



Research Paper

Barriers to naloxone use and acceptance among opioid users, first responders, and emergency department providers in New Hampshire, USA

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ARTICLE INFO

Keywords:

Naloxone
Harm reduction
Opioid
Overdose
New Hampshire

ABSTRACT

Background: The United States is in the midst of a devastating opioid crisis, and the state of New Hampshire (NH) has been disproportionately impacted. Naloxone is an opioid overdose reversal medication that is critical for saving lives. This study was conducted to understand emergency responders' and opioid users' experiences with, and opinions about, naloxone use and distribution in NH.

Methods: Semi-structured interviews were conducted with 76 opioid users and 36 emergency responders in six NH counties in 2016–2017. Interviews focused on respondents' experiences with opioid use and overdose. Interviews were transcribed, coded, and reviewed for consensus among coders. Directed content analysis was used to review high-level domains and identify subthemes.

Results: Users and responders largely agreed that naloxone had become increasingly available in NH at the time of the study. Reported responder barriers to naloxone acceptance included perceptions that increased naloxone availability may enable riskier opioid use and fails to address the underlying causes of addiction. Reported opioid-user barriers included cost, legality, and lack of knowledge regarding distribution locations and indications for use.

Conclusion: Opioid users' and emergency responders' perceptions about naloxone may limit the optimal use of naloxone within the community. This study identifies opportunities to address misconceptions about naloxone and challenges in accessing naloxone, which may improve opioid overdose prevention strategies.

Introduction

Opioid use disorder and opioid overdose are significant and continuing public health concerns in the United States (US). Opioids were involved in an estimated 47,500 deaths in 2018 (Ahmad et al., 2019), a two-and-a-half fold increase from 2008 (National Institute on Drug Abuse, 2019b). Among the roughly 68,500 overall drug overdose deaths estimated in 2018 alone, nearly half involved synthetic opioids other than methadone, such as fentanyl or fentanyl analogues (Ahmad et al., 2019).

Naloxone, an opioid antagonist also known by the brand name Narcan[®] (Adapt Pharma, Inc., Radnor, PA), is an effective medication for rapidly reversing overdoses involving opioids. When administered in time, naloxone can save lives, and when naloxone and overdose

education are available to community members, deaths due to opioid overdose decrease in those communities (Walley et al., 2013). Over the past decade, an increasing number of community-based programmes have offered opioid overdose prevention services, including distribution of naloxone kits to laypersons who might witness an opioid overdose, such as opioid users, their families and friends, and service providers (Doyon, Aks, & Schaeffer, 2014). Various studies have suggested that layperson naloxone use is feasible and important in preventing opioid overdose deaths (Doe-Simkins, Walley, Epstein, & Moyer, 2009; Galea et al., 2006; Lankenau et al., 2013; Leece et al., 2013; Seal et al., 2005).

New Hampshire (NH), a state in the northeastern region of the US, has been disproportionately impacted in this ongoing opioid crisis and has ranked among the top five US states in opioid-related deaths per

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<https://doi.org/10.1016/j.drugpo.2019.09.008>

capita for the last several years. Between 2013 and 2016, opioid-related deaths nearly tripled in NH (National Institute on Drug Abuse, 2019a) and have remained at or near this peak in subsequent years (Ahmad et al., 2019). Annual deaths due to drug overdose in NH have increased since 2012, though the number has plateaued since 2016 (New Hampshire Drug Monitoring Initiative, 2019). The latest available data show that 93% of NH's opioid overdoses involve synthetic opioids other than methadone (Ahmad et al., 2019).

To effectively reduce overdose death, some systems-level intervention approaches specifically seek to reduce harm within “risk environments,” focusing on the contexts of drug-related harms, rather than interventions targeted at the individual level (Rhodes, 2002, 2009). According to Rhodes' risk environment framework (Rhodes, 2002), interactions between different types of environments, including physical, economic, social, and policy, and the macro- or micro-environment can increase or decrease the risk of drug-related harms. NH has responded to the opioid crisis, in part, by changing the policy-level macro-environment and bolstering harm-reduction efforts, including initiating a Naloxone Distribution Campaign from the NH Department of Health and Human Services (DHHS) (AnyoneAnytimeNH, 2016) following the passage of House Bill 271 in 2015 (“New Hampshire House Bill 271, Chapter 65: An act relative to possession & administration of an opioid antagonist for opioid-related overdoses,” 2015). As part of the 2015 Naloxone Distribution Campaign, NH DHHS also established standing orders throughout 188 of the state's pharmacies, allowing naloxone to be distributed without a prescription to those at risk, or in a position to assist another at risk, who have received opioid overdose prevention training (AnyoneAnytimeNH, 2017). The 2015 campaign relied on a fund of \$1.15 million, including a block grant of \$536,000 in federal money from the Substance Abuse and Mental Health Services Administration and approximately \$610,000 from the NH DHHS general fund budget. Of the 6000 naloxone kits distributed by NH DHHS starting in June 2015, about 5300 of the kits were distributed by September 2016, and 5600 additional kits were ordered to continue distribution (AnyoneAnytimeNH, 2016).

Following the initial distribution effort, the number of naloxone administrations prior to emergency medical services (EMS) arrival for calls warranting naloxone increased from 5% of all naloxone administrations in January–May 2015 to 11% during the same time period in 2016, suggesting that the number of naloxone administrations by bystanders increased (AnyoneAnytimeNH, 2016). Between September 2015 and December 2017, nearly 14,000 naloxone kits had been distributed in NH (New Hampshire Governor's Commission on Alcohol & Drug Abuse Prevention, 2018), and various groups have attempted to bolster these distribution efforts through private funding sources (New Hampshire Harm Reduction Coalition (NHHRC), 2019; Project 439).

Despite expanded availability, the state of NH continues to have among the highest rates of death due to opioid overdose (National Institute on Drug Abuse, 2019a). To date, there are limited data to characterize the overall breadth and impact of naloxone distribution in NH. Previous studies examining naloxone distribution efforts in Massachusetts, Ohio, and New York, and exploring medical providers' attitudes and experiences with naloxone, have demonstrated that simply increasing the number of available naloxone kits is insufficient to optimize widespread naloxone use, given a number of additional barriers that prevent successful distribution efforts (Drainoni et al., 2016; Haug, Bielenberg, Linder, & Lembke, 2016; Kirane et al., 2016; Mitchell & Higgins, 2016; Winstanley, Clark, Feinberg, & Wilder, 2016). A 2017 study by Green et al. assessing attitudes of pharmacists and consumers to pharmacy naloxone provision in Rhode Island and Massachusetts found that both consumers and pharmacists expressed discomfort with naloxone provision. Consumers often attributed discomfort to negative past experiences (e.g., with obtaining syringes or opioid use disorder medications) and fear of future consequences from requesting naloxone (e.g., future stigma from

the pharmacist). Pharmacists described discomfort with naloxone conversations and the potential of offending consumers. Pharmacists also identified logistical barriers, such as insufficient pharmacist training, lack of sufficient time to educate patients, and uncertainties regarding billing insurance Green et al. (2017). A 2013 study conducted in Connecticut and Rhode Island by Green et al. found that law enforcement officials often viewed overdose prevention and response as an inherent part of community policing and important for relationships between law enforcement and the community, but also reported a sense of helplessness due to the overall limited availability of effective treatment resources in the community. Many also expressed hesitance surrounding naloxone administration by laypeople and the perception that it may enable further substance use Green et al. (2013). A 2016 systematic review by Mitchell and Higgins highlighted barriers to naloxone distribution, including social stigma, which may influence political decisions and willingness to assist overdose victims; prescriber unawareness and inaction due to lack of provider education and effective patient screening or fear of liability; and legal and financial barriers. However, previous studies have been less focused on how opioid users' and emergency responders' experiences with naloxone may impact its use as a harm-reduction tool within the “risk environments” where overdoses occur. The present qualitative study aimed to understand first responders', emergency department (ED) personnel's, and opioid users' experiences with, and opinions of, naloxone use and distribution in NH.

Methods

Setting

With support from the National Drug Early Warning System (NDEWS), a National Institute on Drug Abuse-supported public health surveillance system aimed at understanding trends in drug use, our research team at the Center for Technology and Behavioral Health (CTBH) at Dartmouth College conducted a rapid epidemiological investigation to characterize emerging drug use trends in the wake of NH's opioid crisis, and more specifically the fentanyl crisis, beginning in August 2016. In the first phase of the study, teams from both NDEWS and CTBH partnered with treatment providers, medical responders, law enforcement personnel, and legal authorities to characterize the fentanyl crisis in NH. The study's findings, among other conclusions, pointed to the necessity of user-level data to better characterize the state of the fentanyl crisis in NH and to inform policy recommendations as well as treatment and harm-reduction strategies (NDEWS Coordinating Center, 2016).

In the second phase of the study, we examined first-person perspectives on the overdose crisis in NH among opioid users as well as first responders and emergency department providers (collectively, “emergency responders” or “responders”). A qualitative approach was selected to better appreciate how contexts in NH impact individual actions, and as a result, the way that these contexts could inform the development of intervention strategies (Rhodes, 2000). Interview guides were developed based on the results of the aforementioned surveillance study to address knowledge gaps recognized by NH stakeholders. Interviews with current and past opioid users focused on experiences with opioids and substance use in general, knowledge about overdose in NH, experiences with treatment services in NH, experiences with naloxone access and use, and impacts of NH state policy. Interviews with responders targeted their experience with the opioid epidemic in NH, substance use treatment services in NH, naloxone use in NH, impacts of state policy, and understanding of fentanyl product and access in the region. This manuscript describes the methods and findings of the second phase of the study that pertain to naloxone.

Recruitment and data collection

We used a multi-pronged recruitment approach, including snowball sampling (Given, 2008), posting flyers at public centers throughout the state of NH, and placing advertisements on Craigslist. To be eligible for the study, all participants were required to be age 18 years or older. Participants in the sample of opioid users were residents of NH and had a self-reported recent or ongoing history of opioid use. Each participant in the emergency responder sample worked as an emergency department provider, emergency medical services provider, firefighter, and/or police officer in one of six NH counties. Though sampling was concentrated in Hillsborough County, additional participants were recruited from Cheshire, Grafton, Rockingham, Strafford, and Sullivan counties in NH.

Interviews were conducted by trained members of the research team. Participants were offered a study information sheet and encouraged to ask questions regarding the study before providing verbal consent, which was used to ensure participant confidentiality, or anonymity if desired by the participant. Participants then completed semi-structured interviews as well as surveys that requested demographic characteristics and information regarding their substance use and treatment histories (user sample) or responder experiences (responder sample). Opioid users were asked about their experiences with naloxone, if any; ease of naloxone access; locations where naloxone can be obtained; and side effects of naloxone. Emergency responders were asked about their experiences administering naloxone, if any; trends in the use of naloxone in NH; unanticipated side effects of naloxone administration, if any; and perspectives on the use of naloxone. Interview questions were semi-structured and open-ended, allowing participants to talk freely, and interviewers followed up responses with prompts if additional clarification or more information was needed to fully understand participants' experiences or opinions. Interviews were conducted over the phone or in person in a private interview room, based on participant preference, and were recorded for subsequent transcription. The average duration of each interview was between 1 and 1.5 h. Participants were compensated with a \$50 gift card for their time. All study materials and methods were approved by the Dartmouth College Committee for the Protection of Human Subjects.

Data analysis

Interview transcripts were uploaded to a qualitative data analytic software, ATLAS.ti (v. 8.1) (ATLAS.ti Scientific Software Development GmbH, 2017). Research staff members read the transcripts completely to ensure coherence and coded study-relevant text segments during subsequent readings. The quality of the transcriptions was ensured by dual involvement of interviewers in the analyses. Any questions or discrepancies regarding specific transcriptions were addressed through verification in the original recording. Transcripts were analyzed using content analysis (Powers & Knapp, 2006), which systematically categorizes and describes content to determine patterns and themes (Downe-Wamboldt, 1992; Morgan, 1993). A directed approach to content analysis was used (Hsieh & Shannon, 2005); domains in the interview guide (e.g., treatment, harm-reduction strategies, experiences with naloxone, and experiences with overdose) served as a framework for the development of an initial code list for each group—opioid users and responders. Five members of the research team completed first-level coding of relevant text segments, starting with two of the same transcripts from each group with the corresponding code list. Analysts noted and discussed any issues, and then iteratively revised and expanded each initial code list to include emergent subcodes. The four primary analysts then coded the remaining 74 user and 34 emergency responder transcripts, meeting weekly to reach consensus in coding. Discrepancies were resolved by discussion. After coding all transcripts, five members of the analysis team conducted a subtheme analysis. Analysts exported reports with all coded text segments for each code

Table 1
Participant characteristics.

	Responder characteristics (n = 36)	User characteristics (n = 76)
Age in years, <i>m(sd)</i>	42.5 (9.6)	34.1 (8.3)
Gender, <i>n(%)</i>		
Male	29 (80.6%)	37 (48.7%)
Female	7 (19.4%)	39 (51.3%)
County, <i>n(%)</i>		
Cheshire	6 (16.7%)	7 (9.2%)
Grafton	6 (16.7%)	6 (7.9%)
Hillsborough	6 (16.7%)	41 (54.0%)
Rockingham	6 (16.7%)	6 (7.9%)
Strafford	6 (16.7%)	8 (10.5%)
Sullivan	6 (16.7%)	8 (10.5%)
Primary professional role, <i>n(%)</i>		
Police	6 (16.7%)	NA
Fire	6 (16.7%)	NA
Emergency medical services	6 (16.7%)	NA
Emergency department	18 (50.0%)	NA
How many overdoses have you responded to? Median (<i>range</i>)	78 (4–1000)	NA
How many times have you administered naloxone, <i>m(sd)</i>	52 (107)	NA
Previously received naloxone, <i>n(%)</i>	NA	33 (62.3%)
Number of naloxone administrations per overdose^a, <i>m(sd)</i>	NA	3.0 (1.6)

Note: NA = not applicable.

^a Among consumers who reported receiving naloxone (*n* = 33).

and subcode and then reviewed the coded text segments line by line to identify patterns and themes. Two analysts reviewed all coded text segments within each interview guide domain, and the analysts met weekly to discuss these themes and subthemes. The following results focus specifically on users' and responders' perspectives regarding the use and acceptance of naloxone as a safe, effective, and accessible intervention in addressing the opioid overdose crisis.

Results

A total of 112 semi-structured interviews were conducted with 76 opioid users and 36 emergency responders throughout six counties in NH (Table 1). No substantial differences were noted regarding opinions about naloxone across participants based on varying locations or the various roles within the responder group. In response to questions on experiences with, and opinions of, naloxone, respondents predominantly discussed barriers to naloxone use and acceptance. Therefore, the current findings are organized into two key domains: (1) responder barriers to naloxone use and acceptance, and (2) user barriers to naloxone use and acceptance.

Responder barriers to naloxone use and acceptance

Responders expressed widespread perceptions that naloxone availability had increased throughout the state at the time of data collection, and acknowledged that naloxone is an effective way to rapidly reverse overdose due to opioids (Table 2). Several responders also commented that the experience of administering naloxone was highly rewarding: "There's a couple things we do in medicine that are pretty great because it's like you're raising the dead, and it's one of them" [ED].

Despite the perceptions of increased naloxone availability and affirmations of its effectiveness, various barriers to its use and acceptance persist (Table 3). Some responders fully supported efforts to increase naloxone in the community: "I think having it [naloxone] available to

Table 2
Community enthusiasm for naloxone.

Subtheme	Illustrative quote
General agreement on increased naloxone availability	
User	<i>As far as I know, it's relatively simple. You just go to the doctor and you tell them that, you know, you yourself or somebody that you know that you have exposure to on a regular basis is an addict and there's a potential need for Narcan... and they'll give it to you, pretty much no questions asked. [opioid user]</i>
Responder	<i>[Naloxone] is out there more. It's out in the open now. It's being distributed by hospitals and crisis centers and that kind of stuff. [fire]</i>
Acknowledgement that naloxone effectively reverses overdose	
User	<i>It instantly releases. It is horrible, but it wakes you right the f*** up, and you're starting from a detox standpoint, and that's it. [opioid user]</i>
Responder	<i>Well, it definitely saves lives. If you didn't have it, you'd have literally ... I mean, well, I'll give you the stats. We had 331 overdoses we knew about in Nashua in 2016 and 44 deaths. If in fact we didn't have Narcan, we'd have 331 deaths. I mean, that's just as we know of. Yeah, it absolutely saves lives. I hate to say it, but it's a medical magic bullet for people that overdose on opioids. [police]</i>
Rewarding experience of reversing overdose with naloxone	
Responder	<i>I think in the beginning of my career, I really thought it was sort of a heroic ... It was very self-gratifying, because I took somebody who wasn't breathing, I was able to breath for them, and then administer medication that allowed them to basically come back from the almost dead. [emergency medical services]</i>

as many people as possible is great” [EMS]. However, many responders perceived that increasing naloxone availability enables and even encourages use of opioids:

They don't see it as, ‘Hey, we're cheating death.’ They say, ‘Hey, we're helping each other. We're protecting each other. We're going to do this and just you're going to stand by. It probably won't happen because I know what I'm doing, but if it does happen, you're there to stick me.’ Again, it encourages use. [police]

Many noted that naloxone allows opioid users to “push the high” and encourages riskier opioid use: “People feel safer doing it, and people can do higher levels...” [ED]. Furthermore, responders expressed concerns that naloxone is a short-term fix that fails to address long-term issues of addiction: “It's kind of a crutch; it's kind of a band-aid. It's not a long-term solution to a chronic problem the community is facing” [EMS].

Responders also widely spoke of difficult patient encounters following the administration of naloxone. These participants addressed common incidents of interacting with angry patients after being revived with naloxone: “Typically, this is unfortunate, but very typically the person that was just revived is pissed off that we ruined their high” [police]. They also expressed concerns regarding their own safety due to patient responses to precipitated withdrawal symptoms, which can result from overdose reversal by naloxone: “When you give somebody

intravenous Narcan, because you're throwing them immediately into withdrawals, they can have a tendency to be violent, unintentionally violent, but violent” [EMS]. Some responders indicated that these encounters could be avoided by more gradual titration and nuanced administration of naloxone to prevent precipitated withdrawal: “I think we have become a lot more nuanced in how we use Narcan, so we've learned to tailor it to, really, just their respiratory drive as opposed to having them be both wide awake, sitting upright, staring at you in withdrawal” [ED].

User barriers to naloxone use and acceptance

Users largely agreed that naloxone is an effective way to reverse overdose, and some expressed a perception during the study period that naloxone was generally available in NH (Table 2): “I'm seeing it more and more out here. They give it out... I didn't used to see Narcan, but now I see it all over the place” [opioid user]. However, this perception of availability by some contrasted with many users' statements regarding access. Several users commented that naloxone was not accessible in their region (“I'm sure if I persisted, I could get it, but it's like... You really have to go out of your way” [opioid user]) or that they were simply unsure about naloxone availability (“I've heard that you can get it at a pharmacy or something... maybe now, but I'm not sure” [opioid user]). Additional barriers on the user side included

Table 3
Responder barriers to naloxone use and acceptance.

Subtheme	Illustrative quote
Belief that naloxone enables opioid use	
Increased opioid use	<i>Why is because I think it does the same thing as, “Hey, listen... You can go to Walgreens and you can get free Narcan. As long as you have that, listen, listen, listen. As long as you and I are going to shoot up together, I got this free Narcan, so if I go out you got to just jam this in my arm, and we're good to go. I can shoot all the heroin I want because I got Narcan.” [police]</i>
Enables riskier use of opioids	<i>People are getting Narcan more often and I think knowing that it's out there... Whether they are choosing to be riskier and take higher doses... I think we're seeing more people who have had repeat Narcan administrations. [emergency department]</i>
Naloxone does not address underlying addiction	<i>Narcan has been billed as a miracle drug by politicians, and bureaucrats, and so-called experts. When the timing is right, it is a miracle drug. However, it doesn't help everybody, and it will do nothing for you in the long term. It is a short-term fix, unfortunately, for a very long-term problem. [emergency medical services]</i>
Difficult patient encounters after naloxone	
Titration of naloxone	<i>When you gave an IV, if you administered it too fast, people would wake up instantly. They would be incredibly violent and angry, so now you have an angry, combative patient and a contaminated sharp needle in the back of a very small ambulance, and that posed a huge risk for us. [emergency medical services]</i> <i>If we can get you to where you're breathing well and oxygenating yourself, then that's really how much Narcan you need. Again, if you have the time and the staffing to do it in that nuanced manner, you can give smaller doses to get that effect and not induce this acute withdrawal state... We didn't like putting these guys into acute withdrawal because it was never pleasant for us or them. [emergency department]</i>
Belief that lay use prevents people from going to the ED	<i>I think the bad side is I don't think we're called as much now. I think they're just using the Narcan and then just saying, “We don't want the police or the EMS there.” [emergency medical services]</i>

Table 4
User barriers to naloxone use and acceptance.

Subtheme	Illustrative quote
Misunderstanding of naloxone use	
Uncertainty about how to administer naloxone	<i>I wouldn't know how to do it [administer naloxone] myself. I would be scared. I wouldn't know. [opioid user]</i>
Misguided alternatives to reverse opioid overdose	<i>You always see flyers about [naloxone], and this and that, but you always have to travel to go get it. They were making it so expensive to buy in pharmacies and stuff that somebody who's an addict is not going to go spend that money on Narcan when they can go buy drugs, because being an addict you find these ways like splash water on them, put them in really cold water to shock their body, inject them with coke because it will reverse the effects. We kind of found ways to bring somebody back. [opioid user]</i>
Distribution barriers	
Cost	<i>Nobody is gonna spend, especially if they have a problem, \$50 is more than they have... They are already spending too much money on this drug. \$50 is unlikely. [opioid user]</i>
Lack of knowledge regarding where to access	<i>It's like one of those things that kind of just shows up. Sometimes when you need it and sometimes when it doesn't show up. I don't really know how people get this s***. It's just sometimes there and sometimes it's not. [opioid user]</i>
User/responder relations	
Legal concerns	<i>Nobody wanted to call the cops because they didn't want to be involved in it, because people were selling drugs out of there. Luckily somebody else in the building found them, and they were able to save them. [opioid user]</i>
Lack of trust	<i>I don't think they [medical providers] would give it [naloxone] to a strung-out addict who is just gonna overdose and try to bring himself back. [opioid user]</i>
Stigma	<i>A lot of the doctors that regulate it are very... I wouldn't say choosy on who they give it to, but their standards are pretty high and they're very judgmental. [opioid user]</i>
User experiences with overdose and naloxone	
Witnessing overdose as more traumatic than individual experiences with overdose	<i>It's the other people that realise how much effort's going into waking you up and s***. That's the scary part... It's the ones that sit around and watch him f***ing turn blue and fall down... Those are the people that get f***ing traumatised by s***. [opioid user]</i>
Resistance to naloxone use due to withdrawal symptoms	<i>Bang, here's some Narcan. We're going to kick all the f***ing dope off your receptors instantly... instead of gradually letting them fall off, like a tree. You have a tree and the apples fall off the tree on their own, or you can go up the tree and shake the s*** out of it and they all fall down... Like being in your mother's womb and being f***ing ripped out of it, and thrown on the table... That's how bad it hurts... It's like taking a caterpillar out of its cocoon and throwing it on the ground, you know? Before it's ready to hatch. [opioid user]</i>

misunderstandings regarding naloxone use, relationships between users and responders, and experiences with overdose and naloxone (Table 4).

Misunderstandings regarding naloxone use included perceptions that only medical professionals can administer naloxone: "... the police will take it from you, which makes absolutely no sense to me. They are like, 'It needs to be administered by a professional'" [opioid user]. Some participants expressed uncertainty about how to administer naloxone: "I don't know how to use [naloxone]; I guess it's a nose spray or something" [opioid user]. Some denied that they would ever need to use naloxone for themselves and stated that misguided methods such as cold water could effectively reverse opioid-related overdoses: "I believe that you can go out and come back without medical attention. I mean, there's things you can do. You can shock somebody by giving them a cold shower, or stuff like that" [opioid user]. Users also expressed reluctance that other opioid users would be willing to spend money on naloxone over opioids: "When it comes down to it, are you going to spend \$30 on a Narcan kit or a bag of dope? Usually a bag of dope" [opioid user].

In terms of user and responder relations, many users expressed legal concerns, often despite having prior knowledge of an effective Good Samaritan Law in NH, which provides immunity from legal repercussions that might otherwise be imposed on bystanders: "A lot of people are afraid to call 911 or anything like that. Which they really shouldn't be, but you know, I can understand the fear of it. You don't want a bunch of cops coming in and trying to bust you for something that you may be doing or that person was doing and blaming you for it" [opioid user]. Additionally, several users felt that pharmacists, physicians, and first responders were not receptive or interested in distributing naloxone because of stigma toward people who use substances: "I think there's way too much stigma around addiction, and there's not enough awareness of the importance of Narcan that when people are asking for it in hospitals and being denied, that's not how it should be. Absolutely not. They should be handing it out" [opioid user].

Further, participants almost unanimously agreed that the experience of witnessing an overdose is more traumatic than experiencing an overdose themselves: "It's not so much scary that you OD. I think it's more scary to see somebody else OD... I've had a couple of people OD

and die in front of me. It's scary, because you do everything, everything you can to help them" [opioid user]. Among the 76 opioid users, only one commented that their own overdose experience convinced them to seek treatment for their opioid use. Participants also commented that naloxone administration immediately put them into withdrawal, which often led to an urgent desire to use again to eliminate the withdrawal symptoms: "They were complaining of headache and nausea, and withdrawal was the first thing that came to mind, so they did more drugs, and then they died from that because they assumed they weren't high anymore, so they needed to get high not to be dope sick" [opioid user]. Some commented that these withdrawal symptoms contribute to a resistance among users to receive naloxone: "I've always told people that if I was OD'ing, try and get me to come back on my own, and worst-case scenario use Narcan, but I don't want it used on me" [opioid user].

Discussion

The opioid epidemic, both throughout the US and specifically in NH, has gained widespread attention as a significant public health crisis. Given the increasing prevalence of fentanyl-related overdose and the larger doses of naloxone sometimes required to reverse overdoses from synthetic opioids like fentanyl, there is an overall need to expand naloxone access and optimize its distribution (Barry, 2018; Fairbairn, Coffin, & Walley, 2017; Lewis, Vo, & Fishman, 2017; Somerville et al., 2017). The current study focused on NH as an exemplar state, given that it has been among the states most impacted by the US opioid crisis and given that limited research has characterized the breadth and impact of naloxone distribution in NH. Findings from the current study suggest that a number of social and policy-level changes are important to improve access to, and acceptability of, naloxone and reduce drug-related harms.

Results from the present study indicate that a major source of opposition to naloxone occurs at the social level of the risk environment for responders and is rooted in concerns that naloxone enables greater and/or riskier opioid use. This finding closely aligns with other reports in the existing literature. Haug et al. (2016) revealed that, although many providers show concern for individuals who misuse substances

and recognize the efficacy of naloxone in overdose reversal, providers had mixed perceptions regarding the role of naloxone in overdose management, and many expressed beliefs that naloxone does not address the problem of opioid addiction where there is a high probability for recurrent overdose. In Drainoni et al.'s 2016 study of emergency department staff, many participants commented that a potentially unspoken barrier to kit distribution might relate to perceptions of who is "worthy" to receive naloxone kits, despite a medical understanding of addiction and withdrawal. Kirane et al. (2016) found that 35% of providers felt that substance use disorders were due in part to moral failings. These stigmatized views prevent acceptance by emergency responders and the community at large, and consequently the successful implementation of naloxone distribution programmes.

In contrast to some of these perceptions by various community stakeholders, several studies have concluded that increasing naloxone accessibility neither encourages opioid users to increase drug consumption, nor increases the likelihood that users will harm themselves or those around them (Rees, Sabia, Argys, Latshaw, & Dhaval, 2017; Seal et al., 2005; Wagner et al., 2010). A 2017 study by Rees et al. on the effect of Naloxone Access Laws found that for the period of 1999–2014, the adoption of a Naloxone Access Law was associated with a reduction in opioid-related deaths of 9–11%. Prior literature also demonstrates that bystanders are both willing and able to effectively administer naloxone (Mueller, Walley, Calcaterra, Glanz, & Binswanger, 2015), and with proper training through opioid overdose prevention programmes, there are few, if any, risks associated with laypeople administering naloxone (Willman, Liss, Schwarz, & Mullins, 2017). The current study highlights the importance of embracing the perspectives of users and responders as a key part of naloxone distribution campaign efforts to help address misconceptions and maximize the availability, acceptability, and optimal use of naloxone as part of a broader, multi-faceted initiative to reduce overdose deaths.

The present study also elucidated a belief that naloxone does not address underlying issues of addiction. Indeed, the primary objective of naloxone is to reverse opioid overdose, not to treat addiction. Naloxone is a harm-reduction tool and not a form of treatment for opioid use disorders. It remains important to address misconceptions that the experience of overdose reversal by naloxone will cause opioid users to immediately turn to treatment for opioid use disorder. User-level data from this study indicated that experiences of overdose might not drive users to seek treatment for at least two reasons. First, experiences with overdose are more traumatizing for bystanders (often first responders) than the users who overdose, and second, the severity of symptoms associated with precipitated withdrawal often drives users to seek opioids in order to eliminate the symptoms. Responder expectations that an overdose experience will direct users toward treatment may lead to increased disappointment and burnout and may contribute to persistent stigma towards opioid-using populations. Life-saving interventions like naloxone are vital to ensuring that opioid users have the opportunity to seek longer-term treatment.

Study findings also demonstrated that several emergency responders have the ability to administer naloxone in a manner that can prevent experiences of precipitated withdrawal among persons who have overdosed. Responders indicated that this practice requires a combination of training and resources, namely a combination of intranasally and intramuscularly or intravenously administered naloxone. Improved abilities to titrate naloxone may help address unpleasant and sometimes violent patient experiences for responders, prevent debilitating withdrawal symptoms for patients that may encourage opioid-seeking behavior and risk for re-overdose, and improve patient-responder relationships.

Barriers to accessing and using naloxone for opioid users occurred at the social, physical, and policy levels. Users demonstrated various misperceptions regarding where to access naloxone and the efficacy of naloxone compared to other ineffective methods, such as cold water. Future distribution efforts should prioritize communication of the

current status of harm-reduction policies (e.g., the Good Samaritan Law), and communicate with layperson language the specific mechanisms by which naloxone works to reverse overdose. It is also critical to choose naloxone distribution locations that are readily accessible in a diverse array of community settings to minimize stigma and to promote widespread messaging regarding the specific locations where naloxone may be accessed. Furthermore, opioid users were often uncertain about the legality of using naloxone, indications for naloxone use (e.g., usefulness for prescription opioids and heroin; all routes of opioid consumption), and whether laypersons are qualified to reverse overdose with naloxone. Public health campaigns must expand education about naloxone, with an emphasis on these demonstrated gaps in knowledge.

Our results revealed responders' perspectives on increased access to naloxone among community members, including a belief that consumers use emergency department medical services less frequently than needed as a result of this expanded community access. However, emergency department and hospital billing data from July 2016 to September 2017 indicated that NH has not experienced significant decreases in emergency department visits related to opioid overdose (Vivolo-Kantor et al., 2018), and data from the NH Drug Monitoring Initiative by NH DHHS indicate that opioid-related ED visits increased by 18.5% from December 2017 to January 2018, with a 54% increase in heroin/fentanyl treatment admissions during that same period (New Hampshire Drug Monitoring Initiative, 2018). These results underscore the utility of having multiple flexible points of naloxone access—both in diverse community settings as well as via the first-responder system. Given the dynamic nature of the opioid crisis, it is imperative that responders are routinely provided with up-to-date information that may be relevant to their role in addressing these issues.

Critically, emergency responders may benefit from a more thorough understanding of the role of naloxone in the context of addiction as a chronic relapsing condition, namely its utility as well as its limitations. Education efforts should address 1) responder understandings of the current status of the opioid crisis within NH, 2) responder understandings regarding the primary role and limits of naloxone, and 3) responder ability and willingness to prevent precipitated withdrawal symptoms.

The optimization of naloxone distribution efforts is dependent on emergency responders, opioid users, and the broader community supporting its widespread distribution. It is important to address frustrations that naloxone enables use and does not treat underlying addiction by emphasizing naloxone use as a harm-reduction strategy rather than treatment. Individual user narratives surrounding addiction and experiences with overdose can be leveraged as powerful tools to do so.

Importantly, although naloxone is a demonstrated life-saving medication, efforts to combat the opioid crisis and its associated harms must include—and also extend beyond—harm-reduction strategies. A multi-pronged approach to reducing opioid overdose death and providing life-changing resources to individuals with opioid use disorders should also ensure low-threshold, highly available access to Food and Drug Administration (FDA)-approved medications (National Academies of Sciences, Engineering and Medicine, 2019) and accompanying evidence-based behavioral treatments for opioid use disorders that appropriately target the underlying disease of addiction. Complementary efforts should focus on the various social determinants of addiction and factors that largely impact a recovery process, including unemployment, lack of housing, and familial substance use.

The findings of this study are subject to several limitations. The user and responder samples consisted of volunteers who may have stronger opinions about, and/or more experience with, naloxone than the populations they are intended to represent. The potential for social desirability bias should also be considered. For example, responders may have been reluctant to share their biases about opioid-using populations, though users were clear that stigma was a barrier to naloxone access. Further, the small sample size may have precluded the detection

of potential geographical and/or subgroup differences within the responder category. The findings may not be transferable to other US states given that this was a NH-specific study. Future research is recommended to expand upon the subsample size and to determine the broader geographical applicability.

Naloxone is a rapid and effective tool to reverse opioid-related overdoses. Although there are various opportunities available throughout NH for naloxone training, there is a need for expanded resources that provide more comprehensive education regarding naloxone use that are responsive to the needs and perspectives of both opioid users and emergency responders. It is not, however, the sole responsibility of individuals to improve their knowledge about opioids and naloxone, nor would doing so fully address the crisis. In his landmark paper on the “risk environment,” Rhodes (2002) makes clear that a variety of factors—physical, social, economic, and policy—interact in at least two levels—micro and macro environments—to determine the chances of drug-related harm and the relative success of harm-reduction efforts. Thus, both risk and response are impacted by the contexts in which they occur. For example, state policies influence the risk environment. In addition to efforts aimed at bolstering prevention and treatment services, many states, including NH, have turned to initiatives seeking to increase access to naloxone. Users and responders alike generally perceived naloxone as an increasingly available resource to the public at the time of data collection. However, the growing availability of naloxone in NH, via policy decisions such as *New Hampshire House Bill 271 (2015)*, has not translated to on-the-ground perceptions that naloxone is easily accessed. While initiatives focused on increasing access to harm-reduction resources remain important, experiences with stigma as well as fear and mistrust toward health and governmental officials persist as barriers to their safe and successful implementation. Considering the physical, social, economic, and policy factors at both the macro and micro levels is critical to effectively addressing the opioid crisis.

Funding

This research was supported by NIDA U01DA038360-Z0717001 (PI: Wish; Sub PI: Marsch) with additional infrastructure support provided by NIDA UG1DA040309 (PI: Marsch).

CRediT authorship contribution statement

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Declaration of Competing Interest

None.

Acknowledgments

The authors would like to thank all of the study participants, as well as the staff at Groups: Recover Together, Manchester Fire Department, and Serenity Place, for their support of the study.

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