



Contents lists available at ScienceDirect

Exploratory Research in Clinical and Social Pharmacy

journal homepage: www.elsevier.com/locate/rcsop

Community pharmacist engagement in HIV and HCV prevention: Current practices and potential for service uptake

KariLynn Dowling-McClay^{a,*}, Stephanie M. Mathis^b, Nicholas Hagemeyer^a^a East Tennessee State University Bill Gatton College of Pharmacy, Box 70657, Johnson City, TN 37614, USA^b East Tennessee State University College of Public Health, Box 70623, Johnson City, TN 37614, USA

ARTICLE INFO

Article history:

Received 29 June 2021

Received in revised form 10 October 2021

Accepted 25 October 2021

Keywords:

HIV
Hepatitis C
Nonprescription syringe
Community pharmacy
Pharmacist
Prevention

ABSTRACT

Background: The central Appalachian region is at an elevated risk for HIV/HCV outbreaks, primarily due to injection drug use. Regional risk assessments highlight gaps in the evidence-based continuum of primary, secondary, and tertiary prevention strategies to minimize HIV/HCV transmission. One potential strategy for increasing the reach of HIV/HCV prevention efforts in rural areas is through provision of services at community pharmacies.

Objective: To qualitatively describe community pharmacists' HIV/HCV-related prevention behaviors, attitudes, and beliefs in a 3-state central Appalachian region.

Methods: Key informant interviews were conducted with 15 practicing community pharmacists. Theory of Planned Behavior-based questions probed for perceptions about the role of pharmacies in preventing and reducing HIV/HCV outbreaks in rural areas through activities such as syringe services, screening for HIV/HCV, and linking people to treatment when appropriate. Investigators applied thematic analysis to deductively and inductively generate themes from the interview transcripts.

Results: Two overarching themes regarding pharmacist engagement in HIV/HCV-related prevention services were generated: 1) current approaches to primary prevention through nonprescription syringe sales (e.g., gatekeeping behaviors) and 2) potential for uptake of the continuum of HIV/HCV-related prevention services in community pharmacies. Future engagement of community pharmacists in the continuum of HIV/HCV-related prevention services comprised 2 subthemes as possible underlying factors: general and specific willingness to provide services and perceived fit within the pharmacy profession.

Conclusions: Central Appalachian community pharmacists express a general willingness to help patients who may benefit from HIV/HCV-related prevention services, but current engagement, willingness, and perceived fit for offering specific prevention services in the community pharmacy setting is variable. This has potential immediate implications, such as prioritizing the introduction of more widely accepted services (e.g., provision of HIV/HCV-related prevention education) to community pharmacy practice, and longer-term implications, such as the integration and framing of HIV/HCV-related prevention services as helping behavior within the pharmacist professional identity.

1. Introduction

Detection and treatment strategies for human immunodeficiency virus (HIV) and hepatitis C virus (HCV) have advanced remarkably in the past several decades.^{1,2} Despite these advances, nearly 40,000 new HIV diagnoses³ and an estimated 50,000 acute HCV cases⁴ occur annually in the United States (U.S.), placing significant clinical and economic burdens on public health and health systems.^{5,6} Regional risk of HIV and HCV transmission is not uniform. Recent increases in acute HCV infections are largely attributable to increased injection of prescription and illicit opioids, mainly in rural areas such as Appalachia—the 13-state region spanning southern New York to northern Mississippi^{7,8}—and particularly in the highly rural and economically distressed central Appalachian subregion.⁹ Of the 220

counties identified by the Centers for Disease Control and Prevention (CDC) as most vulnerable to HIV/HCV outbreaks, 147 (67%) are located within the central Appalachian states of Kentucky, North Carolina, Ohio, Tennessee, Virginia, and West Virginia.¹⁰ High national incidence rates and regional risk assessments highlight gaps in the evidence-based continuum of primary, secondary, and tertiary prevention strategies to minimize HIV/HCV transmission.^{1,10,11}

The World Health Organization (WHO) has established ambitious goals to end the HIV/AIDS epidemic and eliminate viral hepatitis as a public health threat by 2030.^{12,13} Primary prevention measures, or interventions that reduce risk factors for the onset of a disease,¹⁴ can be targeted to individuals at risk for HIV/HCV exposure and are a cornerstone of the WHO strategies.^{12,13} Of particular concern in the U.S. is injection drug use, a

* Corresponding author.

E-mail addresses: dowlingk1@etsu.edu (K. Dowling-McClay), mathiss@etsu.edu (S.M. Mathis), hagemeyer@etsu.edu (N. Hagemeyer).

risk behavior present in the majority of acute HCV cases,⁴ and a growing proportion of new HIV diagnoses.^{3,15} One primary prevention approach that has been studied extensively is the provision and/or exchange of needles and syringes for people who inject drugs (PWID).^{16,17} Syringe services programs (SSPs), which often provide services beyond syringe distribution (e.g., HIV/HCV screening), can reduce risky behavior and HIV/HCV transmission among PWID.^{18–22} While studies of SSPs have largely been in urban areas where they tend to cluster, their effectiveness in rural regions remains inadequately explored.^{23–25}

Mathematical models demonstrate that primary prevention efforts are necessary, but insufficient alone, to reach the WHO 2030 goals.^{11,26,27} Approximately 15% of individuals living with HIV are unaware of their seropositive status; this group accounts for nearly 40% of all HIV transmissions in the U.S.²⁸ Approximately 50% of patients who develop chronic HCV are similarly unaware of their diagnosis,²⁹ largely due to the asymptomatic nature of acute infection.³⁰ Secondary prevention measures, designed to facilitate early identification of a disease through screening,¹⁴ must be implemented to identify individuals with existing infections and connect them to appropriate treatment.³¹ Despite CDC recommendations for universal screening of high-risk individuals at regular intervals,^{30,32} participation in HIV/HCV screening is generally suboptimal, including among PWID.^{25,31} Studies on the provision of HIV/HCV screening services for PWID in rural America are likewise very limited.²⁴

Screening for HIV/HCV is effective only if it results in linkage to tertiary prevention—methods aimed at preventing disease progression and adverse outcomes after diagnosis¹⁴—in the form of antiviral medication therapy.³¹ HIV requires life-long viral suppression therapy.²⁵ Current preferred regimens for HCV are curative in 8 to 24 weeks, although patients remain susceptible to reinfection as long as risk factors are still present.²⁵ Pharmacologic management approaches for HIV and HCV are divergent, but the tertiary prevention principles are the same: high levels of antiviral adherence are necessary to achieve an ideal therapeutic response,³³ and adequate viral suppression minimizes transmission.²⁵ Similar to primary and secondary prevention efforts, research on HIV/HCV treatment delivery in rural regions is lacking.³⁴

Numerous gaps in the continuum of care for HIV and HCV have been identified in the United States,^{29,35} and particularly in rural care settings.^{25,34} To reduce HIV/HCV-related morbidity and mortality in the Appalachian region, a comprehensive approach of accessible prevention, detection, and treatment strategies is needed.^{11,25,36} One potential strategy for increasing the reach of HIV/HCV prevention efforts in rural areas is through provision of services at community pharmacies.^{37–39} With more than 60,000 community pharmacies in the US⁴⁰ and approximately 90% of Americans living within 5 miles of a pharmacy,⁴¹ pharmacists may be considered the most accessible health care providers, particularly in rural communities with limited health care resources. Studies have explored pharmacist engagement in all levels of HIV/HCV prevention to varying degrees, particularly primary prevention via the distribution of sterile syringes to PWID. Community pharmacy involvement in syringe distribution and collection in the U.S. is again primarily concentrated in urban areas.^{42,43} A systematic review and meta-analysis of the effectiveness of pharmacy-based syringe programs found they effectively decrease risky injection behaviors, but the impact of pharmacy-based primary prevention efforts on HIV/HCV prevalence is uncertain due to limited evidence.⁴⁴ In community pharmacy-based SSP literature, some pharmacists perceive a benefit in primary prevention strategies, whereas others believe denying PWID syringes will reduce substance misuse in the community.^{45–50} Community pharmacist engagement in secondary and tertiary prevention efforts for HIV/HCV has been investigated to a lesser extent, often in approaches combining screening and referral to infectious disease treatment.^{51,52} Across all levels of HIV/HCV prevention literature, variations in pharmacists' attitudes and beliefs, perceived barriers, and engagement in services emerge.^{51–53} Despite the potential for pharmacists to address gaps in the HIV and HCV continuums of care,^{54,55} limited research has been conducted on their engagement in a rural context.

Research is needed to understand the feasibility of pharmacy-based HIV/HCV prevention services in rural areas. To our knowledge, no published studies have qualitatively evaluated pharmacists' perceptions of and engagement in HIV/HCV-related prevention in more than one state and across levels of prevention. The objective of this qualitative study was to describe community pharmacists' HIV/HCV-related prevention behaviors, attitudes, and beliefs in a 3-state central Appalachian region.

2. Methods

2.1. Study setting and participants

A qualitative study consisting of key informant interviews with 15 practicing community pharmacists in select counties across 3 states—North Carolina (N.C.), Tennessee (T.N.), and Virginia (V.A.)—was conducted. Specifically, the study area was defined as counties in the rural, primarily Appalachian health department regions in close proximity to the study center of [institution redacted for review]. The regions included: Health Department Regions 1 and 2 in North Carolina; the East, Northeast, and Sullivan Health Department Regions of Tennessee; and the Alleghany, Central Shenandoah, Cumberland, Mount Rogers, New River, Lenowisco, and West Piedmont Health Districts of Virginia (non-Appalachian counties excluded) (Fig. 1). In August 2017, a sampling frame was constructed using the directories of all operating pharmacies in each state. The directories were obtained from the state boards of pharmacy, manually reduced to the target counties and pharmacy practice types (i.e., outpatient community pharmacies operating independently, in chains, or in grocery stores), and randomized. Using the sampling frame, trained graduate students affiliated with the [redacted] contacted pharmacists by telephone until 5 pharmacists from each state agreed to participate. While reasons for non-participation were not collected, a total of 21 pharmacists from NC, 11 from T.N., and 15 from V.A. were contacted to achieve the target sample size.

2.2. Data collection

Face-to-face interviews were conducted using a semi-structured key informant interview guide from November 2017 to February 2018. The instrument, based on the study aims and Theory of Planned Behavior,⁵⁶ was pilot tested with 2 pharmacy and 2 public health faculty from the researchers' institution and subsequently revised (Appendix A). Questions probed for current engagement in nonprescription syringe sales and thoughts on the role of pharmacies in preventing and reducing HIV/HCV outbreaks in rural areas through activities such as syringe services, screening for HIV/HCV, and linking people to treatment when appropriate. The interviews took place in a public location of the pharmacist's choice within their geographic area of practice (e.g., fast food restaurant or coffee shop). On average, the interviews lasted 25 min, with a range of 17 to 46 min. Two researchers (KD, NH) agreed that the twelfth interview achieved saturation, but interviews continued as planned to maintain equal representation across states. The interviews were audio-recorded, with unstructured field notes taken by the interviewer at their discretion. The associated audio files were securely uploaded to a professional transcription service following each interview, and the resulting transcripts were de-identified.

Two researchers primarily conducted the interviews, one of whom was a female pharmacy research fellow (K.D.; PharmD) and one of whom was a male graduate student in sociology (J.B.; M.A. candidate). Each researcher completed a practice interview (real or simulated) under the observation of an experienced researcher before conducting interviews independently. The first researcher (KD) conducted 12 interviews in 3 states (5-VA; 4-TN; 3-NC) and supervised an additional interview in one state (T.N.). The second researcher (JB) conducted 3 interviews in 2 states (1-TN; 2-NC). Graduate students observed a subset of interviews for training purposes. The researchers did not have pre-existing relationships with any pharmacists, and limited information about their personal characteristics was provided. Pharmacists were briefly informed about the topic and principal investigator (NH) of the study during recruitment. At the onset of the interview,

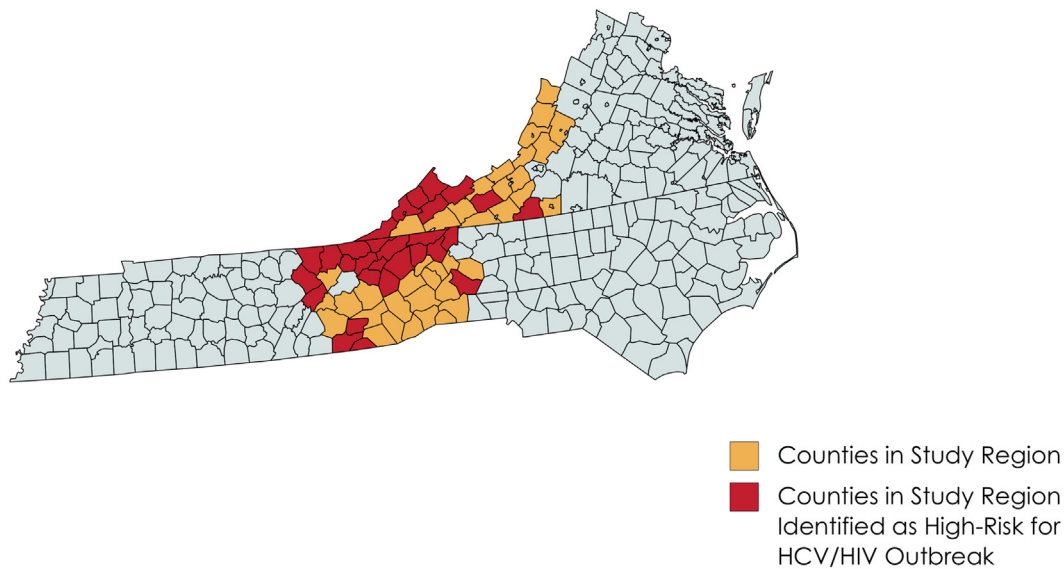


Fig. 1. The study region in North Carolina, Tennessee, and Virginia. Figure created at <https://mapchart.net>.

additional information about the study was briefly provided, including the purpose and that participation was voluntary and confidential. Written informed consent was obtained from participants. A cash payment (99 USD) was used to incentivize participation. This incentive was deemed reasonably comparable to U.S. pharmacists' average hourly wage of approximately 60 USD⁵⁷ for the time spent arranging, traveling to, and completing the interview. The [redacted] Institutional Review Board approved the study.

2.3. Data analysis

Two researchers (KD, S.M.) applied thematic analysis to deductively and inductively generate themes.^{58,59} One researcher (SM) derived a collection of codes from the study aims, interview guide, and independent reading of all transcripts. A coding frame inclusive of code descriptions and illustrative quotes was constructed. After refining the coding frame through open discussion, the researchers independently coded 2 randomly selected transcripts using it. They discussed and resolved coding discrepancies by consensus, contributing to the additional refinement of the coding frame to reduce ambiguity and enhance coding consistency.⁶⁰ The revisions yielded a total of 13 parent nodes, most of which included 2 or more child nodes and, for select child nodes, sub-child nodes. Using the revised coding frame, the researchers independently coded all transcripts. After coding approximately 2 transcripts, they resolved coding discrepancies by consensus. One researcher (SM) also applied consensus-driven coding to a “master” set of transcripts. Using the “master” set, the researchers independently reviewed the coded data. They met regularly over a period of roughly one year to discuss the coded data and generate themes by consensus. The themes were reviewed in comparison to the data, with recoding performed when warranted. The researchers further refined the themes and developed consensus-driven definitions and titles for each.^{58,59} As an additional layer of quality assurance, a third researcher (NH) with qualitative research experience reviewed the theme definitions and was available to resolve discrepancies throughout the data analysis, though consensus was consistently achieved. QSR International's NVivo 10 Software supported data analysis,⁶¹ while reporting was guided by the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist.⁶²

3. Results

Two overarching themes were generated regarding pharmacist engagement in HIV/HCV-related prevention services: current approaches to primary prevention through nonprescription syringe sales and potential for

uptake of HIV/HCV-related primary, secondary, and tertiary prevention services in community pharmacies (Table 1). Below, participants are identified by interview number, state, and community pharmacy type. The demographic characteristics of participants are also presented in Table 2.

3.1. Theme 1. Existing practices: Gradations of gatekeeping

A behavioral status quo emerged in pharmacists' engagement in nonprescription syringe sales as primary prevention of HIV/HCV. Pharmacists frequently described behaviors that functioned as gatekeeping mechanisms to restrict or prohibit sales of nonprescription syringes to individuals known or suspected to be people who inject drugs (PWID).

“What I typically do is request some type of verification that they have a prescription that requires a needle. Where I work is a tourist area, it's not uncommon for people to say, “I left my needles at home. I have my insulin, what can I do?” In that case, if they don't get it filled in my chain pharmacy where I'm able to see a record, then I request to see the bottle with the label, or I usually call their pharmacy if they're able to share that information.” (Pharmacist 3, T.N., Grocery).

Although the degree of engagement in specific gatekeeping behaviors varied across pharmacists, gatekeeping in general enforced specific criteria that were to be met by the person requesting syringes, such as “we have to have a prescription, you have to have an I.D.” (Pharmacist 8, V.A., Chain), or imposed limitations on the potential purchase. As one pharmacist stated, “I don't sell them cheaply. It's the break I've used in my brain to keep me from being a place that everybody comes to for them” (Pharmacist 11, N.C., Independent).

Pharmacists' descriptions of gatekeeping behaviors were not only self-reflective. Observations extended to other pharmacists' engagement in nonprescription syringe sales, often with normative undertones, as one pharmacist said of her coworkers: “We have a very similar stance on it. That is very positive” (Pharmacist 10, NC, Independent). To some extent, pharmacists discussed gatekeeping behaviors among pharmacists at other pharmacies or generalized to the profession at large. “I think a lot of pharmacists either will only dispense them with prescriptions, or they want proof, quote-unquote, “That the person uses insulin” (Pharmacist 12, VA, Independent).

Gatekeeping behaviors were conveyed as a mechanism exhibited not only directly by pharmacists but also indirectly through pharmacist influence on support staff. The behavioral status quo of support staff when engaging in nonprescription syringe sales commonly revolved around the pharmacist, such that support staff would reportedly “follow the lead”

Table 1
Engagement in HIV/HCV-related prevention services: Themes.

Theme	Example Quote
<i>Theme 1. Existing practices: Gradations of gatekeeping.</i> The behavioral status quo of pharmacists when engaging with non-prescription syringe sales.	I know that we keep a log. At this particular store, not necessarily [GROCERY STORE] company wide, but if we have somebody that we know we're good with dispensing the syringes, having them fill out the log book. If we do not know you and you start out a conversation, "My grandmother needs this," or whatever, then we ask them what kind of insulin, especially if they say insulin. "What kind of insulin do you use? How many units?" Ask them as many questions as we can, and it probably doesn't go much further than that. If they still are persistent, we tell them we'd be glad to call their physician and get a prescription for them. We're hard nosed here. (Pharmacist 5, TN, Grocery)
<i>Theme 2. Potential for prevention service uptake.</i> Perceptions that could underlie engagement in the provision of HIV/HCV-related prevention services by pharmacists or within pharmacies.	It could be an area where the pharmacists could be very useful because we're the most accessible healthcare providers. We could be useful in some type of, maybe point of care testing or something like that to help identify the patients. I think it could be something that would be very beneficial to the community, because we're everywhere. Patients can come in and see us at any time. There are always barriers, time constraints and things like that, but in general pharmacy is pretty willing to accept responsibilities for things that can help patient care. (Pharmacist 14, NC, Chain)
<i>Subtheme 2a. Willingness.</i> Pharmacists' willingness to perform various HIV/HCV-related prevention services.	I believe that pharmacies would be a great place for it. I believe pharmacies would be happy to participate in this kind of thing because most pharmacists really don't like being part of the problem. We want to be part of the solution. (Pharmacist 10, NC, Independent)
<i>Subtheme 2b. Perceived fit.</i> The extent to which pharmacists consider the delivery of HIV/HCV-related prevention services to be a fit for the pharmacy profession.	I think pharmacies are a very important access point to patients. It's a huge source of free advice. People come to us before they go to a health clinic because we're free and easy and easily accessible. The more further into southwest [Virginia] it might be a little better because you're going to have more independent pharmacy access where if you try to work with some of the chains, a lot of the chains, such as our own, are very hesitant to be groundbreakers and I could see trying to implement a program like that into a chain or a retail mass merchandiser being a challenge, but overall pharmacies are patient perceived as ease of access. (Pharmacist 6, VA, Chain)

(Pharmacist 5, T.N., Grocery) of a pharmacist or refer the nonprescription syringe request to a pharmacist.

"They know the questions that I would normally ask, so the first thing they do is if the patient's unknown to them they look on our medication profile to see if they've filled an insulin and have a legitimate need. If they can't see one, then they ask them where that insulin supposedly came from. They would normally at that point come and contact me to see if we wanted to follow that lead further, try and call the other pharmacy, or try and investigate it more." (Pharmacist 2, T.N., Grocery).

3.2. Theme 2. Potential for prevention service uptake

In addition to current nonprescription syringe sale behaviors, pharmacists discussed the potential for the engagement of pharmacists and

Table 2
Demographic characteristics of participants (N = 15).

Characteristic	Category	Number (%)
State	North Carolina	5 (33)
	Tennessee	5 (33)
	Virginia	5 (33)
Pharmacy Practice Type	Chain	4 (27)
	Grocery store	3 (20)
	Independent	7 (47)
	Outpatient clinic-based	1 (7)
Gender	Female	9 (60)
	Male	6 (40)

pharmacies in the continuum of HIV/HCV-related prevention services. Two subthemes emerged as factors that may underlie the provision of these services in community pharmacies: willingness and perceived fit.

3.2.1. Subtheme 2a. Willingness

In general, pharmacists expressed willingness to help patients who may benefit from HIV/HCV-related prevention services, as indicated by one pharmacist: "Something needs to be done across the board. Pharmacists are in a good position to identify patients that need help. I'm supportive of anything that we can do to help because it seems to be an out of control issue" (Pharmacist 4, VA, Chain).

Beyond broad expressions of willingness, the actual degree of willingness varied at times by type of service. Generally, cognitive services (e.g., provision of education, informational handouts, and referrals for services) were described favorably by pharmacists: "Pharmacies, we can provide education" (Pharmacist 1, T.N., Independent). Less willingness was expressed for hands-on clinical services: "It would be hard for us to screen for the HIV and Hep" (Pharmacist 7, V.A., Independent).

Direct provision of syringes was supported by approximately half of the pharmacists. As one pharmacist explained, "I'm personally good with selling syringes. I think everybody should" (Pharmacist 11, NC, Independent). However, the level of willingness for direct syringe provision potentially hinged on minimal contact with the person requesting the syringes. As another stated, "I don't want to spend a lot of time with those interactions" (Pharmacist 15, NC, Independent). Multiple pharmacists further described a preference for syringe distribution methods that involved no direct interaction, such as a "vending machine" (Pharmacist 1, T.N., Independent), or required only a brief, targeted interaction, such as "some sort of protocol [that] could be set up where there's... no questions asked like a drug disposal" (Pharmacist 8, VA, Chain). Despite a desire for minimal interpersonal contact, pharmacists who supported direct syringe provision generally viewed this prevention service as beneficial: "But if we can help one person, or if any one person knows that they can do this and they come to us and we can help, then isn't that still worth it?" (Pharmacist 15, N.C., Independent).

3.2.2. Subtheme 2b. Perceived fit

A separate but complementary factor to pharmacists' willingness was the extent to which they considered the provision of HIV/HCV-related prevention services to be a fit for the pharmacy profession. Fit was generally gauged at 2 levels—fit with the organizational properties of a pharmacy and fit with the professional identity of a pharmacist.

Statements of organizational fit were particularly prominent, with pharmacists frequently citing the public accessibility of community pharmacies and describing pharmacists as "the most accessible healthcare providers" (Pharmacist 14, N.C., Chain) who "may be the only people that see some of these drug users" (Pharmacist 9, T.N., Independent). Community pharmacy type (i.e., chain or independent) also figured into pharmacists' descriptions of organizational fit: "Again, your independents are going to have a better chance of doing that, or your small retail chains like your [grocery store] that are a regional chain you might be able to do more with than your national chains that are hesitant from a legal standpoint" (Pharmacist 6, VA, Chain). While pharmacy organizational fit was generally cast in a

positive light, statements of pharmacist professional identity fit were more varied. Expressions of professional identity fit ranged from enthusiasm (e.g., “I would love to do that in my pharmacy. The thing is we don't get used enough for our clinical knowledge.” [Pharmacist 10, NC, Independent]) to resistance: “It seems like a larger fix should be taken before it comes to me being the gatekeeper, I guess, where it's me solving the problem of somebody's drug addiction. There are many other places where their drug addiction could be either treated or prevented before it gets to me at a local community pharmacy” (Pharmacist 2, TN, Grocery).

4. Discussion

This manuscript describes a thematic analysis of key informant interviews that explored community pharmacists' HIV/HCV-related prevention service perceptions and behaviors in the central Appalachian regions of N.C., TN, and V.A. To our knowledge, this is the first study to qualitatively examine pharmacists' engagement in HIV/HCV services across the prevention continuum in more than one state. Notably, the study was conducted in a rural region with multiple counties considered vulnerable to HIV/HCV outbreaks.¹⁰ The Theory of Planned Behavior-based interview guide elicited pharmacists' attitudes, subjective norms, perceived behavioral control, behavioral intent, and actual behaviors regarding HIV/HCV-related prevention services. Themes included the behavioral status quo of pharmacists when engaging in nonprescription syringe sales for the primary prevention of HIV/HCV and pharmacist perceptions that potentially underlie the uptake of the continuum of HIV/HCV-related primary, secondary, and tertiary prevention services in community pharmacies.

In health care, gatekeeping behavior is observed when health professionals regulate resources for medical, legal, fiscal, or moral reasons. Their scope of practice grants them exclusive discretion over a good or service.⁶³ In the context of this study, gatekeeping was a frequently described method to restrict or prohibit sales of nonprescription syringes to individuals known or suspected to be PWID. While syringe gatekeeping was enforced at various degrees and with a variety of methods, it appeared to be perceived as a norm within the practice of community pharmacy at large, even if those norms were not directly reflected in the pharmacist's approach to nonprescription syringe sales. Furthermore, the specific approach to nonprescription syringe sales, hence gatekeeping behaviors, may be normative among pharmacists and staff within a single pharmacy. Pharmacists frequently described a hierarchical influence on support staff, who “follow the lead” of the pharmacist or refer nonprescription syringe requests to them, indicating support staff potentially serve as an extension of the pharmacist's gatekeeper role. These findings suggest that interventions to reduce gatekeeping and improve nonprescription syringe access for PWID should target pharmacists for pharmacy-level normative changes and include support staff, who may serve as the first or only line of interaction with PWID at the pharmacy counter.

Pharmacists generally expressed willingness to help patients who may benefit from HIV/HCV-related prevention services, but what they supported within the prevention continuum was variable, suggesting that what pharmacists frame as helping behavior in the HIV/HCV prevention domain may differ substantially. Therefore, when promoting the uptake of HIV/HCV-related prevention services in community pharmacies, it may be advisable to start with the most universally accepted services first, such as the provision of educational materials and referral to external services, rather than services pharmacists expressed less outright willingness to perform, such as HIV/HCV point-of-care testing and nonprescription syringe provision. Interestingly, the provision of educational materials on HIV/HCV prevention was not explicitly probed for yet frequently emerged as a point of discussion, potentially offering additional support for its acceptability as a pharmacy service.

Approximately half of the pharmacists supported the direct provision of syringes through pharmacies. This is potentially at odds with the gatekeeping behaviors described in pharmacists' current approaches to nonprescription syringe sales. However, the preference toward minimal-contact distribution may indicate that pharmacists who are not opposed to

providing nonprescription syringes to PWID aim to avoid potential discomfort or inconvenience accompanying sales of sterile injection equipment through a typical pharmacy counter transaction. Therefore, pharmacists may be more amenable to nonprescription syringe distribution methods that are streamlined to remove requirements for proof of need and other gatekeeping methods that lengthen the interaction with the patient.

Statements of perceived fit revealed both modifiable and nonmodifiable factors underlying potential uptake of HIV/HCV-related prevention services. Pharmacy organizational fit (e.g., pharmacy type) may guide the prioritization of settings for promotional campaigns, demonstration projects, or other efforts to increase community pharmacy uptake of HIV/HCV-related prevention services. Fit of HIV/HCV-related prevention services with pharmacist professional identity is potentially modifiable, but also potentially a slower, longer-term undertaking that may be rooted in the early formation of professional identity during pharmacy education.⁶⁴ Even so, there is precedent for widespread adoption of services previously considered outside the traditional scope of community pharmacy practice. Pharmacy-based immunization, for example, accelerated from the first national training programs offered in 1996 to adoption in all states' pharmacy practice acts by 2009.⁶⁵

This thematic analysis intended to assess to what extent community pharmacies and pharmacists in central Appalachia are primed to uptake HIV/HCV-related prevention services. The intent was not to address factors that may influence the degree of participation in current and future prevention practices, including state-specific policies, pharmacy resources, pharmacist training, and personal knowledge, attitudes, and beliefs about HIV/HCV and injection drug use, nor was the study designed to detect differences in pharmacists' priming for HIV/HCV-related prevention service uptake by geographic location, pharmacy setting, or personal characteristics. Further investigation into barriers and facilitators to pharmacist participation in HIV/HCV-related prevention services is warranted to inform interventions that aim to improve service delivery in the community pharmacy setting and reduce HIV/HCV-related morbidity and mortality, particularly in rural areas.

This research has several limitations. First, while the focus on central Appalachia was intentional due to the highly rural population and the elevated regional risk for HIV/HCV outbreaks, the findings may not be generalizable to other subregions of Appalachia (e.g., northern or southern Appalachia) and rural communities outside of Appalachia (e.g., the rural Midwest). Additionally, while efforts were undertaken to make participants comfortable (e.g., informed consent regarding confidentiality, interviewing at a location of the pharmacist's choosing), the possibility of social desirability bias in the self-reported answers cannot be ruled out given the public interview settings and the potentially uncomfortable nature of discussing nonprescription syringe dispensing to PWID. Furthermore, even though the monetary incentive was designed to be reasonably comparable to average hourly earnings for pharmacists in the U.S., the value of 99 USD may have disproportionately influenced desire to participate, particularly in a region where some of the lowest and highest median hourly wages for pharmacists working in nonmetropolitan areas are reported (2018 median estimates: 40.60 USD to 67.28 USD per hour).⁶⁶ Thus, the findings may over- or underrepresent perspectives from various subregions of the study area. Finally, in focusing on the primary, secondary, and tertiary prevention measures that are common between HIV and HCV, additional HIV prevention measures such as pre-exposure prophylaxis (PrEP) and post-exposure prophylaxis (PEP) regimens to prevent infection before or after the known or suspected risk of exposure to HIV were not discussed.⁶⁷ PrEP and PEP are important components of the complete HIV prevention and care continuum and warrant further investigation in the community pharmacy setting.^{55,67}

5. Conclusions

Central Appalachian community pharmacists' engagement in HIV/HCV-related prevention services is variable, as is their willingness and perceived fit for offering HIV/HCV-related prevention services in the community pharmacy setting in the future. The frequently described, potentially

normative practice of nonprescription syringe gatekeeping is concerning given the regional risk for HIV/HCV and the urgent need for accessible prevention services across the continuum. However, it is promising that pharmacists express a general willingness to help patients who may benefit from HIV/HCV-related prevention services. In the short term, this willingness might best be capitalized on by introducing more widely accepted services—such as the provision of HIV/HCV-related prevention education—to community pharmacy practice. In the long-term, the framing of helping behavior specific to HIV/HCV prevention and the integration of HIV/HCV-related prevention services within the pharmacist professional identity may be potential targets for interventions to reduce HIV/HCV-related morbidity and mortality in the Appalachian region.

Funding

This work was supported by East Tennessee State University Research Development Committee Major Grant #18-021. All activities relating to study design, data collection, analysis, report writing and the decision to submit for publication solely represent the work of the authors without involvement of the funder.

Declaration of Competing Interest

None.

Acknowledgements

The authors wish to acknowledge Kelly Foster, PhD and the East Tennessee State University Applied Social Research Lab, Jesse Burkhalter, MA, Taylor Riedley, PharmD, and Casey Blakeley, PharmD, for their assistance with data collection and analysis.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jrsop.2021.100088>.

References

- Frieden TR, Foti KE, Mermin J. Applying public health principles to the HIV epidemic—How are we doing? *N Engl J Med* Dec 3 2015;373(23):2281–2287. <https://doi.org/10.1056/NEJMms1513641>.
- Global hepatitis report 2017. Geneva: World Health Organization. 2017.
- HIV Surveillance Report, 2018 (Updated). *Centers for disease control and prevention*. May 2020.
- Ryerson A, Schillie S, Barker L, Kupronis B, Wester C. Vital signs: Newly reported acute and chronic hepatitis C cases — United States, 2009–2018. *MMWR Morb Mortal Wkly Rep* 2020;399–404.
- Sulkowski M, Ionescu-Ittu R, Macaulay D, Sanchez-Gonzalez Y. The economic value of improved productivity from treatment of chronic hepatitis C virus infection: A retrospective analysis of earnings, work loss, and health insurance data. *Adv Ther* Nov 2020;37(11):4709–4719. <https://doi.org/10.1007/s12325-020-01492-x>.
- Mattingly 2nd TJ, Pandit NS, Onukwughu E. Burden of co-infection: A cost analysis of human immunodeficiency virus in a commercially insured hepatitis C virus population. *Infect Dis Ther* Jun 2019;8(2):219–228. <https://doi.org/10.1007/s40121-019-0240-7>.
- Zibbell JE, Iqbal K, Patel RC, et al. Increases in hepatitis C virus infection related to injection drug use among persons aged ≤ 30 years - Kentucky, Tennessee, Virginia, and West Virginia, 2006–2012. *MMWR Morb Mortal Wkly Rep* May 08 2015;64(17):453–458.
- Subregions in Appalachia. Appalachian Regional Commission. Accessed December 8: <https://www.arc.gov/map/subregions-in-appalachia/> 2020.
- Taking stock: Rural people, poverty, and housing in the 21st century. Housing Assistance Council. 2021. Accessed January 14: http://www.ruraldataportal.org/docs/hac_taking-stock-regions.pdf.
- Van Handel MM, Rose CE, Hallisey EJ, et al. County-level vulnerability assessment for rapid dissemination of HIV or HCV infections among persons who inject drugs, United States. *J Acquir Immune Defic Syndr* Nov 01 2016;73(3):323–331. <https://doi.org/10.1097/qai.0000000000001098>.
- Heffernan A, Cooke GS, Nayagam S, Thurst M, Hallett TB. Scaling up prevention and treatment towards the elimination of hepatitis C: a global mathematical model. *Lancet* Mar 30 2019;393(10178):1319–1329. [https://doi.org/10.1016/s0140-6736\(18\)32277-3](https://doi.org/10.1016/s0140-6736(18)32277-3).

- Global health sector strategy on HIV 2016–2021 towards ending AIDS. Geneva: World Health Organization. June 2016.
- Combating hepatitis B and C To reach elimination By 2030. Geneva: World Health Organization. May 2016.
- Teutsch SM. A framework for assessing the effectiveness of disease and injury prevention. *MMWR Recomm Rep* Mar 27 1992;41(Rr-3):1–12.
- Peters PJ, Pontones P, Hoover KW, et al. HIV infection linked to injection use of oxycodone in Indiana, 2014–2015. *N Engl J Med* Jul 21 2016;375(3):229–239. <https://doi.org/10.1056/NEJMoa1515195>.
- MacArthur GJ, van Velzen E, Palmateer N, et al. Interventions to prevent HIV and Hepatitis C in people who inject drugs: a review of reviews to assess evidence of effectiveness. *Int J Drug Policy* Jan 2014;25(1):34–52. <https://doi.org/10.1016/j.drugpo.2013.07.001>.
- Fernandes RM, Cary M, Duarte G, et al. Effectiveness of needle and syringe programmes in people who inject drugs - An overview of systematic reviews. *BMC Public Health* Apr 11 2017;17(1):309. <https://doi.org/10.1186/s12889-017-4210-2>.
- Abdul-Quader AS, Feelemyer J, Modi S, et al. Effectiveness of structural-level needle/syringe programs to reduce HCV and HIV infection among people who inject drugs: A systematic review. *AIDS Behav* Nov 2013;17(9):2878–2892. <https://doi.org/10.1007/s10461-013-0593-y>.
- Aspinall EJ, Nambiar D, Goldberg DJ, et al. Are needle and syringe programmes associated with a reduction in HIV transmission among people who inject drugs: A systematic review and meta-analysis. *Int J Epidemiol* Feb 2014;43(1):235–248. <https://doi.org/10.1093/ije/dyt243>.
- Mackesy-Amiti ME, Boodram B, Spiller MW, Paz-Bailey G, Prachand N, Broz D. Injection-related risk behavior and engagement in outreach, intervention and prevention services across 20 U.S. Cities. *J Acquir Immune Defic Syndr* Jul 1 2017;75(suppl 3):S316–S324. <https://doi.org/10.1097/qai.0000000000001406>.
- Patel MR, Foote C, Duwve J, et al. Reduction of injection-related risk behaviors after emergency implementation of a syringe services program during an HIV outbreak. *J Acquir Immune Defic Syndr* Apr 1 2018;77(4):373–382. <https://doi.org/10.1097/qai.0000000000001615>.
- Bixler D, Corby-Lee G, Proescholdbell S, et al. Access to syringe services programs - Kentucky, North Carolina, and West Virginia, 2013–2017. *MMWR Morb Mortal Wkly Rep* May 11 2018;67(18):529–532. <https://doi.org/10.15585/mmwr.mm6718a5>.
- Des Jarlais DC, Nugent A, Solberg A, Feelemyer J, Mermin J, Holtzman D. Syringe service programs for persons who inject drugs in urban, suburban, and rural areas - United States, 2013. *MMWR Morb Mortal Wkly Rep* Dec 11 2015;64(48):1337–1341. <https://doi.org/10.15585/mmwr.mm6448a3>.
- Paquette CE, Pollini RA. Injection drug use, HIV/HCV, and related services in nonurban areas of the United States: a systematic review. *Drug Alcohol Depend* Jul 1 2018;188:239–250. <https://doi.org/10.1016/j.drugalcdep.2018.03.049>.
- Schranz AJ, Barrett J, Hurt CB, Malvestutto C, Miller WC. Challenges facing a rural opioid epidemic: Treatment and prevention of HIV and hepatitis C. *Curr HIV/AIDS Rep* Jun 2018;15(3):245–254. <https://doi.org/10.1007/s11904-018-0393-0>.
- Fraser H, Zibbell J, Hoerger T, et al. Scaling-up HCV prevention and treatment interventions in rural United States—model projections for tackling an increasing epidemic. *Addiction* Jan 2018;113(1):173–182. <https://doi.org/10.1111/add.13948>.
- Habiyambere V, Dongmo Nguimfack B, Vojnov L, et al. Forecasting the global demand for HIV monitoring and diagnostic tests: A 2016–2021 analysis. *PLoS One* 2018;13(9), e0201341. <https://doi.org/10.1371/journal.pone.0201341>.
- Li Z, Purcell DW, Sansom SL, Hayes D, Hall HI. Vital signs: HIV transmission along the continuum of care - United States, 2016. *MMWR Morb Mortal Wkly Rep* Mar 22 2019;68(11):267–272. <https://doi.org/10.15585/mmwr.mm6811e1>.
- Yehia BR, Schranz AJ, Umscheid CA, Lo Re 3rd V. The treatment cascade for chronic hepatitis C virus infection in the United States: a systematic review and meta-analysis. *PLoS One* 2014;9(7), e101554. <https://doi.org/10.1371/journal.pone.0101554>.
- Schillie S, Wester C, Osborne M, Wesolowski L, Ryerson AB. CDC recommendations for Hepatitis C screening among adults - United States, 2020. *MMWR Recomm Rep* Apr 10 2020;69(2):1–17. <https://doi.org/10.15585/mmwr.rr6902a1>.
- Durham DP, Skrip LA, Bruce RD, et al. The impact of enhanced screening and treatment on hepatitis C in the United States. *Clin Infect Dis* Feb 1 2016;62(3):298–304. <https://doi.org/10.1093/cid/civ894>.
- Branson BM, Handsfield HH, Lampe MA, et al. Revised recommendations for HIV testing of adults, adolescents, and pregnant women in healthcare settings. *MMWR Recomm Rep* Sep 22 2006;55(Rr-14):1–17. <https://doi.org/10.1185/mmwr.rr14>.
- Zeremski M, Zibbell JE, Martinez AD, Kritz S, Smith BD, Talal AH. Hepatitis C virus control among persons who inject drugs requires overcoming barriers to care. *World J Gastroenterol* Nov 28 2013;19(44):7846–7851. <https://doi.org/10.3748/wjg.v19.i44.7846>.
- Schafer KR, Albrecht H, Dillingham R, et al. The continuum of HIV care in rural communities in the United States and Canada: What is known and future research directions. *J Acquir Immune Defic Syndr* May 1 2017;75(1):35–44. <https://doi.org/10.1097/qai.0000000000001329>.
- Eaton EF, Saag MS, Mugavero M. Engagement in human immunodeficiency virus care: linkage, retention, and antiretroviral therapy adherence. *Infect Dis Clin N Am* Sep 2014;28(3):355–369. <https://doi.org/10.1016/j.idc.2014.06.004>.
- Moorman JP, Krolkowski MR, Mathis SM, Pack RP. HIV/HCV Co-infection: Burden of disease and care strategies in Appalachia. *Curr HIV/AIDS Rep* Aug 2018;15(4):308–314. <https://doi.org/10.1007/s11904-018-0404-1>.
- Briggs AL. Pharmacists' increasing involvement in hepatitis C management and prevention. *J Am Pharm Assoc* (2003) Jan–Feb 2018;58(1):5–6. <https://doi.org/10.1016/j.japh.2017.12.008>.
- Myers JE, Farhat D, Guzman A, Arya V. Pharmacists in HIV prevention: An untapped potential. *Am J Public Health* Jun 2019;109(6):859–861. <https://doi.org/10.2105/ajph.2019.305057>.

39. McCree DH, Byrd KK, Johnston M, Gaines M, Weidle PJ. Roles for pharmacists in the "Ending the HIV epidemic: A plan for America" initiative. *Public Health Rep Sep/Oct 2020*;135(5):547–554. <https://doi.org/10.1177/0033354920941184>.
40. 2019 NCPA digest: Changing the pharmacy payment model. National Community Pharmacists Association. 2019.
41. rx Impact: A drug store news special report. *Drug Store News*. March 2016.
42. Rose VJ, Lutnick A, Kral AH. Feasibility of providing interventions for injection drug users in pharmacy settings: a case study among San Francisco pharmacists. *J Psychoactive Drugs Jul-Aug 2014*;46(3):226–232. <https://doi.org/10.1080/02791072.2014.921745>.
43. Lewis CF, Rivera AV, Crawford ND, DeCuir J, Amesty S. Pharmacy-randomized intervention delivering HIV prevention services during the syringe sale to people who inject drugs in New York City. *Drug Alcohol Depend Aug 01 2015*;153:72–77. <https://doi.org/10.1016/j.drugalcdep.2015.06.006>.
44. Sawangjit R, Khan TM, Chaiyakunapruk N. Effectiveness of pharmacy-based needle/syringe exchange programme for people who inject drugs: a systematic review and meta-analysis. *Addiction Feb 2017*;112(2):236–247. <https://doi.org/10.1111/add.13593>.
45. Chiarello E. Nonprescription syringe sales: Resistant pharmacists' attitudes and practices. *Drug Alcohol Depend Sep 1 2016*;166:45–50. <https://doi.org/10.1016/j.drugalcdep.2016.06.023>.
46. Pollini RA. Self-reported participation in voluntary nonprescription syringe sales in California's Central Valley. *J Am Pharm Assoc (2003) Nov–Dec 2017*;57(6):677–685. <https://doi.org/10.1016/j.japh.2017.06.017>.
47. Stopka TJ, Donahue A, Hutcheson M, Green TC. Nonprescription naloxone and syringe sales in the midst of opioid overdose and hepatitis C virus epidemics: Massachusetts, 2015. *J Am Pharm Assoc (2003) Mar–Apr 2017*;57(2s):S34–s44. <https://doi.org/10.1016/j.japh.2016.12.077>.
48. Goodin A, Fallin-Bennett A, Green T, Freeman PR. Pharmacists' role in harm reduction: a survey assessment of Kentucky community pharmacists' willingness to participate in syringe/needle exchange. *Harm Reduct J Jan 25 2018*;15(1):4. <https://doi.org/10.1186/s12954-018-0211-4>.
49. Meyerson BE, Davis A, Agle J, et al. Predicting pharmacy syringe sales to people who inject drugs: Policy, practice and perceptions. *Int J Drug Policy Jun 2018*;56:46–53. <https://doi.org/10.1016/j.drugpo.2018.02.024>.
50. Shedd M, Bozhkova A, Kalich BA, Wilkening GL. Evaluation of Bexar County community pharmacist attitudes toward harm reduction. *Ment Health Clin Nov 2019*;9(6):383–391. <https://doi.org/10.9740/mhc.2019.11.383>.
51. Zaller N, Jeronimo A, Bratberg J, Case P, Rich JD. Pharmacist and pharmacy staff experiences with nonprescription (N.P.) sale of syringes and attitudes toward providing HIV prevention services for injection drug users (IDUs) in Providence, RI. *J Urban Health Dec 2010*;87(6):942–953. <https://doi.org/10.1007/s11524-010-9503-z>.
52. Dong BJ, Lopez M, Cocohoba J. Pharmacists performing hepatitis C antibody point-of-care screening in a community pharmacy: a pilot project. *J Am Pharm Assoc (2003) Jul–Aug 2017*;57(4). <https://doi.org/10.1016/j.japh.2017.04.463>.510-515.e2.
53. Min AC, Andres JL, Grover AB, Megherea O. Pharmacist comfort and awareness of HIV and HCV point-of-care testing in community settings. *Health Promot Pract Sep 2020*;21(5):831–837. <https://doi.org/10.1177/1524839919857969>.
54. Hill LA, Ballard C, Cachay ER. The role of the clinical pharmacist in the management of people living with HIV in the modern antiretroviral era. *AIDS Rev 2019*;21(4):195–210. <https://doi.org/10.24875/AIDSRev.19000089>.
55. Crawford ND, Myers S, Young H, Klepser D, Tung E. The role of pharmacies in the HIV prevention and care continuums: A systematic review. *AIDS Behav Jan 2 2021*. <https://doi.org/10.1007/s10461-020-03111-w>.
56. Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process 1991*;50(2):179–211. Theories of cognitive self-regulation: [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T).
57. U.S. Department of Labor. Bureau of labor statistics. Occupational Outlook Handbook, Pharmacists. Accessed October 9, 2021: <https://www.bls.gov/ooh/healthcare/pharmacists.htm>.
58. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol 2006*;3(2):77–101. <https://doi.org/10.1191/1478088706qp0630a>.
59. Braun V, Clarke V. *Thematic analysis*. In: *CP Cooper H, Long DL, Panter AT, Rindskopf D, Sher KJ, eds. APA handbook of research methods in psychology Vol 2: research designs: Quantitative, qualitative, neuropsychological, and biological*. American Psychological Association; 2012. p. 57–71.
60. Joffe H. *Thematic analysis*. In: *AR HDAI. Qualitative research methods in mental health and psychotherapy: A guide for students and practitioners*. 1 ed. John Wiley & Sons, Ltd; 2012.
61. NVivo. Version 10. QSR International Pty Ltd. 2014 <https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home>.
62. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care Dec 2007*;19(6):349–357. <https://doi.org/10.1093/intqhc/mzm042>.
63. Chiarello E. How organizational context affects bioethical decision-making: pharmacists' management of gatekeeping processes in retail and hospital settings. *Soc Sci Med Dec 2013*;98:319–329. <https://doi.org/10.1016/j.socscimed.2012.11.041>.
64. Noble C, McKaige L, Clavarino A. Pharmacy student professional identity formation: a scoping review. *Integr Pharm Res Pract 2019*;8:15–34. <https://doi.org/10.2147/iplr.s162799>.
65. Poudel A, Lau ETL, Deldot M, Campbell C, Waite NM, Nissen LM. Pharmacist role in vaccination: Evidence and challenges. *Vaccine Sep 20 2019*;37(40):5939–5945. <https://doi.org/10.1016/j.vaccine.2019.08.060>.
66. U.S. Department of Labor, Bureau of Labor Statistics. Occupational employment and wage statistics. OEWS data tables. Accessed October 9, 2021: <https://www.bls.gov/oes/tables.htm> 2018.
67. Elliott T, Sanders EJ, Doherty M, et al. Challenges of HIV diagnosis and management in the context of pre-exposure prophylaxis (PrEP), post-exposure prophylaxis (PEP), test and start and acute HIV infection: a scoping review. *J Int AIDS Soc Dec 2019*;22(12), e25419. <https://doi.org/10.1002/jia2.25419>.