



## ORIGINAL RESEARCH

### SAFE – Home Opioid Management Education (SAFE-HOME) in older adults: a naloxone awareness program for home health workers

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#### Abstract

**Background:** Older adults ( $\geq 65$  years) have seen significant increases in opioid overdose deaths. Diversion of older adults' opioid medication is also a contributor to opioid misuse. Naloxone, an opioid antagonist, saves lives when used for an opioid overdose, yet education on opioid overdose and naloxone access and training for older adults is limited.

**Methods:** A prospective, interventional training program was created to educate home health workers and their older adult clients on opioid overdose and naloxone utility. The SAFE – Home Opioid Management Education (SAFE-HOME) naloxone awareness program was created to include in-person training with educational handouts around opioid risks and on the importance of naloxone. Home health workers, who provide in-home care and care coordination to older adults in rural Illinois, were trained to educate their clients with the SAFE-HOME program. Older adults were included if they were prescribed an opioid for any indication. Outcomes included change in knowledge of opioids and naloxone, home health worker perception of client knowledge level

and naloxone obtainment rates following the educational intervention.

**Results:** Thirty-five clients completed the SAFE-HOME program. The average knowledge assessment score increased from a baseline of 39.4% (SD 26.8) to 90.6% (SD 12.6,  $p < 0.01$ ). Most home health workers agreed their older adult clients had poor baseline knowledge of naloxone. No clients obtained naloxone due to lack of perceived need and cost barriers.

**Conclusion:** An educational approach utilizing home health workers as client educators resulted in increased knowledge of opioid risks and naloxone utility amongst older adults.

**Keywords:** home health worker, naloxone, older adult, opioid overdose.

#### Citation

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## Introduction

Dramatic increases in the prescriptive use of opioid analgesics for chronic pain have been accompanied by staggering increases in rates of opioid addiction, misuse and drug-related deaths. Opioid overdose deaths peaked from 2019 to 2020, increasing by 30% to an all-time high of 88,000 deaths in 1 year.<sup>1</sup> The older adult population may be the most at-risk for the misuse of prescription opioids due to the greater prevalence of chronic pain, comorbid conditions and physiological changes that impact opioid pharmacokinetics in this population.<sup>2</sup> Between 1995 and 2010, prescription opioids for chronic pain increased nine-fold amongst older adults.<sup>3</sup> This increase in opioid prescriptions correlated with a five-fold increase in

hospitalizations of older adults due to opioid misuse.<sup>4</sup> The rate of opioid overdose deaths in adults aged  $>65$  years between the years 2016 and 2017 increased by 18%, the largest increase in any age group.<sup>5</sup> Furthermore, the diversion of opioids by family members living in multigenerational homes has contributed significantly to overall increases in opioid misuse.<sup>6</sup> It is estimated that nearly 50% of all individuals who misuse opioids are obtaining the drugs from a family member or friend who has a legal opioid prescription.<sup>7</sup> Rural areas are not spared from the opioid epidemic; the data demonstrate an increasing prevalence of overdose deaths at faster rates in rural than urban areas.<sup>8</sup> Specifically in Illinois, southern rural counties have higher rates of opioid misuse and average days' supply of opioids compared to urban counties across the state.<sup>9</sup> These

factors highlight a vulnerable population that is at high risk for continued opioid misuse, abuse, overdose and death.

Because older adults are particularly vulnerable to opioid overdose both personally and tangentially due to family member or friend misuse, they are an important population to educate directly about the use of naloxone. However, accessing healthcare resources, such as primary care providers and pharmacies, is difficult and can be infrequent due to geography and mobility issues in this rural setting. A method to overcome these barriers is the utilization of home health workers to educate older adults on the use of naloxone in reversing opioid overdose and the ways in which naloxone can be accessed and administered. Home health workers are physician extenders by caring for clients in their homes and are a valuable resource to provide in-home client training and education on the dangers of opioid overdose and the use of naloxone as an effective reversal agent.

The purpose of SAFE – Home Opioid Management Education (SAFE-HOME) naloxone awareness program for older adults is to utilize home health workers to educate older adults who are prescribed opioid medications about the access to and use of naloxone to reverse opioid overdose.

## Methods

Investigators from Rush University and the University of Illinois at Chicago (UIC) College of Pharmacy collaborated to develop SAFE-HOME, a prospective, educational intervention study for community-dwelling older adults (>65 years old).

## Naloxone Awareness Program Toolkit development

Educational handouts on opioid risks and naloxone use were developed specifically for training older adults. Key messaging for educational materials was adapted from information provided by the Centers of Disease Control and Prevention (CDC), the Illinois Department of Public Health, the US Department of Veterans Affairs and the Canadian Deprescribing Network.<sup>10–13</sup> The content was vetted for accuracy by geriatric experts (RG, EE-T, CA, MN) and medication experts (BMM, JBJ, MK). Concurrently, the investigators created a pre-education and post-education knowledge assessment questionnaire to measure the educational outcomes of key messaging and take-home points around opioid risks and access and use of naloxone. The pre-education knowledge assessment questionnaire included a set of questions regarding home health worker perceptions of their clients' knowledge to validate that the answers were not by chance. The educational materials and knowledge assessment questionnaire were vetted by the Health and Medicine Policy Research Group and Literacy Partners of Chicago to ensure literacy reading comprehension at a 6th-grade level and visual ease of readability for older adults such as large fonts and high visual contrast. The final questionnaire and educational materials

were collectively entitled the SAFE-HOME Naloxone Awareness Program Toolkit (Appendices 1–3; available at: <https://www.drugsincontext.com/wp-content/uploads/2021/10/dic.2021-7-6-Appendix.pdf>). A self-efficacy assessment questionnaire was developed by investigators for a 3-month follow-up after the intervention to determine obtainment rates of naloxone within older adult households (Appendix 4).

## Community health partners

Shawnee Health Service is a care coordination organization that provides comprehensive, integrated care management to southern Illinois and southwest Indiana residents. Home health workers are licensed nurses or social workers who go into the homes of clients and assist with tasks related to medical needs, such as appointment scheduling, medication obtainment, insurance enrolment, as well as social needs, such as Supplemental Nutrition Assistance Program (SNAP) and Low Income Home Energy Assistance Program enrolments. They serve as a liaison between the client and their healthcare provider within the patient-centred medical home. Home health workers work closely with non-healthcare licensed Shawnee Health Service staff members, or homemakers, to ensure consistent meetings and interactions with clients.

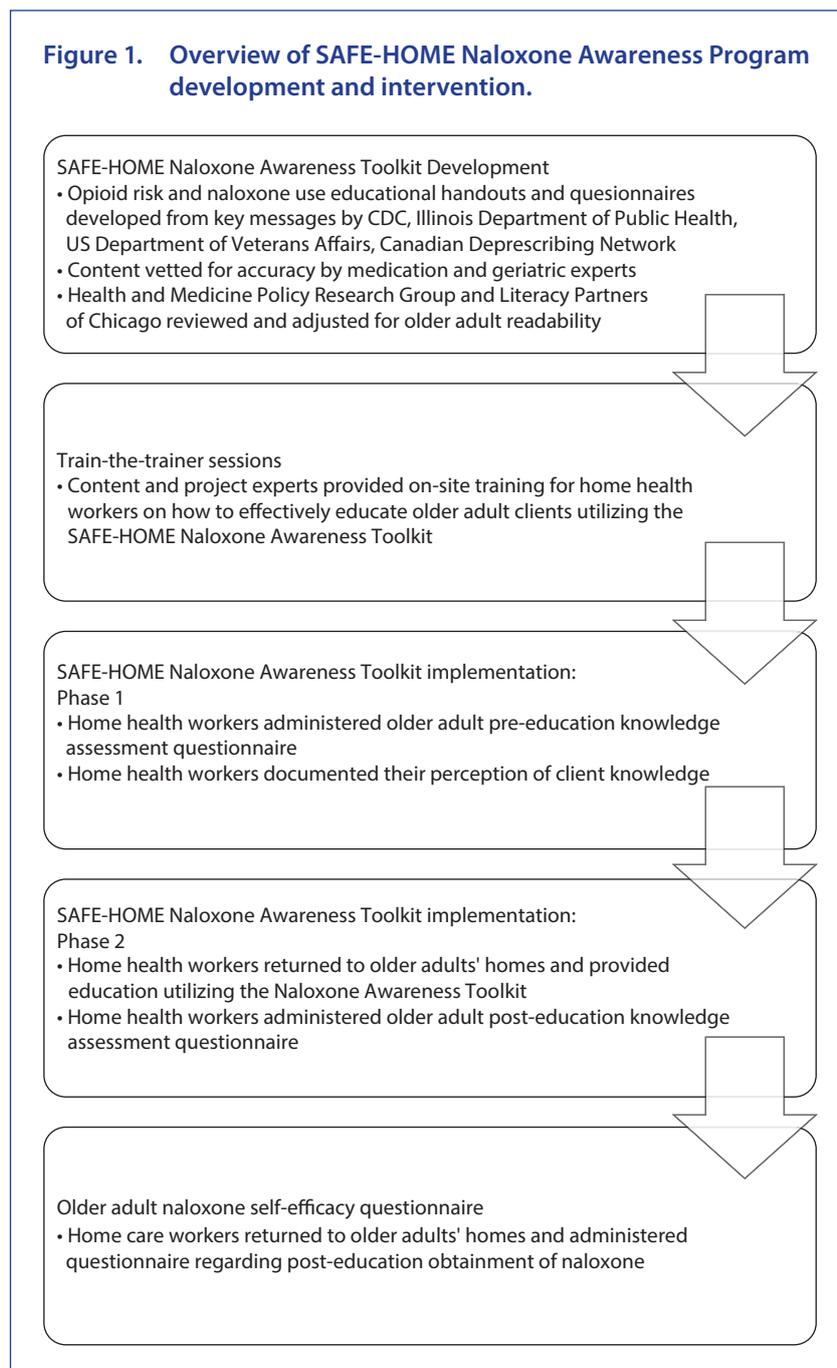
## Train-the-trainer program

Clinical faculty at the UIC College of Pharmacy developed training content for Shawnee Health Service home health workers for educational delivery of the SAFE-HOME Naloxone Awareness Program to older adult clients. Two investigators (JBJ and BMM) provided onsite training for home health workers. The two training sessions covered the study purpose, target client population, the opioid crisis and need for harm mitigation interventions, risks of opioids and the use of and access to naloxone. The face-to-face format of the training allowed for the exchange of ideas between the home health workers and investigators for best practices to implement the SAFE-HOME Naloxone Awareness Program as an educational intervention in this specific population (for example, expanding on clients' baseline knowledge of naloxone from pop culture and media and providing local resources for non-pharmacological pain management in remote areas). The workflow of administering the baseline knowledge assessment questionnaire, education, post-education knowledge assessment questionnaire and self-efficacy survey was also reviewed with home health workers (Figure 1). Home health workers were encouraged to reach out to investigators at any time with questions or concerns to ensure uniform implementation of the SAFE-HOME Program.

## Naloxone Awareness Program Toolkit implementation

Home health workers recruited clients aged 65 years and older who were prescribed an opioid for any indication to

**Figure 1. Overview of SAFE-HOME Naloxone Awareness Program development and intervention.**



participate in the educational intervention. Home health workers administered the baseline knowledge assessment questionnaire to eligible clients who verbally consented (Figure 1). Subsequently, home health workers recorded perceptions of their clients' baseline knowledge based on the preceding interaction to ensure the validity of the knowledge assessment. After an 8–12-week period based on planned appointments, home health workers returned to clients' homes and provided education regarding opioids and naloxone using the Naloxone Awareness Toolkit materials. If caregivers and/or family members were available, they were invited to participate in the education. After the educational intervention, home health workers administered the post-education questionnaire to assess changes in client knowledge. For the third and final

phase, home health workers returned to participating clients' homes after 4–8 weeks and assessed client self-efficacy in obtaining naloxone based on the educational intervention provided.

## Data collection and analysis

The primary objective was the development and validation of the program's educational toolkit highlighting key knowledge points specific to older adults in rural settings regarding opioid safety and naloxone use. Secondary program objectives included the change in older adult knowledge on opioids and naloxone before and after the educational intervention, home health worker perception of

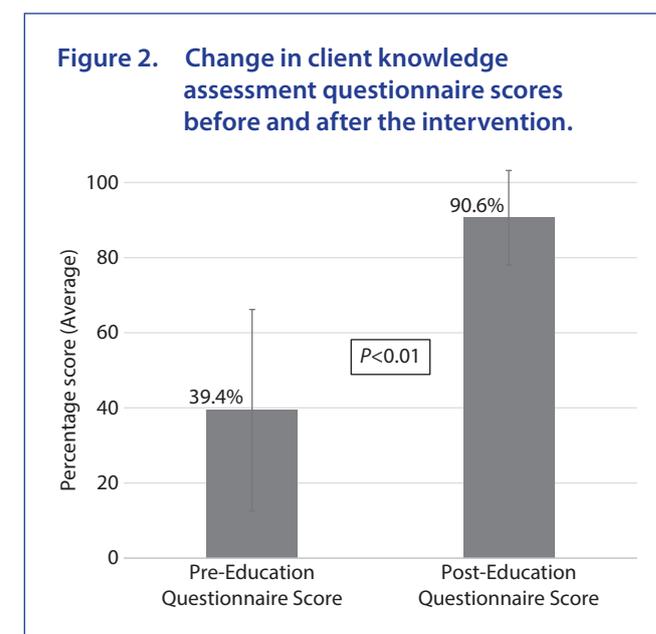
older adult pre-education knowledge regarding opioids and naloxone and the rate of naloxone obtainment in older adults who received the educational intervention.

As the target client population lived in rural areas without consistent access to the Internet or cellular reception, all documents were provided in paper format. Questionnaires were coded for each client, and responses were handwritten (correct answer circled) on paper. Home health workers gave hard copies of questionnaire responses to their supervisor, who mailed all documents in aggregate to investigators at UIC. Once received, investigators input questionnaire responses into Qualtrics® for analysis. Descriptive statistics were used for demographic information, prescribed opioids and naloxone obtainment rates. Dependent t-tests were used to compare baseline knowledge questionnaire scores to post-education scores.

Institutional Review Board approval was obtained through the UIC Office for the Protection of Research Subjects.

## Results

For the primary objective, the completed SAFE-HOME Naloxone Awareness Program Toolkit is shown in Appendices 1–3. Forty-five participants completed the baseline pre-education questionnaire and 40 completed the post-education questionnaire. Overall, 87% of client participants were women and the average age of participants was 74 years old. Most participants were white and were taking hydrocodone or codeine and acetaminophen combination products (Table 1). Thirty-five matched responses were analysed for statistical significance (Figure 2). At baseline, the average client knowledge assessment questionnaire score was 39.4% (SD 26.8). After education with the Naloxone Awareness Program Toolkit, the average score statistically increased to 90.6% (SD



12.6,  $p < 0.01$ ), with an average increase of 51.2 percentage points.

With regards to other secondary outcomes, the perceptions of home health workers regarding their clients' pre-education knowledge are shown in Table 2. Whilst more than half agreed that their client knew about opioid risks, the majority disagreed that their clients understood the purpose, use and obtainment of naloxone.

Upon follow-up for self-efficacy assessment, 31 clients were surveyed. Of those, only 8 (26%) considered getting naloxone based on the education they received. No participants obtained naloxone. The most cited reasons for not obtaining naloxone were lack of perceived need ( $n=3$ , 38%) and cost barriers ( $n=2$ , 25%) (Figure 3).

## Discussion

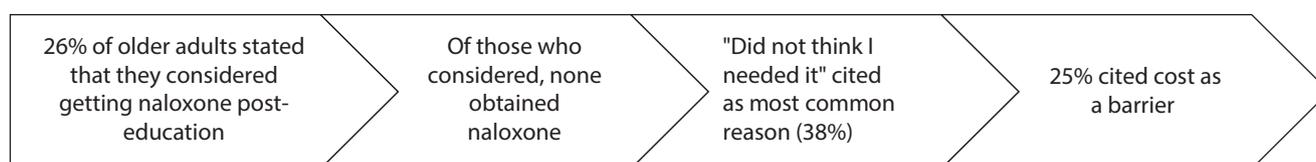
Herein, we present pilot data on an educational intervention targeting older adults receiving opioid prescriptions to improve awareness of and access to naloxone. Our results show that in-home education can significantly increase knowledge on opioid risks, overdose and naloxone utility in older adults living in rural communities. Naloxone effectively reduces mortality due to opioid overdose but knowledge of opioid overdose, naloxone utility and access is critical.<sup>14</sup> Our results align with other studies where knowledge of naloxone is low. In one survey of 405 public participants, nearly 40% of respondents incorrectly indicated that they believed opioid overdose occurs in those who misuse opioids and 50% believed that naloxone enables people who misuse opioids.<sup>15</sup> Appropriate education and outreach to dispel these naloxone misconceptions are needed to reduce the negative impact of the opioid epidemic. Furthermore, the lack of naloxone distribution centres and subsequent lack

**Table 1. Patient participant demographics ( $n=31$ ).**

Characteristic	Respondents, $n$ (%)
Women	27 (87%)
Men	4 (13%)
Age, years, average (SD)	73.6 (7.9)
Race	
White/Caucasian	23 (74%)
Black/African American	8 (26%)
Baseline opioid medication ( $n=30$ )	
Hydrocodone/acetaminophen	14 (47%)
Codeine/acetaminophen	8 (27%)
Oxycodone/acetaminophen	7 (23%)
Oxycodone	1 (3%)

**Table 2. Home health worker perception of older adults' pre-education knowledge (n=44).**

	Completely disagree, n (%)	Somewhat disagree, n (%)	Somewhat agree, n (%)	Completely agree, n (%)	I don't know, n (%)
My clients understand the risks of their opioid medications	2 (4.6%)	12 (27.3%)	19 (43.2%)	11 (25%)	0
My clients know what naloxone is	23 (52.3%)	9 (20.5%)	7 (15.9%)	2 (4.6%)	3 (6.8%)
My clients know <i>how to get</i> naloxone	25 (56.8%)	11 (25%)	2 (4.6%)	3 (6.8%)	3 (6.8%)
My clients know <i>when to use</i> naloxone	24 (54.6%)	8 (18.2%)	6 (13.6%)	3 (6.8%)	3 (6.8%)
My clients know <i>how to use</i> naloxone	27 (61.4%)	8 (18.2%)	3 (6.8%)	2 (4.6%)	4 (9.1%)

**Figure 3. Older adult self-report on obtainment of naloxone (n=31).**

of implementation of the naloxone co-prescribing in rural settings has contributed to the increasing overdose rates in these areas.<sup>9</sup>

To our knowledge, this is the first project utilizing home health workers as in-home providers to offer naloxone education directly to clients. In metropolitan Illinois, for every 10,000 people, there are 35.5 physicians; in rural Illinois, the number is staggeringly low, at 10.4 physicians per 10,000 people.<sup>16</sup> The lack of healthcare access in remote areas requires innovative solutions to resolve disparities in care. Our pilot program highlights the utility of home health workers as a provider extender of the healthcare team in rural communities. Using an educational intervention developed by an interdisciplinary team, home health workers were effective educators as reflected by statistical improvement in client knowledge of opioids and naloxone. Home health workers can meet the client where they are, in their homes, and develop trusting relationships through intimate knowledge of the client's life and circumstances, of which institution-based healthcare providers may not be aware.<sup>17</sup> This is validated in our study by home health workers' perception of their clients' poor baseline knowledge of naloxone corresponding with the low baseline questionnaire scores, indicating the home health workers' familiarity with their clients. This home health worker educational format could be adjusted for a variety of educational initiatives and may be tailored to issues specific to regions of the country.

Updated messaging around the importance of having naloxone available amongst clients receiving opioid

prescriptions is needed to address the opioid epidemic. Several federal and state-level agencies have delineated clients at high risk who should be co-prescribed naloxone with opioid prescriptions; for example, the CDC recommends offering naloxone in the circumstances of a history of overdose or substance use disorder, high-dose opioid prescriptions (>50 morphine milligram equivalents per day) and concurrent benzodiazepine use.<sup>18</sup> Additionally, all 50 states created legislature to increase access to naloxone without a prescriber visit, including 35 states that allow pharmacies to dispense naloxone to clients or community members without a client-specific prescription.<sup>19</sup> Despite such initiatives, naloxone obtainment rates are still low, estimated at <2% of every opioid prescription amongst individuals at high risk.<sup>20</sup> This is further compounded in rural communities due to a lack of healthcare access. Our educational intervention sought to empower at-risk clients with prescription opioids to seek more information about and discuss the need for naloxone with their health provider. Despite an increase in client knowledge regarding risks of opioids and naloxone use, no clients obtained naloxone after our intervention. Participants cited a lack of perceived need and cost as the top reasons for not obtaining. Whilst we did not analyse our client population specifically for CDC-defined high-risk criteria, overdose data<sup>8</sup> demonstrate that the benefits of having direct availability of naloxone in remote, rural community households far outweigh the risks. Our results indicate that stronger messaging highlighting the importance of life-saving naloxone is necessary.

There are limitations to our study. First, although we demonstrated a change in knowledge amongst clients

regarding opioid risks and naloxone use, no client obtained naloxone in the setting of this improved knowledge. Addressing cost concerns is necessary in future implementations of this project; for example, many clients may be unaware that Illinois Medicaid covers naloxone at no co-pay. Additionally, based on the results of this pilot, we are seeking opportunities to directly provide naloxone to any consenting client upon receiving education with the SAFE-HOME Naloxone Awareness Program training. This would remove the cost barrier and facilitate discussion around the lack of perceived need. Further context on the very real risk of overdose and the importance of having naloxone on hand will be paramount. The lack of diversity in the patient population reflected the demographics of the study area but may limit generalizability in diverse

populations. The collection method of pen and paper may have led to interpretation bias, as client responses were coded in handwriting for pre-education and post-education analysis.

## Conclusion

Knowledge and understanding of safe opioid and naloxone use are poor amongst older adults in rural communities. An interprofessional educational approach utilizing home health workers as client educators resulted in significantly increased knowledge of opioid risks and naloxone utility amongst older adults who are prescribed opioids. In rural areas, the biggest barriers to obtaining naloxone remain a perceived lack of benefit and cost.

**Contributions:** BMM: conceptualization, methodology, validation, formal analysis, investigation, resources, data curation, manuscript writing. MK: conceptualization, methodology, validation, resources, manuscript editing and reviewing, visualization, supervision, funding acquisition. EE-T: conceptualization, methodology, validation, resources, manuscript editing and reviewing, visualization, supervision, funding acquisition. RG: conceptualization, methodology, validation, resources, manuscript editing and reviewing, visualization, supervision, funding acquisition. JBJ: conceptualization, methodology, validation, formal analysis, investigation, resources, data curation, manuscript writing, visualization, supervision, project administration, funding acquisition. All named authors meet the International Committee of Medical Journal Editors (ICMJE) criteria for authorship for this article, take responsibility for the integrity of the work as a whole and have given their approval for this version to be published.

**Disclosure and potential conflicts of interest:** Dr McQuade received individual consulting fees for providing support for Opioid Stewardship (a program sponsored by Centers for Medicare Services to target high-opioid prescribing providers and educate them on tapering, pain alternatives, and overall reduction of opioid prescribing) and received honoraria for speaking at the IHC Annual Convention. Dr Koronkowski received consulting fees from OptumRx. Dr Jarrett received grants from HRSA, SAMHSA, the Coleman Foundation and the Moore Foundation. Dr Jarrett was also employed by CVS Health and received stock through this employment from CVS Health. All other authors declare that they have no conflict of interest relevant to this manuscript. The International Committee of Medical Journal Editors (ICMJE) Potential Conflicts of Interests form for the authors is available for download at: <https://www.drugsincontext.com/wp-content/uploads/2021/10/dic.2021-7-6-COI.pdf>

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