

INTRODUCTION

Opioid overdose and mortality is a national health emergency. Both prescription and illicit opioids are sources of abuse. When used inappropriately, opioids bind the μ -opioid receptor causing respiratory depression, which if severe or untreated can result in respiratory arrest and death. A patient experiencing an overdose may be treated with naloxone, a μ -opioid receptor antagonist, to reverse respiratory depression. However, naloxone has historically been limited to prescription availability.

To combat opioid mortality, over-the-counter access to naloxone has become available. Increasing access to naloxone has spurred the need for community education about this lifesaving medication. Thus, opioid education programs have been developed for communities. These education programs are often associated with naloxone distribution following successful completion. While these OEND programs have been qualitatively validated, quantitative data on mortality reduction is minimal.

CLINICAL QUESTION

Among opioid users, does implementation of OEND programs as compared to no OEND program implementation decrease unintentional mortality rates secondary to opioid overdose?

METHODS

PubMed Search Terms: opioid AND overdose AND prevention AND community AND naloxone

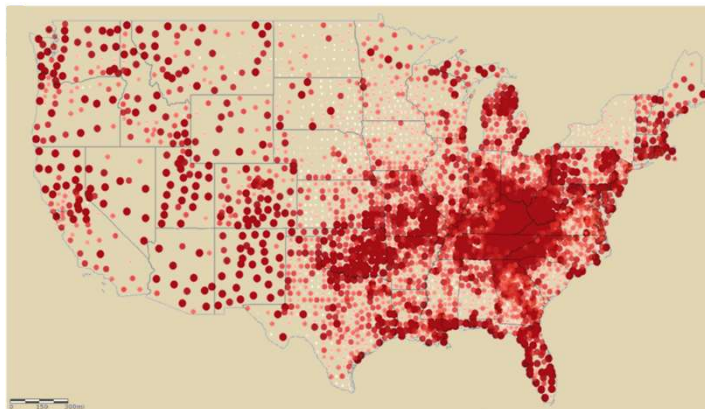
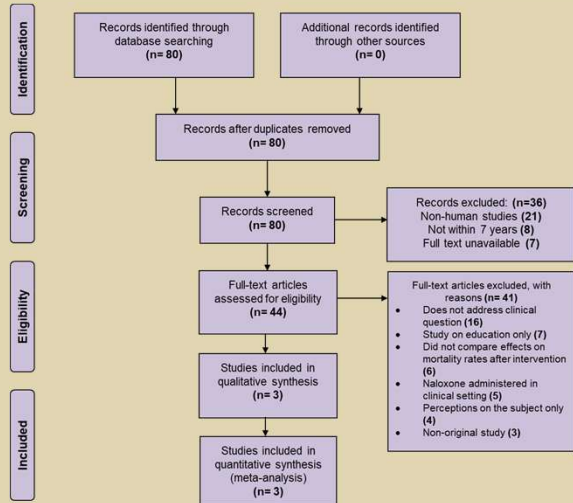


Figure 1. Total drug poisoning deaths in 2015, represented across number deaths and concentration of deaths from the contiguous 48 united states.

RESULTS

Study #1 (Walley et. al.)

Title: *Opioid overdose rates and implementation of overdose education and nasal naloxone distribution in Massachusetts*

Objective: To evaluate the effects of OEND program implementation on rates of opioid related deaths in communities with a high burden of opioid overdoses

Results: As the absolute number of OEND enrollments increased, opioid related death rates demonstrated a decline. After adjusting for possible confounding variables, the enrollment to death rate ratios were significantly reduced in a dose related trend in both the community-year strata with low enrollment 1-100 per 100,000 population (adjusted rate ratio 0.73, 95% confidence interval 0.57 to 0.91) and high enrollment >100 per 100,000 population (0.54, 0.39 to 0.76), as compared to communities without enrollment.

Study #2 (Rowe et. al.)

Title: *Neighborhood-level and spatial characteristics associated with lay naloxone reversal events and opioid overdose deaths*

Objective: To examine demographics and spatial data in relation to OEND programs to determine their effectiveness and identify associated patterns of opioid abuse

Results: During the study period, 316 naloxone reversals and 342 opioid overdose deaths occurred that were included in the data analysis. The census tracts with or adjacent to an OEND site were found have significantly higher income inequality, population density, drug arrests, naloxone reversal events and overdose deaths. In relation to distance to the OEND site, both naloxone reversal events and opioid overdose deaths declined with increasing distance. However, naloxone reversal events and opioid overdose deaths increased with increasing number drug arrests and population density. Further, an association was found between overdose deaths and decreasing median income and increasing income inequality; this pattern was not observable for naloxone reversals. Census tracts with heroin-related overdose were significantly closer to OEND sites when compared to the census tracts that only had non-heroin-related overdose deaths. Naloxone reversals were independently and significantly associated with increasing proximity to OEND sites and with more census tract drug arrests. Opioid overdose deaths, there was an association with increasing number of drug arrests, increasing population size, and decreasing median income; however, there was no significant association between overdose deaths and distance to nearest OEND site.

Study #3 (Albert et. al.)

Title: *Project Lazarus: Community-based overdose prevention in rural North Carolina*

Objective: To study the effects of community-based opioid overdose prevention interventions on overdose mortality rates

Results: The annualized unadjusted overdose deaths in Wilkes County, North Carolina dropped from 46.6 in 2009 to 29.0 in 2010, per 100,000 population. The remaining counties in North Carolina had an increase in overdose deaths during the same time period, therefore the study determined that the decline in Wilkes County indicated a response to the overdose prevention programs. The OEND programs were implemented the same year as the decline in overdoses. Further, from 2008 to 2010, the number of people who died from the same opioid as they were prescribed by a Wilkes County physician, declined from 82% to 10% respectively. During the same time period, prescriber pain management education and actions against prescriber licenses were implemented, further fostering the idea that overdose prevention strategies may be effective.

Table 1. Overview of Studies ¹⁻³

	Walley et. al.	Rowe et. al.	Albert et. al.
Type of Study	Interrupted time series analysis	Retrospective	Retrospective
Setting	State-wide	Urban city	Rural county
Duration of study	2002 to 2009	2010 to 2012	2005 to 2010
Delivery method of education	Group discussions	Classroom Lecture	Video presentation
Source of Naloxone	Public Health Department	Community Group	Pharmacy
Findings	Positive association with OEND implementation and decrease in opioid-related mortality	Increased incidence of opioid overdose is associated with lower income populations and more drug arrests	Positive association between prevention programs targeting opioid overdose and decreased overdose mortality

CONCLUSIONS

Opioid overdose education and naloxone distribution programs are associated with decreased unintentional mortality secondary to opioid overdose. The implementation of OEND programs varies widely with regard to education delivery method, program location, populations targeted, and community partnership. As a result we recommend that implementation of OEND programs be strategic, community-level efforts that leverage available resources and partnerships to address the national opioid epidemic. Finally, OEND programs should target demographic characteristics that are associated with increased incidence of opioid overdose death, specifically populations with lower median income and increased drug arrests.

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