



# Assessment of Opioid Overdose Risk and Response Readiness Among Patients at a Clinic for Uninsured Patients

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## Abstract

**Background:** The opioid epidemic has been worsening. Fortunately, studies show that bystanders can effectively administer naloxone to reverse opioid overdose, and overdose education programs result in improved ability to respond to overdose. However, there has been limited research investigating opioid overdose risk and response preparedness among patients without insurance. This descriptive report aimed to assess risk of opioid overdose among patients without insurance in addition to their family members and close contacts and assess whether these patients, as crucial bystanders, were prepared to respond to opioid overdose.

**Methods:** Patients without insurance at a student-run free clinic completed an anonymous, voluntary survey during in-person appointments. Data were collected for eight months from 2021-2022. One-proportion Z-test compared respondent rates of opioid use with overall statewide community rates reported by the Wisconsin Department of Health Services (DHS) Opioid Dashboard. Subgroup analysis further described the data collected, and hypothetical number needed to screen (NNS) calculations explored possible screening methods for naloxone distribution.

**Results:** Seventy-two patients responded to the survey. The past-year rate of medically prescribed opioid use in the study population (12.5%) did not differ from the rate statewide (15.8%;  $p=0.44$ ). Zero respondents reported personal opioid overdose in the past year, but six overdoses had been witnessed. Among respondents with family or close contacts who use opioids, 50% of those respondents who do not carry naloxone do not know where to get it, but 75% of those respondents who are not trained on how to respond to overdose would like to be. Lastly, screening for family or close contact opioid use offered the lowest hypothetical NNS of screening methods considered.

**Conclusions:** Patients without insurance at student-run free clinics, including those with family members or close contacts who use opioids, likely represent a target population for opioid overdose education and naloxone distribution.

## Introduction

The opioid epidemic has been a worsening public health crisis.<sup>1</sup> In the United States, prescription opioid overdose deaths in 2018 were 4 times higher than 1999,<sup>2</sup> and opioids accounted for 70% of all drug overdose deaths in 2018.<sup>3</sup> The rate of death associated with synthetic opioids increased by 56% from 2019 to 2020.<sup>4</sup> Additionally, the COVID-19 pandemic led to an increase in

drug overdoses. Weekly emergency department visits for all drug and opioid overdoses were up to 45% higher in 2020 compared to the same period in 2019.<sup>5</sup>

Studies have shown that bystanders can effectively administer naloxone to reverse opioid overdose and that overdose education programs result in improved ability to recognize and respond to opioid overdose.<sup>6-9</sup> One study found that implementation of overdose education and

naloxone distribution (OEND) programs reduced death rates due to opioids,<sup>10</sup> and another study conducted by the Massachusetts Department of Public Health OEND Program found that 20% of their recorded naloxone rescues were attempted by family members.<sup>11</sup> Despite the promising effectiveness of OEND programs and the fact that patients who are uninsured are at increased risk of death due to opioid overdose,<sup>12</sup> there is limited research investigating opioid overdose risk in this population. Additionally, as family members and close contacts have the potential to be frequent responders to opioid overdose,<sup>11,13</sup> one question becomes whether patients without insurance are prepared to respond to opioid overdose among their own family members or other close contacts in order to prevent overdose deaths in their communities.

### Objectives

This descriptive report aimed to assess the risk of opioid overdose among patients without insurance in addition to their family members and close contacts and to assess whether these patients, as crucial bystanders, were prepared to respond to opioid overdose. It hopes to help inform how clinics may respond to the opioid epidemic and to inspire future research regarding opioid use and education among patients who are uninsured.

## Methods

### Community Partnership

Researchers partnered with a student-run free clinic for patients without insurance located in Milwaukee, Wisconsin. The demographics of the patients served at the clinic were as follows: 49% African American, 22% White, 16% Hispanic, 9% Asian, and 4% other.

### Participants and Data Collection

Patients completed an anonymous, voluntary survey while at the clinic for in-person appointments. The survey was completed on paper, and data were collected for eight months from 2021-2022 with 72 patients completing the survey. Research participants were all uninsured, English-speaking, and 18-years-old or older. Participants were screened for prior survey completion to

**Table 1.** Pertinent data from the Wisconsin DHS opioid dashboard

Variable	Value
Prescribed opioid use, %	15.8
Opioid misuse	4.7
Opioid overdose (Wisconsin), rate per 100,000	53.7
Opioid overdose (Milwaukee County)	77.0

DHS: Department of Health Services.

**Table 2.** Variables assessed via an anonymous patient survey (N=72)

Variable	n	% of total respondents
Opioid use	10	13.89
Prescribed opioid use	9	12.50
Opioid misuse	1	1.39
Family/close contact opioid use	7	9.72
Affected by opioid use	15	20.83
Overdosed from opioids	0	0.00
Witnessed an opioid overdose	4	5.56
Sum of witnessed opioid overdoses	6	N/A
Used naloxone	0	0.00
Trained on responding to opioid overdose	8	11.11
Would like to be trained	13	18.06
Carry naloxone	2	2.78
Unsure where to get naloxone	44	61.11

N/A: not applicable.

prevent duplicate respondents. This research received institutional review board (IRB) approval.

### Variables and Measurements

This study used the Wisconsin DHS opioid dashboard<sup>14</sup> to compare rates of opioid use, misuse, and overdose from study data with rates county- and statewide. The values for these DHS dashboard metrics are included in Table 1. Data on prescribed opioid use were from 2019 and gathered using the Behavioral Risk Factor Survey coordinated by the Centers for Disease Control and Prevention.<sup>15</sup> Data on opioid misuse were from 2017-2018 and gathered using the National Survey on Drug Use and Health sponsored by the Substance Abuse and Mental Health Services Administration.<sup>16</sup> Data on opioid overdose, defined

**Table 3.** Analysis within different subgroups of respondents

Subgroup	Variable	n within subgroup	% of subgroup
Family/close contact opioid use (n=7)	Trained on responding to opioid overdose	3	42.86
	Would like to be trained	3	42.86
	Carry naloxone	1	14.29
	Unsure where to get naloxone	3	42.86
Witnessed an opioid overdose (n=4)	Trained on responding to opioid overdose	1	25.00
	Would like to be trained	2	50.00
	Carry naloxone	1	25.00
	Unsure where to get naloxone	3	75.00
Not trained on responding to opioid overdose (n=62)	Would like to be trained	12	19.35
Don't carry naloxone (n=64)	Unsure where to get naloxone	41	64.06
Family/close contact opioid use + Not trained on responding to opioid overdose (n=4)	Would like to be trained	3	75.00
Family/close contact opioid use + Don't carry naloxone (n=6)	Unsure where to get naloxone	3	50.00

as emergency room hospitalizations for opioid overdose, were from 2021 and calculated using hospital data collected by the Wisconsin Hospital Association Information Center.

The online appendix includes the survey provided to patients. The authors worked with a community partner to develop a novel survey using a literature review to assess the need for and potential impact of opioid education and naloxone distribution in a student-run free clinic setting. The Center for Medicare and Medicaid Services' "Accountable Health Communities Health-Related Social Needs Screening Tool"<sup>17</sup> was referenced for survey language. Survey questions ultimately investigated personal opioid use and overdose, family and close contact opioid use and overdose, and aspects of responding to opioid overdose including questions about naloxone. Table 2 lists the study variables assessed by the survey. "Affected by opioid use" is a variable defined as those who report either personal opioid use or family or close contact use.

#### Analytical Methods

Data analysis was performed using R (2023.03.0, RStudio, Boston, Massachusetts) A one-proportion Z-test compared study population rates of opioid use with overall statewide community rates reported by the Wisconsin DHS Opioid Dashboard.<sup>14</sup> In addition, to further

describe study data, percentages for survey responses were calculated for different subgroups of respondents.

To evaluate options for distributing naloxone in clinics for patients without insurance, this study performed hypothetical number needed to screen (NNS) calculations based on various patient screening methods. NNS, a "number needed" metric calculated as the reciprocal of absolute risk reduction, is an established measure of the effectiveness of various cancer screening methods and "represents the number of patients who must be enrolled in a screening program over a given period of time to prevent one death from the disease in question".<sup>18</sup> NNS is a metric calculated in randomized controlled trials (RCT), and though this study is not an RCT, a hypothetical NNS was calculated to determine what the NNS could be if screening were to be performed on a group of patients with overdose data matching those of study respondents. This hypothetical prospective intervention considers the possibility that future overdose patterns may be similar to the retrospective data collected in this study. In this hypothetical scenario, the respondents acted as their own controls. Each person screening positive would receive one naloxone kit to be able to intervene in the case of overdose. The experimental group are those who receive naloxone based on a particular patient screening method,

**Table 4.** Results of one-proportion Z-test analysis comparing survey data with data from the Wisconsin DHS opioid dashboard

Variable	$\chi^2$	df	p-value
Prescribed opioid use	0.59	1	0.443
Opioid misuse	1.76	1	0.184

DHS: Department of Health Services; df: degrees of freedom.

**Figure 1.** Calculations determining the hypothetical NNS for distributing naloxone based on three different patient screening methods

<b>One naloxone kit is distributed to every patient:</b>	
	n = 72
4 respondents in this group witnessed at least 1 opioid overdose	
6 total opioid overdoses were witnessed in this group	
Control event rate (CER) = 6/72	
Experimental event rate (EER) = 2/72	
Attributable risk reduction (ARR) = CER – EER	
NNS = 1 / ARR = <b>18</b>	
<b>Screening based on being “affected” by opioid use:</b>	
	n = 15
3 respondents in this group witnessed at least 1 opioid overdose	
5 total opioid overdoses were witnessed in this group	
CER = 5/15	
EER = 2/15	
NNS = <b>5</b>	
<b>Screening based on family or close contact opioid use:</b>	
	n = 7
3 respondents in this group witnessed at least 1 opioid overdose	
5 total opioid overdoses were witnessed in this group	
CER = 5/7	
EER = 2/7	
NNS = <b>2.34</b>	

NNS: number needed to screen.

and the control group of equal size are those who do not receive naloxone. In this study, the hypothetical NNS represents the number of patients needed to be screened via a particular screening method to prevent a witnessed overdose without

bystander naloxone intervention.

## Results

The study sample consisted of 72 respondents. Table 2 reports study variables with percentages of total respondents to which each variable applies, and Table 3 provides subgroup analysis. Zero respondents reported personal opioid overdose in the past year, but six overdoses had been witnessed in the past year. Out of those respondents who reported witnessing an overdose, only 25% carry naloxone. Overall, two out of the total 72 respondents carry naloxone. Among respondents with family or close contacts who use opioids, 50% of those respondents who do not carry naloxone do not know where to get it, but 75% of those respondents who are not trained on how to respond to overdose would like to be. One-proportion Z-test results are provided in Table 4. The fraction of respondents reporting prescribed opioid use in the past year (12.5%) did not differ significantly from the DHS Wisconsin-wide value of 15.8% ( $p = 0.44$ ), nor did the fraction reporting opioid misuse (1.39%) in the past year differ significantly from the state-wide value of 4.7% ( $p = 0.18$ ). Since zero study respondents reported personal opioid overdose, these data could not be directly compared with DHS data. Figure 1 illustrates the NNS calculations for three screening methods. Screening based on family or close contact opioid use offers a lower hypothetical NNS (2.34) compared to the other screening methods considered.

## Discussion

Patients without insurance at student-run free clinics, including those with family members or close contacts who use opioids, likely represent a target population for OEND. Though respondents did not report a past-year history of personal opioid overdose, they reported witnessing a total of six overdoses in the past year. Clinic patients are crucial bystanders who can intervene during a witnessed overdose, including an overdose of a family member or close contact. Very few respondents reported carrying naloxone, and, notably, among respondents with family or close contacts who used opioids, 50% of those

respondents who did not carry naloxone did not know where to get it. This represents a key gap in opioid overdose response readiness. Since overdose education and naloxone distribution programs, including programs directed towards laypeople and those implemented in care settings, are effective in improving overdose recognition and response,<sup>7,10,11</sup> free clinics for patients without insurance could distribute naloxone so that their patients are well-equipped to respond to a witnessed overdose. Among respondents with family or close contacts who used opioids, 75% of those respondents who were not trained on how to respond to overdose would like to be. Offering this training at free clinics for patients without insurance could target individuals with family or close contacts who use opioids but who are not already trained to respond to overdose.

Hypothetical NNS calculations demonstrated that screening based on family or close contact opioid use offered a lower NNS and therefore may represent a favorable screening method. Distributing naloxone by screening for family or close contact opioid use could also be an effective and responsible use of resources because it could result in a targeted distribution of naloxone. Additionally, asking about family or close contact opioid use rather than personal use could reduce stigma felt by patients who are screened.

However, other naloxone distribution models exist in the community. Austin and San Diego implemented naloxone vending machines where patients can readily access free naloxone.<sup>19,20</sup> This method would certainly eliminate stigma associated with accessing naloxone. Perhaps implementing in parallel both a vending machine model and screening for family or close contact use to distribute naloxone would represent a balanced approach. This combination method considers several goals: increasing patient awareness of the issue of opioid overdose, improving patient education by promoting conversations between providers and screened patients, minimizing stigma, and maximizing naloxone distribution.

#### *Limitations and Generalizability*

Patients may have chosen not to participate in the study for various reasons including the stigma associated with the subject matter or perceived risks associated with responding.

Therefore, respondents were self-selected. In part due to self-selection, the sample size was modest, which prevented use of stronger inferential testing methods. Response rate affects the usefulness of NNS calculations when considering implementation of screening questions in clinics. Response rates for clinical screening questions may differ from that of an anonymous, voluntary survey done for research.

As resources limited access to translation services, non-English-speaking patients were excluded from this study; however, many clinic patients do not speak English as a preferred language. Being a US-born English speaker is a factor associated with increased overdose risk;<sup>21</sup> therefore, by excluding patients who did not speak English as a preferred language, the study could have overestimated the overdose risk in the clinic population by sampling those at higher risk. Naloxone distribution in clinics should of course be expanded to patients who speak languages other than English.

#### *Future Directions*

To better understand how naloxone should be distributed at free clinics for patients without insurance or other clinics in urban settings, a future study could investigate the effectiveness of various distribution methods. An RCT study design would offer the ability to calculate true NNS values beyond the hypothetical calculations outlined in this study. It would be valuable to know which screening method truly leads to the greatest rate of naloxone distribution or the greatest rate of overdose rescue.

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#### **Disclosures**

The authors have no conflicts of interest to disclose.

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