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Infectious Diseases Physicians' Perspectives Regarding Injection Drug Use and Related Infections, United States, 2017

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Background. In the context of the opioid epidemic, injection drug use (IDU)-related infections are an escalating health issue for infectious diseases (ID) physicians in the United States.

Methods. We conducted a mixed methods survey of the Infectious Diseases Society of America's Emerging Infections Network between February and April 2017 to evaluate perspectives relating to care of persons who inject drugs (PWID). Topics included the frequency of and management strategies for IDU-related infection, the availability of addiction services, and the evolving role of ID physicians in substance use disorder (SUD) management.

Results. More than half (53%, n = 672) of 1273 network members participated. Of these, 78% (n = 526) reported treating PWID. Infections frequently encountered included skin and soft tissue (62%, n = 324), bacteremia/fungemia (54%, n = 281), and endocarditis (50%, n = 263). In the past year, 79% (n = 416) reported that most IDU-related infections required ≥ 2 weeks of parenteral antibiotics; strategies frequently employed for prolonged treatment included completion of the entire course in the inpatient unit (41%, n = 218) or at another supervised facility (35%, n = 182). Only 35% (n = 184) of respondents agreed/strongly agreed that their health system offered comprehensive SUD management; 46% (n = 242) felt that ID providers should actively manage SUD.

Conclusions. The majority of physicians surveyed treated PWID and reported myriad obstacles to providing care. Public health and health care systems should consider ways to support ID physicians caring for PWID, including (1) guidelines for providing complex care, including safe provision of multiweek parenteral antibiotics; (2) improved access to SUD management; and (3) strategies to assist those interested in roles in SUD management.

Keywords. bacterial infection; health care surveys; infectious diseases specialty; injection drug use; opioid use disorder.

Rates of opioid use and attributable mortality in the United States have risen dramatically in recent years. Provisional data from the Centers for Disease Control and Prevention (CDC) estimate a 21% increase in national overdose deaths alone between the 12-month period ending in January 2016 and that ending in January 2017 (52 898 deaths vs 64 070 deaths, respectively) [1]. Half a million to 1 million persons inject drugs annually in the United States [2, 3], and an estimated 6.6 million people have injected drugs during their lifetime [4]. Nationally, rates of hospitalization and associated costs for serious infection in persons with opioid use disorders have increased [5], notably for endocarditis [6] and skin and soft tissue infection [7]. Infection arising as a consequence of injection drug use

(IDU) has been further highlighted by the increase in new hepatitis C infections, particularly among those aged 20–29 years [8], and the recent HIV outbreak among persons who inject drugs (PWID) in Indiana in 2014–2015 [9].

In the setting of the national opioid crisis, much remains unknown about infectious diseases (ID) physicians' experiences and perspectives regarding treatment of IDU-related infection and opioid use disorder, including buprenorphine prescribing [10, 11]. In this paper, we describe a mixed methods survey of the Infectious Diseases Society of America's (IDSA's) Emerging Infections Network (EIN). This survey was designed to solicit member viewpoints relating to the care of PWID such as on the prevalence of and management strategies for IDU-related infection, the availability of comprehensive addiction services, and the evolving role of the infectious diseases physician in the treatment of addiction.

METHODS

Survey

We disseminated a 14-question multiple choice/open comment survey to members of EIN, a provider-based network of infectious diseases physicians who are members of the IDSA and

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active in clinical practice (Appendix 1). No incentive for participation was provided. ID physicians currently in clinical practice and EIN staff collaboratively developed the survey with technical assistance from the CDC. On February 28, 2017, we sent the confidential survey by e-mail link or by facsimile to 1273 active EIN members with adult ID practices who had previously responded to 1 or more EIN surveys [12], representing nearly 20% of infectious diseases providers currently active in clinical practice [13].

Nonresponders received 2 electronic reminders inviting them to participate at approximately 2-week intervals during the survey period. The survey remained open until April 9, 2017. Primary themes addressed in the survey included the frequency and characteristics of care provided to PWID, the availability of addiction services, and perspectives on, and participation in, substance abuse and harm reduction interventions. HIV and viral hepatitis management in PWID was considered beyond the scope of this survey and was not evaluated. Likert-type scale responses were used for questions that asked about frequency (eg, never/rarely/occasionally/frequently), importance, and comfort. We asked open comment questions about opinions/experiences related to provision of multiweek parenteral antibiotic courses in PWID and helpful strategies for such care. Practice characteristics of participants, including employment, geographic location, and years of practice, were imported from the EIN database.

Analysis

We compared geographic and practice characteristics between nonrespondents and respondents to assess nonresponse bias. Categorical variables were compared using χ^2 or Fisher exact tests, and differences were considered significant at $P < .05$. Quantitative analyses were performed with SAS software (version 9.4; SAS Institute). For the 2 open response questions, 1 of the authors systematically reviewed the comments, deriving codes inductively and grouping them into content-related categories and higher-order headings. This author then read through the text multiple times until all comments that could be coded were labeled. Co-authors reviewed the coding system and suggested ways to combine or refine categories. We used a qualitative analysis software package (MAXQDA, version 11) to organize and summarize coded text segments. Comments that were incomplete, unclear, or not relevant to the query were not coded.

RESULTS

Survey Respondents

More than half (53%, $n = 672$) of the 1273 active members with an adult ID practice participated, a response rate generally consistent with previous queries [14, 15]. Participants were drawn from across the United States: 28% ($n = 191$) from the South, 24% ($n = 163$) from the Midwest, 24% ($n = 159$) from the Northeast, 23% ($n = 152$) from the West, and 1% ($n = 6$) from Canada. Employment and practice settings included

academic, private, and government (Table 1). Years of infectious diseases practice since fellowship varied among respondents: 18% ($n = 123$) had <5 years of experience, 32% ($n = 216$) had 5–14 years, 18% ($n = 123$) had 15–24 years, and 32% ($n = 213$) had ≥ 25 years. Nonrespondents were significantly more likely to have <25 years of ID experience ($P < .0001$).

Frequency of Care Provision to PWID

Of 672 respondents, 78% ($n = 526$) reported treating PWID as part of clinical practice and answered some or all of the remaining survey questions; the majority of these (79%, $n = 416$) reported practicing in both inpatient and outpatient care settings. Respondents were not asked to identify in which of these settings care to PWID was provided. Clinicians in practice for <5 years were significantly more likely to treat PWID (89%, $n = 109$) compared with senior clinicians with ≥ 25 years of experience (67%, $n = 143$, $P < .0001$). Of 526 respondents who treated PWID, 45% ($n = 236$) reported seeing between 1 and 5 patients per month with an IDU-related infection, 28% ($n = 149$) reported seeing 6–15 patients, and 15% ($n = 79$) reported seeing ≥ 16 patients.

Frequencies of IDU-Related Infection

Survey participants were asked to indicate the frequency with which they encountered each of 5 selected IDU-related infections over the last year (2016–2017), including endocarditis,

Table 1. Emerging Infections Network Injection Drug Use and Infectious Disease Practice Survey—Characteristics of Survey Respondents ($n = 672$) vs Nonrespondents ($n = 601$), 2017

	Respondents, No. (%)	Nonrespondents, No. (%)	<i>P</i> Value
Region			
South	191 (28)	181 (30)	
Midwest	163 (24)	151 (25)	
Northeast	159 (24)	122 (20)	
West	152 (23)	152 (23)	
Canada and Puerto Rico	7 (1)	7 (1)	.8168
Years experience since ID fellowship			
<5	123 (18)	122 (20)	
5–14	216 (32)	233 (39)	
15–24	120 (18)	128 (21)	
≥ 25	213 (32)	118 (20)	<.0001
Employment			
Hospital/clinic	218 (32)	185 (31)	
Private/group practice	189 (28)	171 (28)	
University/medical school	217 (32)	212 (35)	
VA and military	45 (7)	30 (5)	
State government	3 (1)	3 (1)	.4486
Primary hospital type			
Community	189 (28)	193 (32)	
Nonuniversity teaching	164 (24)	145 (24)	
University	236 (35)	207 (34)	
VA hospital or Department of Defense	49 (7)	33 (5)	
City/county	34 (5)	23 (4)	.3537

Abbreviations: ID, infectious diseases; VA, Department of Veterans Affairs.

bone and joint, bacteremia/fungemia, spinal infection (epidural abscess), and skin and soft tissue infection (SSTI). The vast majority indicated seeing each of these infections in PWID either “occasionally” or “frequently,” with the following cumulative percentages: spinal infection 75% (n = 396), bone and joint 78% (n = 408), endocarditis 87% (n = 460), bacteremia/fungemia 89% (n = 470), and SSTI 90% (n = 473). At least half of all respondents reported “frequently” seeing skin and soft tissue infection (61%, n = 322), bacteremia/fungemia (53%, n = 278), and endocarditis (50%, n = 261) (Table 2).

Prolonged Parenteral Therapy: Management Strategies and Areas of Concern

Seventy-nine percent (n = 417) of survey participants reported that from 2016 to 2017 the majority (at least 50%) of IDU-related infections seen required ≥ 2 weeks of parenteral therapy. We asked respondents to indicate the frequency of 6 management strategies for prolonged parenteral therapy over the last year (Table 3). Common management strategies involved completion of therapy in monitored health care settings, with 41% indicating “frequently” managing “the entire course on an inpatient unit” (n = 217) and 35% indicating “frequently” requesting “transfer to other supervised facility” (n = 181). Respondents largely indicated discomfort with provision of outpatient parenteral antibiotic therapy (OPAT) to patients with a history of IDU, regardless of whether drug injection was active or remote, with 65% (n = 344) indicating “never” or “rarely” doing so for patients with clear evidence of sobriety and 70% (n = 368) indicating “never” or “rarely” doing so for patients who were stable on medication-assisted therapy for opioid use disorder. Alternative antibiotic dosing intervals and routes of administration for management in PWID were used with varying frequency. The majority indicated prescribing “oral antibiotics with good oral bioavailability in lieu of parenteral therapy,” with 42% (n = 222) indicating doing so “occasionally” and 13% (n = 67) “frequently.” Forty-three percent (n = 224) indicated “never” prescribing “daily or weekly parenteral therapy administered in outpatient setting,” though a cumulative 31% (n = 165) indicated doing so “occasionally” or “frequently” (Table 3).

Respondents were asked to rate the relative importance of potential concerns pertaining to parenteral therapy management

in PWID on a scale of 1–5, 1 being the most important and 5 being the least important. Mean/median scores were calculated to rank their relative importance among respondents. Of the 5 concerns outlined, “ongoing illicit drug use via IV [intravenous] catheter” was ranked highest (mean, 2.3; median, 2), followed by “drug overdose/death resulting from misuse of IV catheter” (mean, 2.6; median, 2), “inadequate follow-up including missed appointments and safety monitoring” (mean, 2.6; median, 3), “socioeconomic factors (housing, transportation) contributing to risk of poor medication adherence and treatment failure” (mean, 3.1; median, 3), and “medicolegal concerns” (mean, 4.2; median, 5).

Comfort With Injection Practice Assessment; Naloxone Prescribing Frequency

We queried survey participants regarding their degree of comfort “assessing patient injection practices and offering counseling regarding safe practices to offset infection risk.” Forty-three percent (n = 225) selected “very comfortable/comfortable,” 27% (n = 142) selected “neutral,” 23% (n = 124) selected “uncomfortable/very uncomfortable,” and the remainder 7% (n = 35) selected “not sure.” Twenty-two percent (n = 117) had ever prescribed naloxone for opioid overdose reversal.

Availability of Addiction Services; Role of ID Providers

Only 116 (22%) respondents representing 87 discrete institutions reported that their hospitals provided a dedicated multidisciplinary addictions service. These respondents were significantly more likely to “agree/strongly agree” that ID physicians should actively manage substance use disorders than were physicians whose facilities did not provide a dedicated service (54% vs 43%, $P = 0.03$). When queried regarding whether their health system offers comprehensive treatment for substance use disorders, only 10% (n = 51) indicated that they “strongly agree,” compared with 31% (n = 163) who indicated that they “strongly disagree.” Though nearly half of respondents felt that infectious diseases providers should actively manage substance use disorders (46%, n = 241), only 3% (n = 18) reported being waived to prescribe buprenorphine.

Respondent Opinions/Experiences Relevant to the Management of Prolonged Parenteral Therapy for PWID

Ninety respondents provided write-in comments expressing opinions or relating experiences relevant to the management of

Table 2. “In the Past Year, How Frequently Have You Seen Each of the Following Complications of IDU?” Responses by 526 Infectious Diseases Physician Members of the Infectious Diseases Society of America Emerging Infections Network, United States, 2017 (Most Frequent Answer in Each Row Appears in Bold)

	Frequently, No. (%)	Occasionally, No. (%)	Rarely, No. (%)	Never, No. (%)	Not Answered, No.
Endocarditis	261 (50)	199 (38)	55 (10)	9 (2)	2
Bone and joint	169 (33)	239 (46)	92 (17)	19 (4)	7
Bacteremia/fungemia	278 (54)	192 (37)	44 (8)	6 (1)	6
Spinal infection (epidural abscess)	159 (30)	237 (45)	104 (20)	24 (5)	2
Skin and soft tissue infection	322 (62)	151 (29)	42 (8)	3 (0.6)	8

Abbreviation: IDU, injection drug use.

Table 3. “In the Past Year, for Infections in PWID Typically Managed With at Least 2 Weeks of Parenteral Therapy, How Frequently Have You Employed the Following Strategies?” Responses by 526 Infectious Diseases Physician Members of the Infectious Diseases Society of America Emerging Infections Network, United States, 2017 (Most Frequent Answer in Each Row Appears in Bold)

	Frequently, No. (%)	Occasionally, No. (%)	Rarely, No. (%)	Never, No. (%)	Not Answered, No.
Transfer to other supervised facility for completion of parenteral therapy	181 (35)	176 (33)	105 (20)	60 (12)	4
Manage entire course of parenteral therapy on inpatient unit	217 (41)	161 (31)	104 (20)	40 (8)	4
Provide OPAT if clear evidence of sobriety	37 (7)	137 (26)	190 (37)	154 (30)	8
Provide OPAT if stable on opioid replacement therapy	23 (4)	123 (24)	166 (32)	202 (40)	12
Prescribe daily or weekly parenteral therapy administered in outpatient infusion setting	45 (9)	120 (23)	128 (25)	224 (43)	9
Prescribe oral antibiotics with good bioavailability in lieu of parenteral therapy	67 (13)	222 (42)	175 (33)	60 (12)	2

Abbreviations: OPAT, outpatient parenteral antibiotic therapy; PWID, people who inject drugs.

prolonged parenteral therapy for PWID. Of the 90 responses, we thematically coded and organized 82 comments into 1 of the following 5 categories: challenging population (n = 55); challenging treatment regimens/lack of addiction services (n = 9); alternate treatment strategies (n = 7); policy/legislative/medicolegal issues (n = 6); and alternate views (n = 5), which were remarks that diverged from the most common themes. Table 4 contains example comments by theme.

Challenging Patient Population

Of the 55 comments that identified challenges associated with treating PWID, almost one-third were general in nature and identified a few underlying issues relevant to the management of parenteral therapy for PWID. For example, 1 respondent identified the “dilemma over whether it is ethical and safe, or at least appropriate, to send an IDU home with a PICC [peripherally inserted central catheter] line,” whereas another pointed out that “there are no clear guidelines.... What do you do when a PWID refuses or is ineligible to go to a sub-acute rehab?”

Barriers to Health Care Access

In 13 comments that mentioned home health care, all of them indicated that this type of service was not available to PWID or to those who had a history of injection drug use. Although a few respondents observed that individuals in this patient population often lack health insurance, having a history of drug use was a substantial obstacle to accessing home health care independent of health care coverage. Nine respondents identified gaps in the health care system, notably the lack of addiction services. Other treatment challenges mentioned in comments included patient relapse rates, polymicrobial infections, and decisions on surgery for infective endocarditis. Network members expressed frustration about the lack of resources for the provision of care with “no concerted effort from either government or individual hospital systems to deal with this problem.” One comment

underscored a noteworthy challenge: “Substance abuse treatment is well beyond the scope of ID trained physician.” Eighteen comments indicated a perception that nothing works: “None, in absence of a robust health system/hospital structure providing the necessary auxiliary services to properly treat addiction.”

Alternative Therapeutic Approaches

Seven comments addressed oral therapies and single-dose infusion antibiotics with dalbavancin and oritavancin. Although 1 respondent noted that there are “poor data on oral options,” a few respondents mentioned their comfort with the use of oral therapies. One respondent reported using dalbavancin “with great success,” and another suggested, “Dalvance and oritavancin may change this landscape in the near future - and that would be a fantastic thing.”

Respondents illustrated policy constraints or barriers at the provider, organizational, and state levels: “By setting a local standard of care in which we don’t discharge injection drug users on parenteral antibiotics, we make it almost impossible to deviate from this standard of care.”

Some respondents offered a more positive experience or opinion. For example, 1 respondent shared the experience that “most patients do NOT use their lines to inject drugs – contrary to popular opinion.” Another respondent observed that “we fairly frequently use PICC lines in folk who still inject, without any evidence that doing so leads to more infections than if they were injected via another skin site.”

Respondents Opinions/Experiences Regarding Helpful Strategies in Provision of Comprehensive Medical Management to PWID

In total, 181 respondents provided write-in comments in response to the question “What strategies have you found particularly helpful to providing comprehensive medical management to PWID?” Of the 181 responses, we organized 163 comments into 1 of these 5 overarching themes: using inpatient

Table 4. Opinions/Experiences Relevant to the Management of Prolonged Parenteral Therapy—Example Comments by Theme, the Infectious Diseases Society of America Emerging Infections Network, United States, 2017

Challenging Population/General
<p>"Dilemma over whether it is ethical and safe, or at least appropriate, to send an IDU home with a PICC line."</p> <p>"There are no clear guidelines on how to handle this issue. We look for clear evidence of recent sobriety or at least lack of IV drug use.... But what do you do when a PWID refuses or is ineligible to go to a sub-acute rehab."</p> <p>"This population is extremely difficult to care for and resource intensive. Often we end up keeping them in house for planned duration of therapy and even then patients frequently leave [against medical advice]."</p> <p>"I struggle with this issue. On several occasions, I have felt a patient could be trusted to come to an infusion center daily with PICC to complete therapy, but my colleagues and hospital staff have adamantly refused to discharge with a PICC."</p>
Challenging Population/Catheter Issues
<p>"One of my primary concerns is contamination of the line if they are using for drugs, leading to further infections with new organisms, malfunction of the line."</p> <p>"Most common problem is that patients fail to follow up and contaminate their catheters leading to additional complications."</p> <p>"Readmissions with superinfections from injecting into lines - often with GNRs or yeast after initial <i>S. aureus</i> infection."</p>
Challenging Population/Barriers to Health Care Access
<p>"I would like to prescribe more OPAT to PWID, but in [this] state, none of the home infusion companies will agree to take these patients."</p> <p>"These patients are nearly impossible to place in NH and the ones that go to NH can still use. I have had them come in follow up to office from NH clearly high saying they can sign out at NH."</p> <p>"Difficulty getting OPAT nursing services into home. Many times housing is not safe for home nursing visits."</p> <p>"Many rehab or SAR or NH will not take patients even if on methadone maintenance which complicates things further for those who have negative urine tox screens."</p> <p>"No home health care facilities will accept pts even if I certify they are in recovery."</p>
Challenging Population/Patient Compliance
<p>"Main concern is risk of catheter misuse resulting in new/additional infections in addition to poor compliance, missed appointment and treatment failure for present infection in patients continuing to inject drugs."</p> <p>"Compliance in this patient population can be a problem and I sometimes insist on IV therapy to insure observation while on treatment."</p>
Challenging Population/Hospital Payment Issues
<p>"Most of our population do not have insurance so they stay in county hospital the entire time."</p> <p>"I am comfortable w signed consent for outpatient management. However, many have no payor source to allow any alternatives."</p> <p>"Most patients have no insurance so therefore stay in the hospital."</p>
Challenging Treatment Regimens/Lack of Addiction Services
<p>"There is almost no access to drug treatment or opioid replacement therapy in our area."</p> <p>"Unacceptable rate of relapse due to lack of detox/abstinence programs after hospital discharge."</p> <p>"We are often stuck with no chronic care options for completion of therapy. Terrible situation."</p> <p>"With IV access, risk of abuse too high to risk unsupervised approach. Once treated, social services and preventative coordination is key."</p>
Alternate Treatment Strategies
<p>"I use IM medications only for outpatient parenteral therapy for PWID. This is faster and I don't worry about use of an IV line."</p> <p>"In general even not PWID I am ok with switching to oral relatively early."</p> <p>"I perceive that I feel much more comfortable than colleagues with oral therapies."</p> <p>"Using lots of dalbavancin with success."</p>
Policy/Legislative/Medicolegal Issues
<p>"Impossible to get them home with PICC because of hospital policies. Reflexively assuming nefariousness with PICC in place in IDUs is the norm, despite evidence. Hospital has made dalbavancin and oritavancin outpatient only so can't start in hospital easily."</p> <p>"It only takes one case of patient abuse of PICC to change practice to avoid challenging medicolegal situations."</p> <p>"The state of [X] passed a law in May 2011 shielding MDs and institutions from tort in this situation. Patient has to sign an IVDU/Vascular Access Disclaimer form prior to discharge."</p>
Alternative View
<p>"It takes some effort to navigate the social difficulties, but often can be done. In 'our neck of the woods' PWID are pretty honest about their habits."</p> <p>"Great opportunity for use of once weekly intravenous antibiotics."</p>
Abbreviations: GNR, gram negative rods; IDU, injection drug user; IV, intravenous; IVDU, intravenous drug use; NH, nursing home; OPAT, outpatient parenteral antibiotic therapy; PICC, peripherally inserted central catheter; PWID, people who inject drugs; SAR, subacute rehab.

and/or outpatient programs ($n = 41$), linking or referring to addiction or mental health services ($n = 28$), working with a multidisciplinary team ($n = 26$), provider-patient relationship ($n = 23$), and engaging family/support system ($n = 15$). Other categories that emerged included challenges around provision of comprehensive medical management to PWID and a general lack of helpful strategies ($n = 30$); we described these challenges above. Table 5 contains example comments organized by category.

Overall, the most frequently mentioned strategy to provide comprehensive medical management to PWID involved

either inpatient antibiotics or a combination of inpatient and outpatient treatment. Respondents' comments mentioned a comprehensive referral center, outpatient coordinated services, social workers, and primary care provider involvement as solutions to the difficulties of managing serious infections in people who use drugs. Other comments identified the use of long-acting injectable antibiotics, such as dalbavancin and oritavancin, and 1 respondent advised using oral antibiotics when possible.

The second and third most common strategies were linking or referring to addiction or mental health services, with 28

Table 5. "What Strategies Have You Found Particularly Helpful to Providing Comprehensive Medical Management to PWID?" Example Comments by Theme, the Infectious Diseases Society of America Emerging Infections Network, 2017**Using Inpatient and Outpatient Programs**

"Best in my experience is when hospital/system can provide dedicated specialist to help patient with substance abuse while inpatient and then link to outpatient services."
 "Nothing short of prolonged inpatient treatment followed by very attentive outpatient follow up from dedicated addiction specialists."
 "Using the severe infection as a tool to help the person address underlying issues, and linking the person with in hospital and out of hospital supports."

Linking or Referring to Addiction Services and Mental Health

"All hospitals should have a 12-step program (NA or AA) available for patients and community members in need."
 "Our outpatient clinic now has a buprenorphine clinic which is excellent but having greater services inpatient would be of great import."
 "Buprenorphine providers affiliated with the medical center with easy follow-up with and multiple spots available."
 "Getting them referred to a long-term inpatient setting that includes substance abuse treatment and counseling."
 "Assessment via addiction medicine specialist to help determine likelihood of relapsing at discharge."

Working With Multidisciplinary Team

"Working w/ a multidisciplinary team on trying to come up with treatment plans and shared expectations for patients with ongoing IV drug use that are going to be admitted for long term."
 "Multi-disciplinary approach so it is not solely my responsibility to decide if patient is safe for home OPAT therapy."
 "Creation of a separate multidisciplinary team that focuses on inpatient PWID with infection requiring IV."
 "Team approach works best...specialization in addiction medicine...also for the patient getting multiple perspectives and REINFORCEMENT of the message to come clean."

Provider–Patient Relationship

"A strong personal relationship and appealing to patient's self-interest."
 "Explicit discussion about concerns regarding active IVDU and effect on plan of care."
 "Don't blame the user. Instead offer support until they become hopeful enough to make a successful quit attempt."
 "Taking a nonjudgmental approach to interaction with patients appears to lead to more open communication."

Engaging Family/Support System (Utilize Social/Community Services)

"Engage patients support system if available to assist in care and help in bridge to rehab program."
 "Early social work and family involvement."
 "Social services along with hospital and community services need to join in helping drug addiction."
 "Working with community-based partners (i.e. needle exchange and MMT) where people are already receiving services."
 "Inpatient order sets for patients with SUDs (includes STI screening, naran prescribing), staff education/teaching lectures, leadership support, capacity building with community organizations."
 "Community/peer navigators, outreach workers."

Challenges

"Very limited resources, we usually keep in house for 2–3 weeks then try to D/C on PO. No real rehab available, limited chronic pain management."
 "The health system will cover hundreds of thousands of dollars for medical management of infectious complications then not cover any rehab."
 "Substance abuse treatment is well beyond the scope of ID trained physician."
 "Need more healthcare resources to focus on this issue."
 "I see no concerted effort from either government or individual hospital systems to deal with this problem."

Abbreviations: AA, Alcoholics Anonymous; D/C, discharge; ID, infectious diseases; IV, intravenous; IVDU, intravenous drug use; MMT, methadone maintenance treatment; NA, Narcotics Anonymous; PO, per oral; OPAT, outpatient parenteral antibiotic therapy; PWID, people who inject drugs; STI, sexually transmitted infection; SUD, substance use disorder.

comments, and working with a multidisciplinary team, with 26 comments. Respondents noted that comprehensive medical management of PWID "works best when combined with some sort of addiction recovery" and a "multidisciplinary approach to care [is the] only chance of making a difference." Comments included inpatient drug rehabilitation and linkage to addiction programs at hospital discharge. A few respondents specifically identified buprenorphine and methadone treatments for opioid use disorder. Other strategies cited included comanagement with syringe exchange programs/substance abuse counseling and targeting social determinants of health with each visit to the health care system.

Twenty-three respondents commented on the provider–patient relationship. Several survey participants reported having open dialogue with patients about risks. With 6 unique instances of the term "nonjudgmental," other comments categorized within this theme contained words that included "trust," "support," "understanding," and "patience."

Extending beyond the provider–patient relationship, 15 respondents identified engaging patients' families or support systems and using social or community services. In general, comments suggested that family/support system engagement was helpful to assistance with care, notably getting patients into outpatient programs or drug rehabilitation programs. With regard to utilizing social/community services, respondents' comments reiterated the need for medical management focused on PWID to go beyond treating infections: "Social services along with hospital and community services need to join in helping drug addiction."

DISCUSSION

In this national sample of infectious diseases clinicians, the majority of survey participants reported providing care to PWID, suggesting that treatment of serious IDU-related infection is a common feature of today's infectious diseases practice in the United States. For a subset of providers, provision of

care to PWID represents a substantial component of clinical practice. In both multiple choice and open text responses, physicians highlighted the often complex, resource-intensive nature of providing care to PWID, owing to infection severity (frequently requiring >2 weeks of parenteral antibiotic treatment) and structural barriers to conventional management (psychosocial complexity and lack of insurance, among others).

Our results demonstrate an overall lack of resources for ID physicians treating PWID. For example, only a small number of ID providers queried (10%, $n = 51$) strongly agreed that their care setting provided comprehensive substance use treatment, highlighting that the majority of providers treat complex infection in PWID who lack access to treatment for underlying opioid use disorders. Respondents expressed diverse opinions regarding the potential role for ID providers in the management of addiction, and acquisition of a federal waiver to prescribe buprenorphine was rare among respondents, commensurate with national data reporting that approximately 4% of practicing physicians have waiver certification [16].

Given the challenges facing ID physicians caring for an increasing number of PWID, our results suggest that public health and health care officials should consider ways to enhance the evolving role of ID physicians in the care of PWID. The IDSA could consider the development of guidelines, a research agenda to identify knowledge gaps, and other resources to address the complex care of PWID, including safe provision of multiweek parenteral therapy. Hospitals and health care systems can consider ways to improve comprehensive substance use disorder treatment, including use of multidisciplinary teams, linkage to addiction or mental health services, syringe exchange programs, and family/support systems.

Some ID physicians expressed interest in taking an active role in the management of SUD. To this end, training in addiction and the care of people who use drugs should be available to all ID physicians. Under the federal Drug Addiction Treatment Act of 2000, physicians who register with the Drug Enforcement Administration, regardless of their subspecialty, can receive a waiver to prescribe buprenorphine for opioid use disorder treatment after undergoing 8 hours of training [17]. For those with particular interest, dual training in addiction medicine may be of value. In March 2016, the American Board of Medical Specialties announced addiction medicine as a subspecialty under the American Board of Preventive Medicine. During the next 5 years, physicians who have a primary ABMS board certification may apply to take the exam to become or continue to be an addiction medicine specialist. After the 5-year period ends, a 1-year fellowship will be required to become an addiction medicine specialist [18].

Our study has several notable limitations. EIN is a convenience sample of physicians, so the opinions of respondents may not be generalizable to other infectious diseases physicians.

Second, we relied on self-reports and responses, which may be subject to recall bias. Lastly, given that nonrespondents were significantly more likely than respondents to have less than 25 years of ID experience, the findings of the survey may not represent the experience of younger respondents. This is particularly noteworthy, as clinicians in practice for <5 years were significantly more likely to treat PWID (89%) compared with senior clinicians with ≥ 25 years of experience (67%, $P < .0001$). Therefore, follow-up queries targeting the experience of infectious diseases providers in earlier stages of practice may better reflect the full range of experiences and challenges relevant to caring for PWID.

In the setting of the escalating opioid crisis, complex care requirements for PWID will persist, highlighting the need for guidelines and further research to identify best practices for management. Expansion of ID providers' clinical purview to integrate concurrent addiction treatment and harm reduction represents 1 novel element that merits further consideration.

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INFECTIOUS DISEASES SOCIETY OF AMERICA EMERGING INFECTIONS NETWORK QUERY:

Injection Drug Use and Infectious Disease Practice

Among adults ages 18-25, heroin use has doubled over the last decade¹ and an estimated half-a-million to one million persons inject drugs annually in the United States.² Associated excess morbidity and mortality amongst persons who inject drugs (PWID) has reached epidemic proportions, with 10,500 deaths attributed to heroin overdose in 2014 alone.¹ Rates of hospitalization for infectious complications of injection drug use have risen precipitously in recent years.³

In the midst of this epidemic, **we are interested in evaluating infectious disease physicians' perspectives relating to the care of PWID, including: the management of infectious complications, the availability of comprehensive addiction services, and the evolving role of the infectious disease practitioner in the management of addiction.** Though HIV and hepatitis C are important pathogens that are known to be associated with injection drug use, they are not the main focus of this query.

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EMERGING INFECTIONS NETWORK QUERY
Injection Drug Use (IDU) and Infectious Disease Practice

Name: _____

1. If you do not treat people who inject drugs (PWID), please check here and submit this survey: _____

2. Where do you see patients? Inpatient only Outpatient only Both

3. In the past year, how many patients per month, on average, have you seen with an infection related to injection drug use (IDU)? <1 1-5 6-15 16-25 >25

4. In the past year, how frequently have you seen each of the following complications of IDU?

[Check one frequency for each line]

	<u>Never</u>	<u>Rarely</u>	<u>Occasionally</u>	<u>Frequently</u>
Endocarditis	___	___	___	___
Bone and joint	___	___	___	___
Bacteremia/fungemia	___	___	___	___
Spinal infection (e.g. epidural abscess)	___	___	___	___
Skin and soft tissue infection	___	___	___	___

5. In the past year, what percent of infections seen in PWID would you typically manage with at least 2 weeks of parenteral therapy? <50% >=50%

6. In past year, for infections in PWID typically managed with at least 2 weeks of parenteral therapy, how frequently have you employed the following strategies?

[Check one frequency for each line]

	<u>Never</u>	<u>Rarely</u>	<u>Occasionally</u>	<u>Frequently</u>
Transfer to other supervised facility for completion of parenteral therapy	___	___	___	___
Manage entire course of parenteral therapy on inpatient unit	___	___	___	___
Provide outpatient parenteral antibiotic therapy (OPAT) if clear evidence of sobriety	___	___	___	___
Provide OPAT if stable on opioid replacement therapy	___	___	___	___
Prescribe daily or weekly parenteral therapy administered in outpatient infusion setting	___	___	___	___
Prescribe oral antibiotics with good bioavailability in lieu of parenteral therapy	___	___	___	___

7. Rank your primary concerns when considering management of parenteral therapy for PWID:

[Please rank order with 1 being the most important and 5 being the least important]

- _____ Drug overdose/death resulting from misuse of IV catheter
- _____ Ongoing illicit drug use via IV catheter
- _____ Inadequate follow-up including missed appointments and safety monitoring
- _____ Socio-economic factors (housing, transportation) contributing to risk of poor medication adherence and treatment failure
- _____ Medicolegal concerns

Other opinions / experiences relevant to the management of prolonged parenteral therapy for PWID:

8. How comfortable do you feel assessing patient injection practices and offering counseling regarding safe practices to offset infection risk? [Circle one answer] Not sure

Very comfortable Comfortable Neutral Uncomfortable Very uncomfortable

9. Inpatient addiction services offered in my hospital include: [Select all that apply]

- Consultation by a dedicated multi-disciplinary addictions service
- Targeted consultation by Social Work, Nursing, Case Management or Psychiatry
- Individual providers offering addiction assessment and/or counseling
- Treatment of opioid withdrawal during hospitalization with buprenorphine or methadone
- Continuation of outpatient buprenorphine or methadone
- Inpatient buprenorphine initiation with linkage to outpatient provider
- Inpatient methadone initiation with linkage to methadone maintenance clinic
- Not sure
- None in my institution
- Other, specify:

10a. Are you waived to prescribe buprenorphine? Yes No

10b. If yes, have you ever prescribed buprenorphine? N/A Yes No

11. Have you ever prescribed naloxone for opioid overdose reversal? Yes No

12. If you answered 'Yes' to either question 10a or 11, would you be willing to participate in a future separate discussion? If yes, please enter your contact name and preferred email address for the survey's investigators:

13. Please rate your level of agreement with each of the following statements:

	Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree	Not sure
a. The health system in which I work offers comprehensive treatment for substance use disorders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. ID physicians should take an active role in the management of substance use disorders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. What strategies have you found particularly helpful to providing comprehensive medical management to PWID?

Thank you for completing this survey!