

An Initial Evaluation of Web-Based Overdose Education

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Abstract

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This study explored the feasibility of a web-based overdose education website, www.stopoverdose.org. The results of 422 voluntary and anonymous surveys submitted on the website were analyzed for participant demographics, knowledge of opioid overdose recognition and response, knowledge of the Washington State Good Samaritan Overdose Law, and differences in characteristics, knowledge, and planned behavior between respondents with professional versus personal interest in overdose education. Survey results indicated that most respondents were 35 or older, female, and residents of Washington State. The mean score on the general knowledge quiz about overdose recognition and response was 16.20 out of 18 possible points, and 1.48 out of 2 possible points for items concerning the Good Samaritan Law. Significant differences were found in the age distribution, history of overdose education, planned behaviors, and personal experience with opioid overdose between respondents indicating

professional versus personal interest in the topic of overdose. Respondents indicating professional interest were more likely to be 35 or older and to have received prior overdose education and less likely to know someone at risk for opioid overdose and to report planning to obtain take-home naloxone. No significant differences were found in knowledge scores between groups. These findings suggest that among Washington residents, there is a demand for naloxone, particularly among respondents who indicated that they knew someone at risk for opioid overdose. Furthermore, respondents had a relatively poor understanding of the Good Samaritan Overdose Law, suggesting that the training may not have effectively conveyed this information. These results indicate that there is a public interest in overdose education and suggest that online education may be a feasible approach to implementing basic overdose education to a broad audience.

Introduction

Fatal drug overdose is a significant health concern in the United States. In 2010, drug overdose surpassed motor vehicle crashes to become the leading cause of injury death among 25-64 year olds (CDC, 2012a). Among injecting drug users, deaths due to drug overdose exceeds deaths due to AIDS, hepatitis, and homicide (Seal et al., 2005; Latkin, Hua, & Tobin, 2004). This epidemic has been largely driven by a national increase in the prescribing, use, and abuse of pharmaceutical opioid analgesics (CDC, 2012b; CDC, 2013; Paulozzi, 2012; Calcaterra, Glanz, & Binswanger, 2013). However, further examination of national overdose mortality data and surveys on drug use reveal two additional emergent challenges associated with this epidemic. First, though age adjusted death rates due to drug poisoning remain highest in urban areas, the rate of increase is greatest in rural areas of the United States (Rossen, Khan, & Warner, 2013). Second, the number of heroin users appears to have significantly increased and the majority of these new users are young adults (SAMHSA, 2012; Banta-Green, 2013).

Patterns of drug use and drug-related fatal overdoses in Washington State are similar to national trends. The number of drug-caused deaths involving prescription opioids rose steeply between 2000 and 2008, with the average annual number of deaths in Washington rising from 310 in 2000-2002 to 607 in 2006-2008 (Banta-Green, 2013). In 2006, the rate of fatal poisonings involving opioid analgesics in Washington was significantly higher than the national rate (Warner, Chen, & Makuc, 2009). Since 2008, the number of pharmaceutical opioid overdose deaths has started to decline, but deaths due to heroin have increased, resulting in a plateau in the overall rate of opioid-related deaths in the state (Banta-Green, 2013). The rise in heroin-related fatalities has been most evident among individuals under 30 (Banta-Green, 2013). In fact, heroin was cited as the most common drug associated with treatment among 18-29 year olds, and the

increase in first time admissions for heroin was largely attributed to this age group (Banta-Green, 2013). Among these young adult users seeking treatment for the first time, a majority reside outside of the Seattle metro area, mirroring national patterns in the spread of drug use to rural and sub-metro areas (Banta-Green, 2013; Rossen et al., 2013).

These data suggest that an effective public health strategy to reduce the number of fatal opioid overdoses in Washington State must consider both prescription opioid and heroin use, target both urban and rural areas, and include the young adult population. Despite these challenges, interventions to reduce fatal opioid overdose are available. In fact, one emerging strategy that has been endorsed by professional organizations including the American Medical Association, the American Public Health Association, and the American Pharmacists Association; international organizations such as the United Nations Office on Drug and Crime and the World Health Organization; and government agencies such as the Substance Abuse and Mental Health Services Administration; and featured in professional journals such as the Journal of Family Practice (Hill, Weiss, Connery, & Rice, 2012) is expanding overdose response education and distribution of take-home-naloxone hydrochloride: a short-acting opioid antagonist that reverses respiratory depression that can lead to fatal opioid overdose.

Naloxone was first approved by the Food and Drug Administration in 1971 as an injectable drug available only through prescription; currently, its formulations have been approved for intravenous, intramuscular, and subcutaneous administration (Wermeling, 2010). Naloxone can also be administered intranasally, though it is considered to be “off-label” use, as the FDA has not officially determined the safety and efficacy of this method of administration. However, several studies have found that intranasal naloxone is safe and effective (Kelly, Kerr, Dietze, Patrick, & Walker, 2005; Kerr, Kelly, Dietze, Jolley, & Barger, 2009; Ashton & Hassan,

2006) even when administered by non-medical personnel (Doe-Simkins, Walley, Epstein, & Moyer, 2009). Recently, intranasal administration has emerged as an alternative option of naloxone delivery that has become the standard of care currently used by Emergency Medical Services in Quincy, Massachusetts and Staten Island, New York, and is endorsed by the Boston Public Health Commission (Doe-Simkins et al., 2009). Yet despite naloxone's effectiveness and its widespread use among medical personnel, it often does not reach those in need. Most heroin overdoses are witnessed by friends and family of the user (Latkin et al., 2004), but witnesses often fail to call 911 due to fear of legal and criminal consequences (Kim, Irwin & Khoshnood, 2009; Tobin, Davey, & Latkin, 2005). Given that death from opioid overdose typically occurs over a span of 1-3 hours, there is often a substantial window of opportunity to intervene if a witness knows how to identify an overdose (Kim et al., 2009). Thus, by addressing legal concerns, expanding naloxone access, and providing overdose education to potential overdose bystanders, a larger segment of the population could more quickly and effectively intervene in overdoses that might otherwise be fatal.

To address concerns about negative legal consequences, states have passed laws that focus on two major issues. Good Samaritan Overdose Laws typically focus on legal immunity for overdose victims and bystanders who seek medical aid during an overdose. Naloxone related laws may address prescribers' concerns about potential liability arising from prescribing naloxone, as well as explicitly allowing people at risk for overdose and potential bystanders to be prescribed, to possess, and to administer naloxone during a suspected overdose. In 2010, Washington became the second state to pass a Good Samaritan-Naloxone Overdose Law that addressed all of the above elements. As of May 15, 2014, twenty-two other states and the District of Columbia have adopted similar laws.

Overdose response education and naloxone distribution programs have been developed, implemented, and evaluated domestically and internationally as a harm reduction strategy to reduce fatal opioid-related overdoses. To date, most of these programs are implemented in-person and in urban settings and have targeted current or former heroin users and individuals with opioid dependence, (Green, Heimer, & Grau, 2008; Gaston, Best, Manning & Day, 2009; Strang et al., 2008; Bennett & Holloway, 2012; Jones, Roux, Stancliff, Matthews, & Comer, 2013; Walley et al., 2013) homeless injection drug users (Wagner et al., 2009), healthcare professionals (Mayet, Manning, Williams, Loaring, & Strang, 2010), and family or friends of heroin users (Williams, Marsden & Strang, 2013; Walley et al., 2013). Evaluations of overdose response training programs suggest that these strategies can be effective in increasing knowledge and reducing overdose fatalities. Participants in in-person trainings have been shown to improve their knowledge of overdose prevention, recognition, and response (Green et al., 2008; Wagner et al., 2009; Mayet et al., 2011; Gaston et al., 2009; Williams et al., 2013; Strang et al., 2008; Bennett & Holloway, 2012; Jones et al., 2013), report increases in perceived competency in recognizing and responding to opioid overdoses (Green et al., 2008; Wagner et al., 2009; Mayet et al., 2011; Williams et al., 2013; Strang et al., 2008; Bennet & Holloway, 2012; Jones et al., 2013), report increases in willingness to administer naloxone (Mayet et al., 2011; Strang et al., 2008; Bennet & Holloway, 2012), and improve their ability to identify overdose risk factors (Mayet et al., 2011; Williams et al., 2013; Strange et al., 2008; Bennett & Holloway, 2012). State supported programs implemented at the community level were found to be associated with a significant reduction in rates of opioid overdose deaths (Walley et al., 2013), and naloxone distribution to heroin users appears to be a cost-effective public health strategy (Coffin & Sullivan, 2013). Although the results of these studies suggest that overdose response education

programs are effective, evaluations have been limited to programs providing in-person trainings. Given the increased use and abuse of prescription drugs, the younger age of the emerging heroin user population, and increased use in rural and sub-metro areas, web-based overdose education may be more accessible to a broader population. However, no studies have investigated the effectiveness of web-based overdose education programs.

The objective of this study is to conduct an initial evaluation of a website for implementing overdose education, www.stopoverdose.org. The training component of the website was developed by the Alcohol and Drug Abuse Institute at the University of Washington and launched on June 2013 to coincide with internet and Facebook advertising targeting residents in King and Spokane Counties in Washington State. It aims to increase awareness of overdose risks and provide specific and actionable overdose response information to potential overdose bystanders. The results of these online surveys were examined to determine: *(a) the characteristics of the population choosing to complete the online assessment (b) the level of knowledge of participants completing the online training and (c) any differences in participant characteristics, knowledge, and self-reported planned behaviors to share information and obtain naloxone between participants based upon self-report of personal or professional bases for their interest in the topic of overdose.* By examining these factors, this study aims to contribute to the literature on overdose education strategies.

Methods

Participant recruitment

The online survey was completed voluntarily and anonymously by 422 participants recruited through convenience sampling using internet and Facebook advertising. Internet

advertisements first appeared in June 2013 on websites such as CNN, Everyday Health, and Facebook and targeted residents of King and Spokane Counties in Washington State. All advertisements included a tagline such as “Learn how to reverse an overdose” and provided a link to the website www.stopoverdose.org (See Figure 1).

Overdose education training and survey

The overdose education website, www.stopoverdose.org was developed by the Alcohol and Drug Abuse Institute (ADAI) at the University of Washington. Its primary objective is to implement overdose education by providing information on opioid overdose recognition and response as well as to provide information on where to obtain naloxone, legal protections for overdose bystanders and victims in Washington State, and links to additional resources for treatment, legal assistance, and overdose education. The website also provides general information on overdose from alcohol and other drugs and information for law enforcement and prescribers of naloxone. Visitors to the website can enter their zip code to find “the nearest overdose prevention and naloxone program.”

In June 2013, the self-directed overdose training and knowledge quiz component of the website was launched to coincide with internet advertising. On the home page, visitors to the website are encouraged to “Watch a video, review the steps, then take a quiz.” Visitors are given the choice of viewing either of two informational videos embedded in the webpage; brief descriptions are provided directly below each video. The first video was produced by the New York Department of Health and is aimed primarily at users of illicit opioids. The second video was produced by Project Lazarus, a non-profit organization based in North Carolina that implements community-based overdose prevention that targets a more general audience, but

includes a physician speaking to a chronic pain patient. Both videos are under 9 minutes long and describe what naloxone is, risk factors for opioid overdose, signs of overdose, and appropriate responses to overdose, including how to administer intra-nasal naloxone. After watching the video, visitors are directed to review the information on the current webpage. In this section, appropriate responses to opioid overdose are described in seven sequential steps with a graphic and descriptive text. The eighth step addresses concerns about law enforcement and is the only component of the training on the home page that provides information about the Washington State Good Samaritan Overdose Law. This section briefly states that “The Washington State 911 Good Samaritan Drug Overdose Law lets bystanders give naloxone if they suspect an overdose,” and that “The law protects the victim and the helpers from prosecution for drug possession. The police can confiscate drugs and prosecute persons who have outstanding warrants from other crimes.” No additional information about the law is presented in the training, but a link to additional information is provided. Finally, visitors are asked to take a quiz to check their understanding of overdose recognition and response. Once participants click on the link to take the survey, information on the voluntary and anonymous nature of the survey is provided with a link to additional information.

The survey consists of 20 questions: seven assess overdose knowledge, 11 assess participant demographics and background, and two assess planned behaviors. The seven knowledge assessment questions are subdivided into a total of 20 possible items, two of which concerns the Washington Good Samaritan Law and are therefore only relevant to Washington State residents. All surveys included in this study were completed between June 3, 2013 and February 5, 2014.

Data Cleaning and Recoding

Survey results were first reviewed for quality and appropriate data categorization. Surveys that indicated “other” as a source of interest for overdose education and specified the source were examined to determine if indicated interest may be recoded to personal or professional. Eight of the 422 responses were recoded.

Analysis

Univariate analyses were performed in order to examine participant characteristics and responses on the knowledge quiz. Analyses were first conducted among all submitted surveys, then compared by participant self-report of personal or professional bases for their interest in the topic of overdose. For surveys classified as personal interest or professional interest, Pearson X^2 statistic and Fisher’s exact test for small cell sizes were used to determine group differences for categorical data. Independent-samples T-tests were used to compare differences in total knowledge scores between the two groups.

Results

Survey participant characteristics

Of the total 422 submitted surveys, most respondents were 35 or older, female, and residents of Washington State. A majority of respondents reported that they had not witnessed an overdose, had never administered naloxone, and had not received overdose education prior to the training they received on the website. Among residents of Washington State (N=163), most had heard of the Good Samaritan 911 Law prior to the online training (Table 1).

After completing the online training, a majority of respondents indicated that they were “very” likely to share the information they just learned. However, only a small proportion of respondents indicated that they were “very” likely to obtain take-home naloxone; most respondents indicated that they were “somewhat” likely to do so. Among respondents reporting that they know someone at risk for opioid overdose, most indicated that they would be “somewhat” likely to obtain take-home naloxone (Table 4).

Knowledge assessment

Of the 20 total items assessing level of knowledge, 18 assessed overdose recognition and response and two assessed knowledge of the Washington State Good Samaritan 911 Law. Out of 18 possible correct responses, the number of correct responses ranged from 6 – 18, with a mean of 16.20 (SD=1.99). Knowledge of the Good Samaritan Law is only reported among Washington State residents; out of two possible correct responses, the number of correct responses ranged from 0 -2, with a mean score of 1.48 (SD=.66) (Table 2).

When items assessing overdose recognition and responses were examined individually, the proportion of correct responses ranged from 75.1% to 99.5%. For 13 of the 18 total items, the proportion of correct responses was 90% or greater. Items with the lowest number of correct responses were signs of opioid overdose and identification of images of naloxone that could be administered intra-nasally. The proportion of correct responses for questions concerning the Good Samaritan Law were among the lowest observed. Although 83.3% of Washington residents correctly indicated that opioid users or bystanders can legally carry naloxone and a syringe, only 67.1% of Washington residents correctly indicated that the Good Samaritan Law does not

provide bystanders with complete immunity from being arrested for any reason, when in fact only immunity from drug possession is addressed by the law (Table 3).

Participant characteristics by professional vs. personal interest

Survey respondents were compared based on their indicated interest in the topic of overdose education. Among the 422 completed surveys, 116 respondents indicated only professional interest (N=115) or only professional and “other” interest (N=1), 180 indicated only personal interest (N=174) or only personal and “other” interest (N=6), 69 indicated only “other” interest, 29 indicated both professional and personal interest, and 28 did not respond (data not shown). Data presented compares professional interest (N=116) and personal interest (N=180).

Between the professional interest group and personal interest group, several significant differences emerged in respondent characteristics. Respondents in the personal interest group were younger and were more likely to report that they knew someone at risk for overdose. However, a larger proportion of respondents in the professional interest group indicated that they had received some level of overdose education prior to visiting the website and had administered naloxone to a person having an overdose (Table 1). Among Washington residents, significant group differences were found in prior knowledge of the Good Samaritan Law: Over two-thirds of respondents from the professional interest group had heard of the Good Samaritan Law prior to online training compared to just over half of respondents from the personal interest group (Table 1).

Significant differences also were found between the two groups’ self-reported planned behavior to obtain take-home naloxone. Overall, respondents from the personal interest group had a greater tendency to report being “very” likely to obtain take-home naloxone ($p < .001$).

Among respondents reporting knowing someone at risk for opioid overdose, group differences remained ($p=.017$) but became less significant.

Knowledge assessment by participant interest

There were no significant differences in the total number of correct responses for recognition and response between the two groups ($p=.056$). Out of 18 possible correct responses, the mean knowledge score for the professional interest group and personal interest group was 16.55($SD=1.73$) and 16.12 ($SD=2.01$), respectively (Table 2). Similarly, there were no significant differences in knowledge of the Good Samaritan Law between groups restricted to Washington residents ($p=.631$) (Table 2).

When the 18 items were examined individually, the proportion of correct responses ranged from 82.8% to 100% for the professional group, and 72.0% to 98.7% for the personal group. Only one item yielded significant differences in the proportion of correct responses between the two groups: respondents in the professional interest group were more likely to correctly indicate that hallucinations were not a sign of opioid overdose ($p=.04$).

Of the two items assessing knowledge of the Good Samaritan Law among Washington residents, a larger proportion of respondents from the personal interest group correctly indicated that persons who help someone during an overdose are not completely immune from arrest. However, a larger proportion of the professional interest group correctly indicated that it is legal for opioid users and bystanders to carry naloxone and a syringe. Group differences in responses to neither of the two items were found to be significantly different (Table 3).

Discussion

This study is an initial evaluation of an online overdose education website for implementing basic opioid overdose education. Results are based on a convenience sample of 422 respondents who completed and submitted an online knowledge survey through the website www.stopoverdose.org. Analyses of survey results revealed that the majority of respondents were able to correctly identify basic signs of opioid overdose and appropriate responses. There were no significant differences in total knowledge scores based on whether respondent interest in overdose education was professional or personal. However, significant differences were found in respondent characteristics and planned behaviors between these two groups.

This is the first study to evaluate an overdose education website for implementing basic education in overdose recognition and response. Previous studies evaluating approaches to overdose education have been limited in-person training programs that target specific populations such as heroin users, healthcare professionals, and homeless injection drug users (Jones et al., 2013; Wagner et al., 2009; Mayet et al., 2011; Gaston et al., 2009; Williams et al., 2013; Strang et al., 2008; Bennett & Holloway, 2012; Green et al., 2008).

These preliminary findings suggest that there is public interest in overdose education among individuals from a wide age and geographic range who have differing levels of exposure to previous overdose education and personal experience with overdose. The number of respondents reached and the knowledge level reflected in these results further suggest that online training may be an accessible and feasible method of implementing overdose education to a broad audience. Indeed, a recent study has suggested that extensive in-person training may not be necessary for correct use of naloxone or appropriate actions to take in case of overdose (Doe-

Simkins et al., 2014). Moreover, the results of the knowledge survey also identified areas where additional education may be necessary.

Results from the knowledge surveys indicated that respondents had a poor understanding of the Washington State Good Samaritan Law. Among Washington residents, only 67.1% were correct in determining that persons who help someone during an overdose do not have complete immunity from being arrested (58.8% among professional interest group, 72.0% among personal interest group). For both groups, these were the lowest scores in the entire survey. Although the Washington State Good Samaritan Law provides certain legal protections to both bystanders and persons experiencing drug-related overdose the law specifically states that “the protection in this section from prosecution for possession crimes under RCW 69.50.4013 shall not be grounds for suppression of evidence in other criminal charges” (Washington State Legislature, 2010). For the second item, 83.3% of respondents correctly indicated that opioid users can legally carry naloxone and a syringe (88.2% among professional interest group, 79.0% among personal interest group). Although the majority of respondents from both groups reported that they had heard of the law prior to this survey, respondents from the professional interest group were significantly more likely to have had prior knowledge of the law. These results not only indicate that familiarity with the Good Samaritan Law is relatively low among individuals with a personal interest in overdose education, but that components of this law are not well understood, even among professionals where familiarity of the law is somewhat higher. This may be a reflection of the limited information provided through the online training. Information on the Good Samaritan Law was only briefly described on the website in the “review” section, whereas information on overdose response and recognition was described in both the video and in text. However, this

may also be a reflection of the modest implementation of overdose education and education about the 911 Good Samaritan Overdose naloxone law in Washington.

Currently in Washington State, there is no statewide technical assistance for the implementation of overdose education. The Good Samaritan Law became effective on June 10, 2010 – three years prior to when the first survey included in this study was submitted. Even among Washington state police officers and paramedics who had been at the scene of a serious opioid overdose, only 16% of those surveyed were familiar with the law and among these, only 46% correctly understood the law (Banta-Green, Beletsky, Schoeppe, Coffin, & Kuszler, 2013). This knowledge gap may be reduced through alternative channels of overdose education. Websites presenting accurate and timely information such as www.stopoverdose.org may play an important role to expand and sustain overdose education.

There are several limitations to this study. First, these survey results are based on an anonymous convenience sample. Respondent characteristics such as interest in overdose, knowledge of overdose response, and personal experience with overdose are unlikely to be representative of the general public. However, with 55% of respondents indicating that they knew someone at risk for opioid overdose, this sample may be representative of the population most likely to be interested in and personally affected by the issue of opioid overdose. This population may be a potential target for the expansion of overdose education programs. A second limitation is that the survey only assesses knowledge at one point in time and as such, is unable to address the overall effectiveness of the online training or the impact of training on future behaviors. Nonetheless, this analysis is merely the first step in determining whether a web-based platform may play a critical role in expanding overdose education in Washington State.

Despite these limitations, this study was able shed light on to the characteristics of participants interested in the topic of overdose and explore whether a web-based platform is a feasible method of conveying basic overdose education. These findings suggest that there is an interest in overdose education and a critical need to disseminate information among Washington residents concerning the Good Samaritan Law. Given the increase in prescription drug abuse, the increase in drug-related overdose deaths in rural and sub-metro areas, and the younger age of new heroin users, these results suggest that online overdose education may play an important role in enhancing current efforts to implement overdose education for a broader audience.

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APPENDIX

Table 1: Participant demographics and experience by interest in overdose education

	Total Responses ^a		Professional Interest Only		Personal Interest Only		P-value ^e	
	N=422	100%	N=116	100%	N=180	100%		
Total ^b								
Age Group							P=.001 ^f	
< 18	26	6.2%	3	2.6%	13	7.2%		
18-24	62	14.7%	6	5.2%	38	21.1%		
25-34	86	20.4%	30	25.9%	36	20.0%		
35-44	81	19.2%	28	24.1%	31	17.2%		
45-60	139	32.9%	41	35.3%	52	28.9%		
Over 60	19	4.5%	7	6.0%	10	5.6%		
Unknown	9	2.1%	1	0.9%	-	-		
Gender							P=.429 ^f	
Male	134	31.8%	36	31.0%	60	33.3%		
Female	272	64.5%	76	65.5%	119	61.1%		
Transgender	5	1.2%	3	2.6%	1	0.6%		
Unknown	11	2.6%	1	0.9%	-	-		
ZIP Code ^c							P=.081	
King County	71	25.5%	34	31.5%	37	21.6%		
Spokane County	16	5.7%	7	6.5%	9	5.3%		
Rest of Washington	41	14.7%	11	10.2%	30	17.5%		
Other	108	38.7%	35	32.4%	73	42.7%		
Unknown	43	15.4%	21	19.4%	22	12.9%		
Know anyone at risk for opioid overdose?							P<.000	
Yes	222	55.0%	55	48.7%	132	75.4%		
No	182	45.0%	58	51.3%	43	24.6%		
Ever witnessed an opioid overdose?							P=.802	
Yes	126	30.9%	39	34.5%	64	36.0%		
No	282	69.1%	74	65.5%	114	64.0%		
Ever administered naloxone?							P=.002 ^f	
Yes	18	4.4%	12	10.7%	3	1.7%		
No	389	95.6%	100	89.3%	174	98.3%		
Ever had OD education before today?							P<.000	
Yes	113	27.8%	56	48.7%	33	18.5%		
No	279	68.6%	54	47.0%	139	78.1%		
Not sure	15	3.7%	5	4.4%	6	3.4%		
Have you heard of the Good Samaritan Overdose 911 law before today? ^d							P=.035 ^f	
No	57	35.0%	11	21.2%	30	39.5%		
Yes	100	61.4%	40	76.9%	42	55.3%		
Not sure	6	3.7%	1	1.9%	4	5.3%		
Total	163		52		76			

^a Missing responses were no more than 10% of the total.

^b One observation was dropped due to 10% survey completion; responses only selecting “other” as primary interest (N=69), both professional and personal interest (N=29), or responses that did not indicate interest (N=28) were excluded from this table.

^c Only valid ZIP code responses were counted.

^d Only included respondents that indicated Washington zip code for work or residence.

^e Pearson’s X2 used unless indicated otherwise; did not include “unknowns”

^f Fisher’s exact test

Table 2: Summary of knowledge quiz scores by interest in overdose education

	Total N=422	Professional Interest N=116	Personal Interest N=180	P-value
Knowledge Score (Out of 18)				
Mean	16.20	16.55	16.12	P=.056 ^a
Range	6-18	11-18	6-18	
Std. Dev.	1.99	1.73	2.01	
	Total WA N=164	WA Professional Interest N=52	WA personal interest N=76	P-value
Knowledge of Good Samaritan Law (Out of 2)				
Mean	1.48	1.44	1.50	P=.631 ^a
Range	0-2	0-2	0-2	
Std. Dev.	0.65	0.64	0.68	

^aIndependent sample t-test

Table 3: Results of knowledge quiz score by individual question

	Total scores			Professional Interest only			Personal Interest only			P-values ^b
	Total response	Total correct	% correct	Total response	Total correct	% correct	Total response	Total correct	% correct	
Which of these drugs should bystanders give in a suspected overdose? (Images shown)										
Naloxone Vial*	412	381	92.5%	114	103	90.4%	172	160	93.0%	P=.416
Naloxone Spray*	398	360	90.5%	111	104	93.7%	165	148	89.7%	P=.248
Ritalin	362	360	99.5%	100	100	100%	151	149	98.7%	P=.519 ^c
These drugs will reverse an opioid overdose. (Images of NoDoz & Niacin shown)										
True/False*	409	394	96.3%	113	112	99.1%	174	167	96.0%	P=.153 ^c
Which form of naloxone can you squirt up someone's nose? (Images shown)										
Naloxone vial	406	356	87.7%	113	98	86.7%	173	152	87.9%	P=.777
Naloxone spray*	406	362	89.2%	113	101	89.4%	173	154	89.0%	P=.923
It is legal for opioid users or bystanders to carry naloxone and a syringe.^a										
True*/False	162	135	83.3%	51	45	88.2%	76	60	79.0%	P=.175
Persons who help someone during an overdose cannot be arrested for any reason.^a										
True/False*	161	108	67.1%	51	30	58.8%	75	54	72.0%	P=.124
Which of these are signs of an opioid overdose?										
-Slow/shallow breath*	421	392	93.1%	116	109	94.0%	180	169	93.9%	P=.979
-Can't wake them up*	421	407	96.7%	116	114	98.3%	180	172	95.6%	P=.325 ^c
-Scratching; see bugs	421	346	82.2%	116	98	84.5%	180	148	82.2%	P=.612
-Hyper, restless	421	353	83.9%	116	105	90.5%	180	155	86.1%	P=.258
-Hallucinations	421	316	75.1%	116	96	82.8%	180	130	72.2%	P=.037
What should you do if you think someone is overdosing?										
- Try to wake/rub chest*	422	411	97.4%	116	114	98.3%	180	174	96.7%	P=.488 ^c
- Make them vomit	422	396	93.8%	116	113	97.4%	180	168	93.3%	P=.164 ^c
- NoDoz	422	409	96.9%	116	113	97.4%	180	176	97.8%	P=1.000 ^c
- Call 911*	422	405	96.0%	116	112	96.6%	180	173	96.1%	P=1.000 ^c
- Mouth-to-mouth*	422	401	95.0%	116	108	93.1%	180	172	95.6%	P=.362
- Naloxone*	422	406	96.2%	116	111	95.7%	180	174	96.7%	P=.756 ^c
- Recovery position*	422	383	90.8%	116	109	94.0%	180	160	88.9%	P=.139

* Correct responses

^a Only participants indicating Washington zip code for work or residence were included.

^b Pearson's X2 test used unless indicated otherwise

^c Fisher's exact test

Table 4: Planned behavior by interest type

	Total Responses		Professional Interest only		Personal Interest only		P-value ^a
	N	%	N	%	N	%	
How likely are you to share the information you just learned?							P=.070 ^b
Not at all	7	1.7%	1	0.9%	2	1.1%	
Somewhat	109	26.6%	20	17.5%	53	29.8%	
Very	255	62.2%	86	75.4%	117	65.7%	
N/A	39	9.5%	7	6.1%	6	3.4%	
Total	410		114		178		
How likely are you to obtain take-home naloxone?							P<.000
Not at all	135	33.0%	40	35.4%	44	24.7%	
Somewhat	140	34.2%	31	27.4%	79	44.4%	
Very	69	16.9%	16	14.2%	45	25.3%	
N/A	65	15.9%	26	23.0%	10	5.6%	
Total	409		113		178		
How likely are you to obtain take-home naloxone? (Among respondents who know someone at risk for opioid overdose)							P=.017
Not at all	46	20.7%	17	30.9%	22	16.7%	
Somewhat	94	42.3%	18	32.7%	62	47.0%	
Very	60	27.0%	13	23.6%	42	31.8%	
N/A	22	9.9%	7	12.7%	6	4.6%	
Total	222		55		132		

^a Pearson's X2 test used unless indicated otherwise

^b Fisher's exact test

Figure 1: Online advertisements

