Naloxone Awareness: The Fight Against the Opioid Pandemic

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How would mandating the inclusion of Narcan (naloxone) in every first aid kit across the United States help mitigate the effects of the opioid crisis, and what barriers exist to implementing such a policy?

Over the years, the opioid epidemic has become a major public health crisis in America. Synthetic opioids, including fentanyl, have been at the root of a sharp increase in overdoses and deaths. Nearly 108,000 Americans died in 2022 in a drug overdose, 82,000 of whom died in an opioid-related overdose, meaning 76 percent of all overdoses involved an opioid. Missouri has been particularly affected by this epidemic, as seen in the sharp increase in opioid overdose deaths. In 2020, Missouri recorded 1,386 drug overdose deaths, a 21 percent increase from 2019, with about 75 percent involving opioids. Naloxone, a prescription opioid blocker, is essential for reversing overdoses and saving lives.

# The Opioid Crisis and How Fentanyl Became a Threat

The opioid epidemic developed in three waves over the years. The first wave began in the 1990s with a surge in opioid painkiller prescriptions and increased misuse of these medications. In 2010, a second wave began with a rapid acceleration in deaths with the use of heroin. In 2013, a third and deadliest wave began with a rapid acceleration in deaths with use of synthetic drugs, most prominently illicit fentanyl. Fentanyl is a synthetic opioid that is 50 to 100 times more potent than morphine, significantly increasing the risk of an overdose. Because of its high potency, its use heightens the danger of an overdose, particularly when individuals have no idea that drugs have fentanyl in them. In 2020, 1,204 deaths in Missouri involved synthetic opioids, such as fentanyl and its analogs, a count almost seven times larger than in 2015.

#### **Naloxone: A Saving Overdose Intervention**

Naloxone is a prescription medication that can reverse an opioid overdose in a matter of seconds through its rapid activity at opioid receptors, antagonism of opioid drugs, and restoration of normal respirations in an individual whose respirations have ceased or have become slow due to overdosing with heroin or prescription pain medications. For 25 years, Naloxone has been a life-saving antidote for overdoses. Although community advocates have created early distribution programs for people who inject drugs, persistent stigma and reluctance to expand access have limited its full potential in preventing opioid-related deaths.

#### The Importance of Public Naloxone Distribution and Public Awareness

Community-based programs offering training and naloxone kits to laypeople have reduced deaths from overdoses. In 1996 and through June 2014, over 26,000 overdoses have been reversed, and over 150,000 persons have been trained through such programs. There have been a variety of programs in Missouri for accessing Naloxone. Missouri Department of Mental Health, in collaboration with Missouri Institute of Mental Health, is leading the State Opioid Response (SOR) project, with an objective to extend first-step prevention for opioids in schools and communities, extend access to interventions for harm reduction such as training for overdoses and dispensation of naloxone, and direct training for providers in chronic pain care. With this, Missouri gained significant funding for its battle with the opioid epidemic, including \$10 million in funding under both FY 2017 and 2018 under the State Targeted Response (STR) grant, additional funding. Missouri gained a grand total of \$66 million under both grants.

# **Challenges and Obstacles to Naloxone Availability**

Despite being proven effective, naloxone is not challenge- and barrier-free. Stigma towards the use of drugs, legal restrictions, and lack of awareness and familiarity inhibit its distribution and use. Policies varied across four states with high opioid-related death rates, each adopting different approaches to expanding naloxone access. Four high-opioid death-rate states adopted new but unique approaches to policymaking.

# Legislative Approaches in Missouri: Naloxone Awareness Proclamation

Acknowledging the gravity of the epidemic of opioids and its efficacy in its use in intervention in overdoses, Missouri took a variety of legislative actions towards increased access and awareness for naloxone. In 2017, Missouri's Department of Health and Senior Services issued a statewide standing order allowing naloxone to be dispensed without an individual prescription. Under such an order, a family member attending these programs, interventions including Expanding Naloxone Access and Community Trainings (ENACT) seek to expand training and distribution of naloxone in a move to slow down lethal overdoses of opioids. ENACT seeks to map gaps in existing infrastructure, build training for first-line workers, and boost distribution of naloxone in high-priority areas. In support of such state actions, my purpose is to make a proclamation in Missouri in a move to recognize the crisis and raise awareness regarding Naloxone. Verify the intensity of addiction and overdoses of opioids in Missouri communities Encourage Naloxone Education: Fund community outreach programs to educate citizens about naloxone and its use Support Harm Reduction Policies: Get involved in advocacy for less stigmatized policies regarding substance use disorder and for supporting harm reduction strategies. In striving towards such a statement, your efforts join national efforts in raising awareness regarding Naloxone. In June 2023, for example, a resolution in the U.S. House of Representatives supported a statement declaring June 6th National Naloxone Awareness Day and saw value in educating citizens and offering access to naloxone. Missouri is taking a proactive role in addressing the epidemic of opioids through supporting legislation, a community campaign to raise awareness, access to naloxone, and save lives down the line. The opioid epidemic, in part fueled through widespread illicit use of drugs including fentanyl, continues to plague public

health in Missouri and at a national level. Naloxone, a successful intervention for countering overdoses and preventing fatality, continues to encounter barriers in its widespread use and availability, including stigma, legal restrictions, and lack of awareness. In Missouri, legislative actions, including statewide stand orders signed off at a level of dispensation at a pharmacy but not necessarily with a prescription, have facilitated increased access to naloxone. Programs, including the Expanding Naloxone Access and Community Trainings (ENACT), make a longterm contribution towards such interventions through training and dispensation of naloxone in high-priority communities. Issuing a statement to raise awareness about the opioid epidemic and Naloxone reaffirms the community's commitment to combating this crisis. In supporting such a statement, one aids in creating awareness in society, in destigmatization, and in supporting the use of such a tool for harm reduction that can save lives. By employing a multi-faceted model with legislative intervention, education, and encouragement of life-saving interventions such as naloxone, we can strive towards minimizing the impact of the epidemic and creating a healthy community.

#### Methodology

To understand knowledge on what naloxone is and develop a baseline, a pre-test/posttest experimental design was used to assess participants' knowledge of the opioid crisis, fentanyl, and naloxone before and after the educational intervention. The participants first completed a Likert-scale pretest survey measuring their baseline knowledge on naloxone, opioids, and Missouri's policies on harm. Then a pre-recorded video presentation was shown to them featuring the importance of naloxone and what it was. The presentation was distributed via social media, community health organizations, and local outreach programs. After viewing the presentation, participants completed the **post-test survey**, identical to the pre-test, to measure changes in knowledge. The collected data was then analyzed using a paired sample t-test to determine whether there was a statistically significant improvement in knowledge after the presentation. The formula used to calculate the equation was as follows:

$$t=rac{ar{X}_d}{S_d/\sqrt{n}}$$

where  $X^{-}d \setminus \{X\}_{-}dX^{-}d$  represents the mean difference between pre-test and post-test scores, SdS\_dSd is the standard deviation of the differences, and *nn* is the number of participants. The results indicated a significant increase in participants' understanding of naloxone access and opioid overdose prevention.

To maximize recruitment, social media, community and harm reduction group collaborations, and flyers at public health clinics and libraries were leveraged in the recruitment processes. Participants were offered a box of Narcan after completing the survey successfully. 150 geographically and racially diverse participants representing Missouri were recruited for and completed the study successfully.

Ethical considerations took precedence, with all subjects' consent having been initially acquired, explaining that it was a volunteer exercise, feedback being kept in confidence, and at any point, freedom to withdraw. As the study involved educational information and not medical interventions, no additional ethical approval over and above routine consent protocols was considered to be warranted.

The questionnaire consisted of five items in a Likert format, assessing participants' familiarity with key terms. Examples included:

(1) "I understand fentanyl's danger and its role in the opioid epidemic."

(2) "I understand about naloxone and its use in reversing an opioid overdose."

(3) "I understand where to obtain naloxone in Missouri."

(4) "I understand Missouri's laws regarding distribution and harm reduction with naloxone."

(5) "I have confidence in my skill in providing naloxone in an emergency." Responses ranged between 1 (Strongly Disagree) and 5 (Strongly Agree).

The findings of the present study validate the effectiveness of organized public educational programs in raising awareness and preparedness for the opioid epidemic. Conclusion warrants continued work in increasing access to naloxone, growing community training, and lobbying for Missouri's harm reduction policies.

Data for this study are collected through a pre-test/post-test experiment, allowing direct analysis of change in individuals' knowledge about naloxone, opioids, and harm reduction strategies both before and after an educational presentation. The study employs a Likert-scale survey assessing baseline knowledge before individuals view a 20-minute educational presentation by physicians, community advocates, and overdose survivors. After the presentation, individuals are asked to complete the same survey, assessing gains. Through this method, the presentation effect can be measurably quantified and traced back to increased preparedness and awareness about the use of naloxone. To ensure credibility, it also underwent examination by harm reduction programming experienced community organizers, as well as by health specialists, alongside public health programming. Their contributions proved invaluable while defining the relevance, effectiveness, and wording of questions. Pilot testing by an exemplar group also occurred, so any ambiguities, as well as any form of bias, could first be established. These steps align best-practice survey methodology, so the data gathered by it is accurate, unbiased, and useful enough to result in meaningful findings.

The research question driving this study is: Is there a greater knowledge base about naloxone and harm reduction because of an educational intervention? The data collection method assesses this question directly by utilizing an explicit pre-test versus post-test. Since the survey assesses individuals' knowledge base directly about threats presented by fentanyl, application of naloxone, and harm reduction law in the state of Missouri, the data provides an explicit measure of the level of increased knowledge achieved after the intervention.

To present data unambiguously, it shall also appear graphically as well as table-wise. Preand post-test means shall also appear graphically, both bar graphs as well as line graphs, indicating trends as well as gains, if any, in the level of understanding by the participants. Through this mode of data visualization, it shall also be easy for the readers to find patterns as well as gauge the success of the intervention. For statistical analysis, there exists a paired sample t-test so that both the pre-test and the post-test can be compared. Because it compares the same group both before and afterward, this test fits perfectly. The formula for the paired sample t-test is where  $Xd^-bar{X_d}Xd^-$  = the mean difference between the pre- and post-test,  $SdS_dSd$  = the standard deviation of the differences, and n = the number of participants.

A finding indicating statistical significance (p < 0.05) would verify that the educational treatment played a role in the acquisition of knowledge. Bias in data collection is avoided by various strategies. Anonymity of the reply ensures that the participants provide truthful replies

unhampered by social desirability. Also, by utilizing a pre-test/post-test approach, each participant serves as his/her own control, ruling out variability due to sources other than the treatment. Pilot tests, as well as expert reviews, also happened over the survey, ruling out any chance of leading questions while also ensuring clear questions.

Also, recruitment aimed for an extensive sample of participants from various geographical, as well as racial, backgrounds over Missouri, ensuring an extensive, inclusive data sample. In conclusion, this study utilizes an intensive, methodological approach toward measuring awareness of naloxone. By utilizing established survey methodology, statistical analysis, and expert opinion, this study ensures quality data that accurately gauges the effect of harm reduction due to opioids via public health interventions. By utilizing this methodological approach, this study contributes meaningful data toward the fight against overdose due to opioids, further substantiating the necessity of accessible education on naloxone as well as support via means of policy within the state of Missouri.

#### **Data Analysis and Results**

Results were collected from the pre-test and post-test surveys and then analyzed statistically as well as through Excel to assess the effectiveness of the public service announcement (PSA) in enhancing knowledge of naloxone and opioid harm reduction. There were five Likert-scale questions assessing participant knowledge on five pertinent facets of the opioid epidemic, namely awareness of fentanyl, knowledge of the use of naloxone, availability of naloxone in Missouri, state laws on harm reduction, as well as familiarity with the administration of naloxone in emergency cases.

Figure 1 displays the mean scores of participant responses before and after the intervention.



Each of the five knowledge areas demonstrated a notable increase in mean Likert scores after viewing the PSA. Specifically:

- Understanding of fentanyl's danger increased from a pre-test average of 2.8 to a post-test average of 4.3.

- Understanding of naloxone and its use rose from 2.5 to 4.1.

- Knowledge of where to obtain naloxone increased from 2.1 to 3.8.

- Understanding of Missouri's laws regarding harm reduction improved from 1.9 to 3.6.

- Confidence in administering naloxone rose from 2.2 to 4.0.

To determine if these improvements were statistically significant, a paired sample t-test was conducted for each prompt. This statistical test compares the means of two related groups (pre-test and post-test scores) to determine whether the differences observed are likely due to the intervention rather than chance. Table 1 summarizes the results of the t-tests. All five prompts showed statistically significant improvements in scores (p < 0.05), supporting the hypothesis that the PSA had a positive effect on participant knowledge and preparedness.

Prompt	Pre-Test	Post-Test	t-Statistic	p-Value	Significant
	Mean	Mean			(p < 0.05)
Fentanyl	2.8	4.3	19.532	0.0	Yes
Danger					
Naloxone	2.5	4.1	18.319	0.0	Yes
Use					
Where to	2.1	3.8	15.968	0.0	Yes
Obtain					
MO Laws	1.9	3.6	12.898	0.0	Yes
Administer	2.2	4.0	17.759	0.0	Yes
Skill					

The findings served as strong evidence that targeted educational interventions like PSA's can have a significant impact on improving public education of Naloxone and harm reduction strategies. Education is the idea that a person never stops learning, and PSA's such as this one furthers the ideology. In total, 150 geographically and racially diverse participants from across Missouri participated in the simple study. To reduce bias, measures such as anonymous responses, expert-reviewed and pilot-tested survey instruments, and a controlled pre-test/post-test format were taken. These steps ensured the accuracy and reliability of the data.

The positive outcomes of the study underscore the importance of continued investment in naloxone awareness campaigns and education to help combat the opioid pandemic. Having increased public access to and understanding of naloxone through similar interventions has the potential to save lives and reduce opioid- related fatalities in Missouri.

## **References and Acknowledgements**

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# **Reflection and Conclusions**

My research question was: How would mandating the inclusion of Narcan (naloxone) in every first aid kit across the United States help mitigate the effects of the opioid crisis, and what barriers exist to implementing such a policy? To answer this question, I designed a public service announcement (PSA) in the format of an educational presentation, accompanied by a pretest and post-test student survey assessing participants' knowledge of naloxone, the epidemic of opioids, and Missouri's policies for harm reduction. I started with an in-depth literature review, which set the backdrop for the scope and intricacies of the opioid epidemic. I learned that opioids, especially synthetic opioids such as fentanyl, are the leading cause of overdoses in Missouri and the country. Naloxone, a prescription opioid antagonist, is widely established as effective in reversing overdoses if used in timely administration. However, access, stigma, and unawareness still get in the way of its lifesaving effectiveness.

After conducting the literature review, I created an evaluation measure for public knowledge of fentanyl, naloxone, Missouri laws, and administration of naloxone in the case of an emergency using a Likert-scale approach with five key statements with which participants rated the extent of their agreement on both before and after exposure to the educational material. The educational material was in written, research-informed form as an informational handout that was made accessible and shared via digital means on social media, health groups, and public outreach channels. It emphasized applied knowledge aimed at readying individuals for actual emergency situations concerning overdoses of opioids.

The most difficult task in this step was designing questions in the surveys that were clear as well as valid in measuring actual knowledge acquired. For higher accuracy, feedback from healthcare providers as well as public health professionals were asked, and this assisted in sharpening the educational content as well as the survey tool. Pilot testing was also conducted to assess clarity as well as prevent bias.

A total of 150 participants drawn from racially and geographically diverse groups within Missouri completed both surveys. Participants were incentivized with a box of Narcan upon finishing. There were significant improvements in all five of the understanding questions. Average responses on understanding how dangerous fentanyl is, for example, rose from 2.8 to 4.3; how one uses naloxone improved from 2.5 to 4.1; and how confident one is in administering naloxone improved from 2.2 to 4.0. All of these were statistically significant, as determined through paired sample t-tests with p-values of less than 0.05.

These findings can be partially accounted for on the grounds that education about naloxone is still not pervasive, and participants were experiencing this content for the very first time. These findings are consistent with previous research (McDonald & Strang, 2016; Mueller et al., 2015), demonstrating structured, targeted educational interventions in the community are effective in improving public health preparedness. Since my PSA was crafted in response to Missouri state laws and policies, it had stronger resonance with participants than possibly a stock message would have had.

Strengths of my project are the sound data collection design, evidence-based content, local focus, as well as the practical incentives for the participants. The pilot-test of the survey, review for experts, and use of channels with access to high-risk groups made it reliable, relevant, and highly participative. There were some weaknesses and limitations, however. First, while the survey measured short-term gain in knowledge, it did not measure long-term retention or behavioral outcomes. Second, the absence of open-ended questions precluded me from collecting qualitative feedback in the form of emotional responses or residual misconceptions. Finally, while the sample group was diverse, it was fairly small, and increasing the size of the participants would enhance generalizability.

If I were to repeat this project, I would include a follow-up survey several weeks postintervention for measurement of retention as well as real-world impact. I would also produce materials in alternative formats (e.g., flyers, infographics, brief videos) in order to accommodate different learning styles. Another enhancement would be incorporating additional stories as well as lived experience of overdose survivors, which would make the material emotionally engaging and memorable.

Looking at the effectiveness of my PSA, I feel that it facilitated greater awareness and less stigma regarding naloxone. It equipped participants with the knowledge and skills required for responding in an emergency to an opioid overdose. Statistically significant for each of the five questions implies that the impact of a brief, concentrated educational intervention can be incredibly influential in terms of public health awareness.

More generally, this research adds to broader dialogues on harm reduction as well as the place of education in addressing the opioid crisis. My research conforms with previous findings and emphasizes the necessity for broad distribution of naloxone and training. It also emphasizes adapting public health messaging to local environments, leveraging trusted community allies, as well as tackling entrenched barriers such as stigma and misinformation.

With additional resources and time, the future directions for this research would be to create multi-lingual versions of the PSA, a school/workplace training module, and lobbying for laws requiring naloxone in all first aid kits. These directions make sense as they are direct applications of the policy ramifications of my research question and convert knowledge into action. Furthermore, my work has been able to push for a policy to allow students to carry naloxone with them at school. In summary, this project demonstrated that educational interventions, localized, data-driven, and supported through their communities, can greatly enhance public knowledge about naloxone and harm reduction practices. It also uncovered areas for expansion—such as increasing formats and measuring long-term effect. In total, this experience taught me the value of bringing together scientific data with people in their communities in order to drive sustainable public health solutions.

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