

DRUG & ALCOHOL FINDINGS

Research analysis

This entry is our analysis of a study considered particularly relevant to improving outcomes from drug or alcohol interventions in the UK. The original study was not published by Findings; click [Title](#) to order a copy. Free reprints may be available from the authors – click [prepared e-mail](#). The summary conveys the findings and views expressed in the study. Below is a commentary from Drug and Alcohol Findings.

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► One opioid user saving another: the first study of an opioid overdose-reversal and naloxone distribution program addressing hard-to-reach drug scenes in Denmark.

Thylstrup B., Hesse M., Jørgensen m. et al.

Harm Reduction Journal: 2019, 16(66).

Unable to obtain a copy by clicking title? Try asking the author for a reprint by adapting this [prepared e-mail](#) or by writing to Dr Thylstrup at bt.crf@psy.au.dk.

A Danish programme targeted potential bystanders of opioid overdoses, providing training and supplies of the 'overdose antidote' naloxone. People who use opioids were the most likely to intervene in an overdose situation, highlighting their positive role as "public health collaborators".

SUMMARY Opioid overdose education and naloxone distribution programmes have been [expanding since 1996](#), [providing training](#) to bystanders on how to identify the symptoms of an overdose and administer the 'overdose antidote' naloxone, which [constitutes](#) the standard of care for the medical treatment of overdoses and can be administered nasally, into a vein, into muscle, or under the skin.

The featured study evaluated the feasibility and effect of the Save Lives programme in Denmark. This facilitated training to groups of potential bystanders on how to recognise an opioid overdose, perform cardiopulmonary resuscitation, and administer naloxone. The programme was implemented across [four municipalities](#) with high rates of overdoses.

A key element of Save Lives was the use of the 'train-the-trainer' model – extending the opportunity of training across a large number of people, in a relatively short period of time, and at relatively low cost. Train-the-trainer models take a 'trickle-down' approach to training: a central trainer trains others, who then in turn train more people. In this case, the project coordinator (a registered nurse) invited people to participate in the 'trainer workshops', including people who use opioids affiliated with the Danish Drug Users Union in Copenhagen and people working at management level in the police services, community substance use treatment centres, methadone and heroin maintenance clinics, homeless shelters, and drop-in centres. Following the training workshops, trainers invited other staff at their places of work, people who use opioids, and significant others (family members, partners, and friends of people who use opioids) to participate in the 'helper workshops'.

- The **trainer workshops** lasted four hours and covered: background and rationale for the Save Lives programme; what happens physiologically during an overdose; identifying and responding to an overdose; effects of naloxone; assembling the naloxone kit and administering naloxone; cardiopulmonary resuscitation using a training mannequin; project documentation; and implementation procedures at the local sites.

- The **helper workshops** lasted one hour, involved 5–6 participants, and covered: participant experience with overdoses and risk behaviour; introduction to the naloxone kit; and resuscitation training.

Participants who were unable to follow the instructions and demonstrate the procedures of resuscitating someone who had an overdose were not given naloxone.

The overdose prevention kit included:

- prefilled syringes (five 0.4 ml doses of 0.4 mg);
- nasal atomiser, which turned the solution in the syringes into a fine mist;
- ventilation mask;
- cotton and surgical alcohol wipes;
- gloves;
- cards with project information and a doctor's signature for the prescription of naloxone.

Participants were instructed to deliver 0.4 ml in each nostril, aid the person's breathing, and treat with naloxone again if overdose symptoms did not subside within two minutes.

Throughout the project period, the coordinator recorded details about known treated overdoses. The primary sources of information about overdose incidents were the overdose prevention kits, which trainers were asked to return after use, and follow-up interviews conducted with 174 (32%) participants either in person or over the phone.

Main findings

The Save Lives programme facilitated workshops for 552 participants via 10 trainer workshops (43 participants), and an initial round of 86 helper workshops (509 participants). Two thirds (60%) of trainers provided helper workshops.



Key points

From summary and commentary

The Danish Save Lives programme was initiated in 2010, providing training and supplies of the 'overdose antidote' naloxone to groups of people more likely than the average member of the public to witness an overdose.

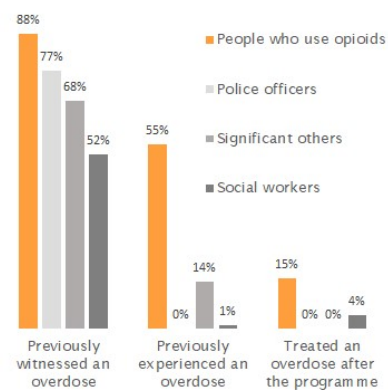
During the study period (April 2013–May 2015), 45 overdoses were treated by 37 out of a total 552 participants. In all but one case the overdose intervention was successful, and with regard to the exception, the person was already deceased before naloxone was administered.

People who use opioids reported the highest rate of interventions, demonstrating the positive role that peers can play in reversing overdoses. Further effort is needed to increase the involvement of police officers and significant others in the prevention of overdoses.

The most commonly cited reason for not doing so was lack of time, followed by lack of interest from people who use opioids. At the time the featured paper was written, records of the workshops had been deleted, and it was therefore not possible for the authors to describe the workshops in more detail.

Social workers (39%) and people who use opioids (34%) were represented in greater numbers in the overall sample than police officers (5%) and significant others (4%). A further 17% of participants could not be classified due to missing data. Participants ranged from 20 to 87 years old, with an average age of 42 years. Asked about their experience with overdoses, people who use opioids were more likely than other groups to have witnessed an overdose, previously experienced an overdose themselves, and to have treated an overdose after participating in the Save Lives programme:

- 88% of people who use opioids had previously witnessed at least one overdose, compared with 77% of police officers, 68% of significant others, and 52% of social workers;
- 55% of people who use opioids had previously experienced an overdose, compared with zero police officers, 14% of significant others, and 1% of social workers;
- 15% of people who use opioids had treated an overdose after participating in the training, compared with zero police officers, zero significant others, and 4% of social workers;



People who use opioids were more likely to have witnessed an overdose, previously experienced an overdose themselves, and to have treated an overdose after participating in the Save Lives programme

A total of 616 overdose prevention kits were distributed over the study period including refills, and 45 overdoses were reported and responded to by 37 participants (two trainers and 35 helpers). The vast majority of overdose responders (28 out of 37) were people who use drugs. Across all responders, most (31) responded to one incident each, one participant responded to two incidents, and four participants responded to three incidents each.

Of the 45 treated overdoses, data from follow-up interviews was available for 26:

- Most of the people who overdosed were men (19 men to 7 women).
- In all but two cases naloxone was administered, and in ten cases cardiopulmonary resuscitation was given.
- In 20 events the person who had treated the overdose was already present at the site when the overdose occurred.
- In 19 events, people recovered without complications. In cases with complications, one victim drifted in and out of consciousness, and five had cramps and vomited. In one additional case, the individual died. However, according to the report this person was already dead at the time naloxone was used.

Among the first-time overdose responses, naloxone was administered 65% of the time, and of these instances, 57% of participants reported using the prefilled syringes to administer naloxone nasally; the remainder used an earlier version of the kit with glass ampules.

Only 22 participants reported whether they had called emergency services. Of these, 12 affirmed that they called emergency services (six people who use opioids and six social workers).

Analysing the relationship between participant characteristics and the effect of the training, researchers found that older age, being a person who used opioids, and participating in training later in the study period were independently associated with treating an overdose. People who use opioids were significantly more likely than other groups of potential bystanders to have treated an overdose.

The authors' conclusions

The featured study evaluated the feasibility and effect of training bystanders to respond to opioid overdoses by performing resuscitation and administering naloxone. Following the training, there were 45 reported overdose incidents, and the responses of bystanders worked in all but one of these cases, and with regard to the exception, the person was already deceased before naloxone was administered.

People who use opioids reported the highest rate of interventions, demonstrating the positive role that service users can play in reversing overdoses, and the ability of people who use opioids to act as public health collaborators. However, there may be unintended consequences to this finding, including placing people who use drugs under additional stress.

Further effort is required to increase the involvement of police officers and significant others in the prevention of overdoses. Although they are among the most likely to be nearby when overdoses take place in public spaces and social settings, in the featured study there were no reports of them witnessing an overdose and intervening.

The study had several limitations. The lack of comparison or control groups and the low follow-up rate, in particular, restricted conclusions that could be drawn about the impact of the Save Lives programme. It is probable that some participants who responded to an overdose did not report this, which would make the number of reported overdoses lower than the number of overdoses actually treated.

FINDINGS COMMENTARY From 2013 to 2015, the Danish Save Lives programme facilitated training for 552 people on how to respond to opioid overdoses. The critical population of bystanders was the third of participants who identified as people who use opioids. Almost all (88%) had witnessed an overdose at some point, over half (55%) had previously experienced an overdose, and 15% treated an overdose following their participation in the programme, compared with 4% of social workers, and zero police officers and significant others.

The success of the Save Lives programme was gauged by factors such as the number of people training was disseminated to, the number of naloxone kits in circulation, and the number of overdoses that were (successfully) responded to. Against these markers, a considerable number of potential bystanders were trained from an initially small investment in training – 43 people took part in workshops and then rolled the

training out to 509 more people – and 37 of the 552 total participants reported having the opportunity to put these skills into practice when they witnessed an overdose in a ‘real world’ setting.

The study attempted to follow participants’ involvement in overdose events over a short period of time, which itself was dependent on participants being willing/able to take part in interviews or otherwise disclose their involvement. Due to reliance on self-reporting the researchers acknowledged that they may have underestimated the number of overdose events that Save Lives participants intervened in. Furthermore, the same reliance on self-reporting (and focus on overdose responses) meant the study would not have captured overdose events *witnessed* by participants but which they declined to respond to or saw someone else respond to. There was only one known case of a fatal overdose, and this was not believed to be due to something the person who intervened did or didn’t do. There were also reported adverse effects in a few cases, which can occur in any situation where naloxone is used to rapidly precipitate overdose reversal, but the way data was collected prevented the researchers from concluding that these were unavoidable side effects (versus for example the incorrect administration of first aid including naloxone).

Follow-up interview data was only available for 26 overdose events, and the researchers did not provide the kind of breakdown that might help to answer questions such as *why* people who use opioids were more likely to respond to overdoses. In 20 out of 37 events the person who had treated the overdose was already present at the site when the overdose occurred. What proportion were people who use opioids was not stated. However, it could be argued that regardless of the *why*, the overall findings indicated that in similar settings people who use drugs would be vital to the success of naloxone distribution programmes.

As the researchers acknowledged, naloxone has become the standard of care for the medical treatment of overdoses. The aim was therefore not to test the effectiveness of naloxone, but rather its application in a real world context with non-medical professionals taking the helm. In four municipalities in Denmark, the study demonstrated the proof of concept. We know *what happened*: 45 overdoses were reversed by 37 people who had been given the knowledge and resources to respond in an emergency situation. However, what we don’t know is *what would have happened* had those people not been trained or given naloxone supplies.

Can we really say naloxone reduces the overall rate of overdose deaths?

Critics of take-home naloxone programmes have [argued that](#) the absence of randomised controlled trials means there is no strong evidence that they reduce overdose deaths. However, similar concerns were previously expressed about other harm reduction strategies – including needle exchange programmes and opioid substitution therapy – that are now considered evidence-based practice.

A 2016 review analysed in the Effectiveness Bank [assessed](#) the safety of take-home naloxone programmes and their impact on overdose-related deaths using the nine ‘Bradford Hill criteria’. This well-established method can help to establish the likelihood of a ‘cause and effect’ relationship between an intervention (in this case, take-home naloxone programmes) and an outcome (in this case, rates of overdose-related deaths) where it is not possible to allocate participants at random to an intervention versus a comparator, for example because it would be impractical or unethical.

Scrutinising evidence from 22 observational studies, reviewers [found that](#) the community-based provision of the overdose antidote naloxone is likely to be an effective way of preventing overdose-related deaths. While the evidence was sometimes based on only one or two studies, or criteria only partially fulfilled, there was nonetheless support for all nine criteria. Take-home naloxone has led to improved survival rates among programme participants and reduced heroin overdose mortality rates in the community, with only a low rate of adverse events reported. For these reasons, reviewers concluded that standard care for the community-based prevention of heroin overdose deaths should include distributing take-home naloxone to at-risk users.

While the featured study was not designed to show conclusively that the Danish Save Lives programme saved lives that would otherwise have been lost, there is not necessarily a strong argument for this being the bar for implementation. Fatal opioid overdoses can occur rapidly or take several hours depending on the circumstances, and before the point of an overdose becoming fatal, impaired breathing can lead to vital organs being starved of oxygen, which can cause unconsciousness, coma, and brain damage. Although in overdose situations it is possible that emergency services could respond in time, bystanders would be in a position to respond more quickly ([unfold !\[\]\(5361750c22c4e047a52f4eac1ec2d4cc_img.jpg\) the supplementary text](#)), which is why there is such interest in equipping people who are likely to witness an overdose with the knowledge and resources to help.

[Close supplementary text](#)

If a patient has had a suspected overdose and is unconscious, this [falls under](#) a ‘category one’ emergency according to NHS England – the highest priority category of event for emergency responders. Overdoses which require immediate treatment (but where the person is still conscious) can fall under a ‘category two’ emergency.

According to a Nuffield Trust [analysis](#) of ambulance response times:

“Category 1 ambulance calls are those that are classified as life-threatening and needing immediate intervention and/or resuscitation, e.g. cardiac or respiratory arrest. The national standard sets out that all ambulance trusts must respond to Category 1 calls in 7 minutes on average, and respond to 90% of Category 1 calls in 15 minutes.”

“The average Category 1 response time improved from 7 minutes 37 seconds in April 2018 to 6 minutes 54 seconds in May 2018. The 7 minute target was met in March, April and May of this year. However, the average response time worsened in June 2019 to 7 minutes 11 seconds. The 90th centile target is consistently being met, reaching 12 minutes 28 seconds in June 2019.”

"Category 2 ambulance calls are those that are classed as an emergency for a potentially serious condition that may require rapid assessment, urgent on-scene intervention and/or urgent transport. For example, a person may have had a heart attack or stroke, or be suffering from sepsis or major burns. All ambulance trusts should respond to Category 2 calls in 18 minutes on average, and respond to 90% of Category 2 calls in 40 minutes under the new standards."

"Between April 2018 and June 2019, both the average and 90th centile response time targets for Category 2 calls were not met. Response times fluctuated but worsened overall. In June 2019, the mean response time was 22 minutes 26 seconds and the 90th centile response time was 46 minutes."

[Close supplementary text](#)

Application in the UK context

In 2005 naloxone became the [new hope](#) for harm reduction after UK law was amended to permit emergency administration by any member of the public. Its legal approval was seen as an important step to widening availability – meaning that GPs could prescribe kits to suitably trained drug users, friends and families. Scotland lifted these restrictions further, [allowing](#) emergency-use naloxone to be provided to services without prescription, enabling drug treatment and homeless hostel staff to have the drug ready for use. National naloxone programmes [have been](#) in place in Wales and Scotland since 2011, but in the name of localism, England has so far not established a centrally driven national programme.

As of 2019, the nasal spray format was being [tried](#) in a pioneering way by police officers in West Midlands Police, providing a potential model for other police forces and professionals who come into contact with people who inject in public places.

The UK's first naloxone peer training and supply programme was also [launched](#) in Scotland, where it is hoped that "volunteers will contribute to increasing the availability of naloxone within the community so that it is more likely to be present when an overdose occurs". [In-depth research](#) from Scotland with a small number of people known to have used take-home naloxone in an overdose situation identified some of the challenges as well as opportunities such a programme presents for people who inject drugs. It found that despite people who inject drugs being prime candidates for witnessing and intervening in a drug overdose, there can be a reluctance to use naloxone even in a life-saving situation. Looking back to the first time they administered naloxone, participants [described](#) the scene as chaotic – emphasising their alarm, anxiety, and panic. These emotions were linked to feeling unprepared, wanting to respond quickly, being concerned about the person in danger, and afraid of being blamed 'whatever the outcome'. Some participants also put their apprehension down to their inexperience with witnessing an overdose, administering naloxone, or of injecting others. These stresses – alone or in combination – often contributed to overdose responses based on instinct rather than on following protocol, for example some participants referred to administering all the naloxone at once rather than in smaller doses [as recommended](#) within UK national prescribing guidelines. Lower doses of naloxone are advised because they are less likely to trigger acute withdrawal which can be physically unpleasant for the patient and potentially distressing for those administering the drug.

In 2004 experts convened by the World Health Organization judged the risk-benefit profile to be strongly in favour of naloxone distribution to prevent opioid overdose deaths, but also cautioned that this "does not address the underlying causes of opioid overdose". Explained in [guidelines](#) on the "Community management of opioid overdose", among the recommendations were that:

- People likely to witness an opioid overdose should have access to naloxone and be instructed in its administration to enable them to use it for the emergency management of suspected opioid overdose.
- Naloxone is effective when administered by intravenous, intramuscular, subcutaneous and intranasal routes. Persons administering naloxone should select a route based on the formulation available, their skills in administration, the setting, and the local context.
- In cases of suspected opioid overdose, first responders should focus on airway management, assisting ventilation and administering naloxone.
- After successful resuscitation following the administration of naloxone, the level of consciousness and breathing of the affected person should be closely observed until they are fully recovered.

Effectiveness Bank hot topics have reviewed issues relating to [overdose prevention](#) and [naloxone provision](#).

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