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# Adult emergency department naloxone education and prescription program: Video and pamphlet education comparison

Megan McElhinny [a,b,c,*], Kimberly Chea [d], Ashley Carter-Powell [e], Aimee Mishler [b], Bikash Bhattarai [b], Kara Geren [a,b,c]

[a] Creighton University School of Medicine – Phoenix Emergency Medicine Residency, United States of America
[b] Valleywise Health Medical Center, 2601 E. Roosevelt St., Phoenix, AZ 85283, United States of America
[c] University of Arizona College of Medicine- Phoenix, 475 N 5th St, Phoenix, AZ 85004, United States of America
[d] Honor Health Scottsdale Osborne
[e] Banner Health Thunderbird Medical Center

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ABSTRACT

*Objectives:* This study looked at the fill rate of naloxone prescriptions, after the implementation of an opioid overdose and naloxone education intervention for adult patients in the emergency department (ED). The study compared fill rates between recipients who received this education by video versus written format.
*Methods:* This was a prospective, randomized controlled study of patients seen in the adult ED for opioid-related complaints between August 1, 2017, and December 1, 2018. The study randomized patients to education through video or written pamphlet, and all patients received a prescription for a free naloxone kit redeemable at the discharge pharmacy. The study calculated and compared naloxone prescription fill rates for the respective education methods.
*Results:* Of the 770 patients reviewed for recruitment, the study excluded 703. Of the 67 patients enrolled, 59 were contacted at follow-up and eighteen (30.5%) had filled a naloxone prescription. Thirty-three percent (13/39) of patients who received video education and 25% (5/20) who received written pamphlet education filled naloxone prescriptions. The *p*-value of the chi-square for this data was 0.53.
*Conclusions:* There is a large population affected by opioid overdose both nationally and locally in Arizona. Opioid overdose and naloxone distribution education for ED patients through both video and pamphlet is feasible but requires more research to determine which education method is superior. Legislative changes, improved identification of patients at high risk for opioid overdose, opiate education for medical providers, and naloxone availability from multiple venues are needed to create a holistic approach to improve naloxone access to those who need it most.

## 1. Introduction

The opioid epidemic is worsening. In 2018 more than 128 people per day in the United States died due to an opioid overdose (National Institute of Drug Abuse, 2020). The national rate of overdose deaths increased 5% from 2018 to 2019 (Katz, Goodnough, & Sanger-Katz, 2020). During only the first half of 2020, drug deaths had already increased by 13% (Wen & Sadeghi, 2020). In addition to the millions of Americans with opioid-related disorders, the healtcare system sees many more patients for nonfatal overdoses and other opioid-related complications. While the emotional consequences of the epidemic are incalculable, the economic burden of prescription opioid misuse tops $78.5 billion a year in health care, lost productivity, addiction treatment, and criminal justice involvement (Florence, Zhou, Luo, & Xu, 2016). Arizona has experienced a parallel increase in opioid overdoses, with 52,556 suspected opioid overdoses resulting in 7270 in deaths over the last 3.5 years (Arizona Department of Health Services, 2020).

Naloxone, a potentially life-saving opiate reversal agent, is part of the puzzle to address this public health crisis. Between 2010 and 2015, forty-three states passed legislation to improve layperson access to

* Corresponding author at: c/o Valleywise Health, Creighton School of Medicine – Phoenix Emergency Medicine Residency, 2601 E. Roosevelt St., Phoenix, AZ 85008, United States of America.
*E-mail address:* megan_mcelhinny@dmgaz.org (M. McElhinny).

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naloxone (Davis & Carr, 2015). Arizona, however, did not address the legal barriers to naloxone until spring 2016, when it passed a law to protect clinicians and pharmacists when prescribing and dispensing naloxone. This was followed by legislation in mid-2017 that allowed the utilization of standing orders for pharmacy dispensation of naloxone (Arizona Department of Health Services, 2017). In response to this new legislation, physicians and pharmacists in the Adult Emergency Department (ED) at Valleywise Health Medical Center (VHMC) implemented an Opioid Education and Naloxone Distribution (OEND) program. While small in scale, this hospital-based naloxone education and distribution program is the first of its kind in the state of Arizona, initiated in partnership with Sonoran Prevention Works, a grassroots community organization.

This pilot study aimed to evaluate the effectiveness of different modalities of overdose education within the ED. The American College of Emergency Physicians *ACEP Now* publication states that in-person counseling and an educational video or handout is ideal but acknowledges this is difficult to execute (E.A. Samuels et al., 2016). While education in a written format, such as a pamphlet with words and pictures, is cheaper, easier to reproduce, and simple to administer, education through a video is thought to be more thorough and may be better for those with lower health literacy. Video education has been used as part of a coordinated approach to improve OEND education within the Veterans Administration Health system (Jensen et al., 2019; Oliva et al., 2017). Early responses to the opiate crisis through ED naloxone distribution have described the use of video education (E. Samuels, 2014).

Given this, participants in this study received opioid and naloxone education via written pamphlet or video. The primary outcome that the study measured was the number of prescriptions filled in each intervention arm. We hypothesized that patients receiving video education would be more likely to fill their naloxone prescription than those receiving written education. Secondary outcomes included the number of patients who used their naloxone to treat an overdose over the three months following distribution. We designed the outcomes of this pilot project as building blocks to launch a more extensive naloxone distribution program.

## 2. Methods

This is a prospective, randomized controlled pilot study of adult patients seen in the VHMC Adult ED between August 1, 2017, and December 1, 2018. Patients were eligible for the study if the patient was 18 years of age or older and evaluated and treated in the ED for possible opioid intoxication/poisoning, use of illicit opioids or prescription opioids, or opioid injection use–related conditions as determined by ED provider or research associate (RA). This study excluded patients if they could not consent, were in police custody, had an allergy to naloxone kit constituents, did not speak English or Spanish, had been enrolled in the pilot study on a previous visit, or were not discharged home from the ED. The study considered patients with altered mental status unable to consent to study enrollment.

An RA monitored the ED tracking board for patients who might meet inclusion criteria and study staff encouraged ED staff to call the RA for any patient with a possible opiate-related problem. An RA approached eligible patients. When the patient agreed to be in the study, the RA consented the subject and assigned them, via a random number generator, to receive overdose education via video or a written pamphlet. In the privacy of the subject's room, the RA played the prepared video on a Kindle Fire or handed the patient the written pamphlet. The RA answered questions about the content of the video or pamphlet. After the intervention and at the time of discharge, each patient received a prescription for a free naloxone kit available only at the VHMC discharge pharmacy. To fill the prescription, patients walked about 100 ft from the exit of the ED to the pharmacy. The naloxone kits that the pharmacy dispensed had been donated by Sonoran Prevention Works, a community harm reduction partner focused on evidence-based drug education. Each kit was free to the patient and included 2 doses of 0.4 mg of naloxone, a syringe, a needle, and instructions on use. Patients in both groups received both verbal and written instructions from the outpatient pharmacist on the proper use of naloxone. The VHMC discharge pharmacy recorded which patients filled their prescription for a naloxone kit. Three months after receiving their naloxone prescriptions, study staff called the subjects to determine if their naloxone prescription was filled at a different pharmacy, if the naloxone kit was used, and, in the event that the kit had been used, if it reversed an opiate overdose.

The study developed the content of both the video and the pamphlet in conjunction with Sonoran Prevention Works. Both educational formats contained the same information, including details about the risk factors for opiate overdose and first aid instructions for a suspected overdose, including the administration of intramuscular naloxone. The video was approximately 4 min long and included a visual demonstration along with narration. The narration can be found in Supplemental Materials A. The pamphlet was a simple trifold print with visual depictions and words and can be found in Supplemental Materials B. Both of these were available in Spanish for patients who identified Spanish as their preferred language.

The Institutional Review Board of Valleywise Health approved the study. The study calculated sample size with a goal of demonstrating statistical significance between naloxone prescription fill rate for video versus written handout education groups. The study used rates for epinephrine auto injector prescription as a model in this calculation given its similarity to intramuscular naloxone as a lifesaving antidote with an intramuscular preparation with goal enrollment of 1440 participants. The study conducted a Chi-square test to investigate whether video education or a written handout was more effective at prompting patients to fill prescriptions for take-home naloxone. The study calculated odds ratio and its 95% confidence limits to measure the magnitude of the association between respective education methods and if naloxone prescription was filled. The study set the alpha level at 0.05. Research staff conducted analyses using MS Excel and Statulator, an online statistical software.

## 3. Results

As indicated by the CONSORT diagram in Fig. 1, of the 770 patients reviewed for the study, the study excluded 703. The most common reasons for exclusion were cognitive impairment (225), admission to the hospital or a direct transfer to a psychiatric and/or drug rehabilitation facility (174), and participant declining enrollment (118). Enrollment was discontinued due to low enrollment after 15 months with 770 patients reviewed and only 67 patients enrolled. Unfortunately, 66 patients declined participation in the study despite qualifying and ED providers deemed 21 patients who qualified for the study not be to candidates for naloxone. Of the 67 patients who the study enrolled, 61% were male and 39% were female. Overall participants were represented among age categories with 25% of participants aged 20–29, 22% aged 30–39, 18% aged 40–49, and 13% aged 50–59. The study included both patients with English and Spanish proficiency, although 94% were English speaking only with 4% Spanish speaking only. The remainder were bilingual. Of the 67 patients enrolled, four withdrew consent, 59 were successfully contacted at follow-up, and 18 (30.5%) filled a naloxone prescription [$p = 0.534$]. Thirty-three percent (13/39) of patients who received video education and 25% (5/20) of those who received written pamphlet education filled naloxone prescriptions. The study successfully contacted twelve of the patients who filled their prescriptions at three-month follow-up, eight from the video intervention group and four from the pamphlet intervention group. None had used the naloxone kit.

## 4. Discussion

Previous studies in the ED evaluating video vs. written patient

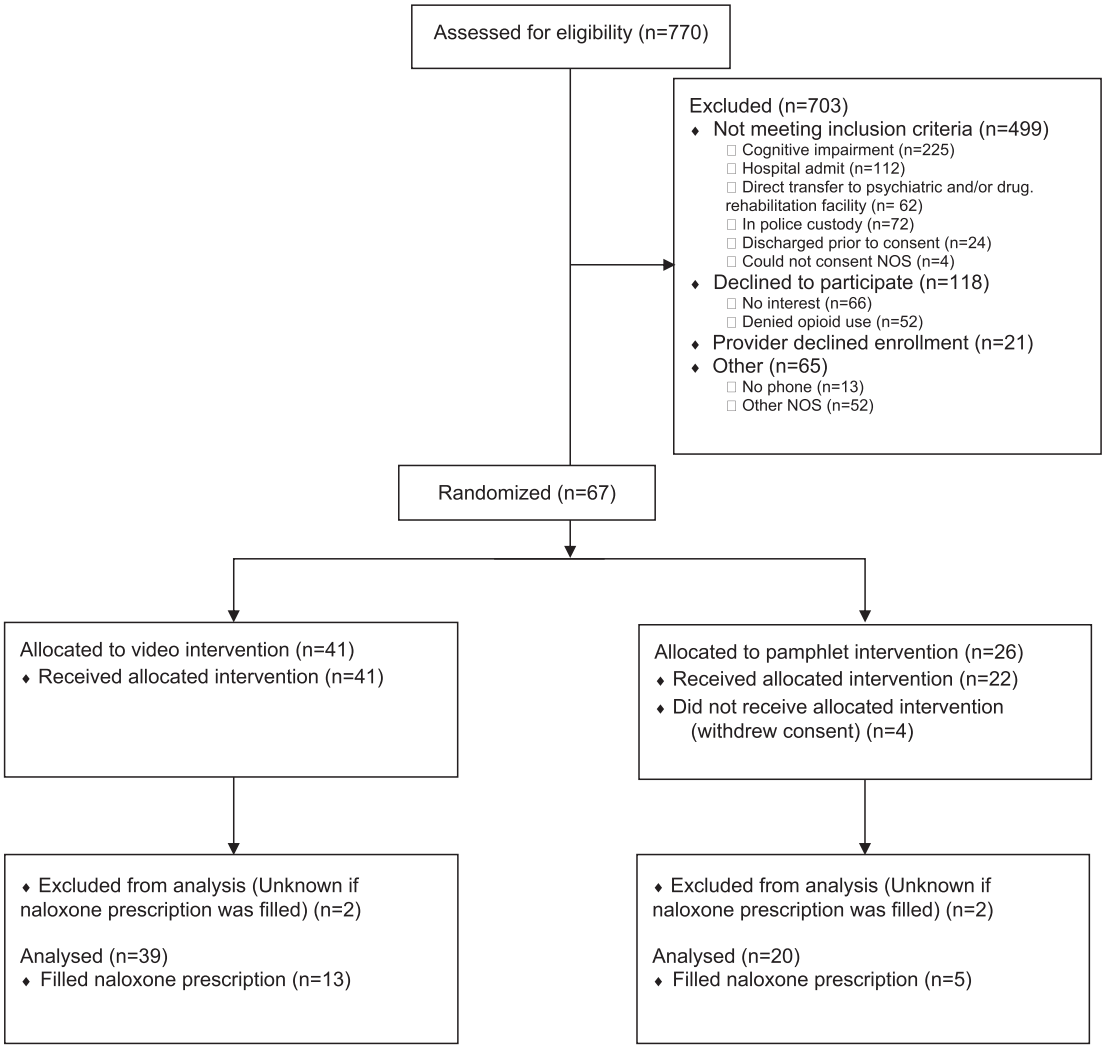


**Fig. 1.** Flow diagram describing the progress of participants through the study.

educational material have generally favored video education. For example, Schnellinger et al. (2010) showed that parental knowledge about the need for antibiotics after an animated video improved long-term retention of information compared to a pamphlet. Bloch and Bloch (2013) demonstrated video, compared to written discharge instructions, improved retention of discharge information at days 2 and 5 after discharge. Given these findings and the presumption that, similar to many other urban EDs, our patients may have lower health literacy (Herndon, Chaney, & Carden, 2011; Olives, Patel, Patel, Hottinger, & Miner, 2011), we hypothesized video education would be superior to a written pamphlet. Although a higher percentage of patients who received video education filled a naloxone prescription, the $p$ value of 0.534 suggests that this may be due to random sampling rather than either the video or pamphlet education interventions. Since the completion of this naloxone pilot study, Merchant, Marks, Clark, Carey, and Liu (2020) evaluated HIV testing knowledge in 1367 English and Spanish speakers in the ED who received education through a video or pictorial brochure. They concluded that HIV knowledge improvement through video education was only slightly better than pictorial brochure. The authors of that study found that video was "modestly better" for patients with lower health literacy. Further research should explore the optimal way to educate patients about OEND, especially for those with lower health literacy.

Due to Arizona pharmacy regulations, medications intended for use outside the ED cannot be distributed directly from the ED (Arizona State Board of Pharmacy, 2016). As a result, rather than receiving a take-home naloxone kit in the ED, patients received a prescription for a naloxone kit that had to be filled at the hospital pharmacy. This is not a problem unique to Arizona, as other naloxone distribution programs have had a similar barrier to success (Barbour, McQuade, Somasundaram, & Chakravarthy, 2018; Lebin, Chen, Korab, Jablonowski, & Whiteside, 2017). While the fill rate for prescriptions that patients receive from the ED may be as high as 88–89% (Farris et al., 2018; Fernando, Nguyen, & Baraff, 2012), studies on naloxone fill rates are much lower. The fill rate for naloxone in our pilot study was 30.5%, which although low, is consistent with other naloxone distribution programs from the ED (Barbour et al., 2018). When a prescription for naloxone without any independent opioid education was given to a discharged patient from the ED, the fill rate was even lower at 18% (Verdier, Routsolias, & Aks, 2019). This finding indicates that opioid education in the ED might improve naloxone prescription fill rates. Ultimately, however, patients at risk for opioid overdose are best served by receiving a naloxone kit in the ED. Since the implementation of this pilot study, other local EDs have tried to develop naloxone distribution programs but have had similar struggles with direct dispensing of naloxone from the ED.

### 4.1. Limitations

The largest limitation of this study was the small sample size. The

total number of patients that the study enrolled was much smaller than the anticipated sample size and, as a result, did not meet statistical significance. Multiple factors caused the limited enrollment. First, RA availability, which was typically during weekday business hours, was limited and may have been when fewer patients with opiate disorder emergencies presented to the ED. Second, patients at risk of opioid overdose presenting to the ED are thought to be accepting of take-home naloxone (Gunn et al., 2018); however, 66 patients who were deemed to be at risk for opioid overdose by health care providers or an RA declined to participate in the study. This indicates that patients at high risk for an opiate overdose may not recognize or accept their risk for opioid overdose. Next, despite basic education about opioids and treatment for opioid-related disorders for providers, 21 patients who qualified for the study were deemed not to need naloxone by ED providers. Although emergency medicine physicians have warmed to opiate harm reduction over the past two decades (E.A. Samuels et al., 2016), resistance to prescribing naloxone is still prevalent among this group (Barbour et al., 2018). The chasm between the need for opiate harm reduction and actual naloxone prescriptions inspired a new opiate education program for all resident physicians in our hospital system and enhanced opiate education for the local medical community. Last, this study enrolled patients only if they were being discharged home from the ED. This eliminated a large portion of potential subjects. Of the patients reviewed for eligibility, 15% were admitted to the hospital or transferred to psychiatric and/or a drug rehabilitation facility. This speaks to the importance of providing OEND to patients discharged from inpatient units as well as a community approach to OEND and opioid disorders. One program will not be able to capture all the patients in need.

In addition to having a small sample size, more patients were enrolled in the video education compared to the pamphlet education arm, which creates possible bias. Prior to the start of the pilot study, the research team created a one-to-one randomization plan with a goal of 1480 subjects. This randomization scheme happens to lean heavily toward enrollment in the video arm for the first 67 participants. Complicating matters, the four patients who withdrew consent after randomization were all part of the pamphlet education arm.

### 4.2. Conclusion

Opioid overdose, both nationally and locally in Arizona, affects a large population. Opioid overdose and naloxone distribution education for ED patients through both video and pamphlet is feasible but requires more research to determine which type of education is superior. Legislative changes, improved identification of patients at high risk for opioid overdose, opiate education for medical providers, and naloxone availability from multiple venues will help to create a holistic approach to improve naloxone access to those who need it most.

## CRediT authorship contribution statement

**Megan McElhinny:** project administration, writing-original draft preparation; **Kimberly Chea**: conceptualization, methodology; **Ashley Carter-Powell** project administration; **Aimee Mishler:** project administration; **Bikash Bhattarai:** formal analysis, writing- review and editing **Kara Geren:** conceptualization, writing- original draft preparation, reviewing and editing.

## Declaration of competing interest

Kimberly Chea received grant funding from Maricopa Medical Foundation. Ashley Carter-Powell received grant funding from Arizona College of Emergency Physicians. Neither funding source was involved in study design, data collection, analysis or interpretation of the data, writing of the report or decision to submit the article for publication. For the remaining authors no conflicts were declared.

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*Author statement*

All *authors* have seen and approved the final version of the manuscript being submitted. We warrant that the article is *our* original work, hasn't received prior publication and isn't under consideration for publication elsewhere.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jsat.2021.108346.

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