j.pec.2024.108318>.
- [17] Kelder I, Sneijder P, Klarenbeek A, Laan E. Communication practices in conversations about sexual health in medical healthcare settings: a systematic

- review. *Patient Educ Couns* 2022;105(4):858–68. <https://doi.org/10.1016/j.pec.2021.07.049>.
- [18] Flynn KE, Whicker D, Lin L, Cusatis R, Nyitray A, Weinfurt KP. Sexual orientation and patient-provider communication about sexual problems or concerns among US adults. *J Gen Intern Med* 2019;34:2505–11. <https://doi.org/10.1007/s11606-019-05300-3>.
- [19] Nah M, Hughto JMW, Austin SB, Goldman RE, Potter J, Agenor M. Promoting equitable sexual health communication among patients with minoritized racial/ethnic, sexual orientation, and gender identities: Strategies, challenges, and opportunities. *SSM* 2024;344. <https://doi.org/10.1016/j.socscimed.2024.116634>.
- [20] Centers for Disease Control and Prevention. Health equity. 22 April 2024. (<https://www.cdc.gov/sti/php/projects/health-equity.html>) [accessed 13 November 2024].
- [21] US Department of Health and Human Services. Sexually transmitted infections national strategic plan for the United States: 2021–2025. 2020. (<https://www.hhs.gov/sites/default/files/STI-National-Strategic-Plan-2021-2025.pdf>) [accessed 13 November 2024].
- [22] National Academies of Sciences, Engineering, and Medicine. Sexually transmitted infections: Adopting a sexual health paradigm. 2021. <https://doi.org/10.17226/25955> [accessed 13 November 2024].
- [23] Centers for Disease Control and Prevention. Sexually transmitted disease surveillance 2019. US Department of Health and Human Services. 2021. (<https://www.cdc.gov/std/statistics/2019/std-surveillance-2019.pdf>) [accessed 13 November 2024].
- [24] Sullivan PS, Peterson J, Rosenberg ES, Kelley CF, Cooper H, Vaughan A, et al. Understanding racial HIV/STI disparities in black and white men who have sex with men: a multilevel approach. *PLOS ONE* 2014;9(3). <https://doi.org/10.1371/journal.pone.0090514>.
- [25] McCree DH, Williams AM, Chesson HW, Beer L, Jeffries WL, Lemons A, et al. Changes in disparities in estimated HIV incidence rates among Black, Hispanic/Latino, and White men who have sex with men (MSM) in the United States, 2010–2015. *JAIDS* 2019;81(1):57–62. <https://doi.org/10.1097/QAI.0000000000001977>.
- [26] Dillon T, Arayasirikul S, Xie H, Sicro S, Meza J, Bella M, et al. Disparities in sexually transmitted infection testing and the need to strengthen comprehensive sexual health services for trans women. *Transgend Health* 2022;7(3). <https://doi.org/10.1089/trgh.2020.0133>.
- [27] Centers for Disease Control and Prevention. Health disparities in Black or African American people. Health disparities in HIV, viral hepatitis, STDs, & tuberculosis. 17 January 2024. (<https://www.cdc.gov/health-disparities-hiv-std-tb-hepatitis/populations/black-african-american.html>) [accessed 13 November 2024].
- [28] Lim MSC, Molenaar A, Brennan L, Reid M, McCaffrey T. Young adults' use of different social media platforms for health information: insights from web-based conversations. *JMIR* 2022;24(1). <https://doi.org/10.2196/23656>.
- [29] Hausmann JS, Touloumtzis C, White MT, Colbert JA, Gooding HC. Adolescent and young adult use of social media for health and its implications. *J Adolesc Health* 2017;60(6):714–9. <https://doi.org/10.1016/j.jadohealth.2016.12.025>.
- [30] Freeman JL, Caldwell PHY, Scott KM. How adolescents trust health information on social media: a systematic review. *Acad Pedia* 2023;23(4):703–19. <https://doi.org/10.1016/j.acap.2022.12.011>.