

New York State

**Technical Working Group on
Resuscitation Training in Naloxone
Provision Programs**

2016 Report



**Department
of Health**

**AIDS
Institute**

Summary

Opioid overdose leads to respiratory depression and causes hypoxia culminating in cardiac arrest and death. Since April 2006, New York Public Health Law has allowed programs registered with the State Health Department to train potential witnesses to an opioid overdose in the processes of overdose recognition. These Trained Overdose Responders are also provided with naloxone to treat the victim and reverse the respiratory depressive effects of opioids and prevent death. The initial state-sanctioned training adopted the components of the other trainings in the United States that included the following steps:

- Recognition of a potential overdose
- Activation of Emergency Medical Services (EMS)
- Rescue breathing
- Administration of naloxone

Some opioid overdose prevention programs in other parts of the world differ in their guidelines, instead recommending chest compression only resuscitation or full Cardiopulmonary Resuscitation (CPR).

The New York State Department of Health (NYSDOH) convened a Technical Working Group on Resuscitation Training in Naloxone Programs to ensure that overdose programs in New York State (NYS) and elsewhere are afforded the best possible resuscitation protocol guidance tailored to suspected opioid overdoses in diverse settings. The group discussed the relevant medical literature, current practices and available Health Department data and reached the following conclusions:

The basic curriculum for Trained Overdose Responders should include the following essential components:

- Role of naloxone
- Recognition of a potential opioid overdose
- Confirmation of unresponsiveness with the sternal rub
- Administration of naloxone and calling EMS
- Re-administration of naloxone if response is inadequate
- Ensuring that the revived person is monitored for several hours, preferably in a medical setting
- Legality of naloxone possession and administration in NYS
- Rescue position

The following elements should also be included when possible:

- Hands-on practice with a demonstration kit
- Risk factors for overdose fatality
- New York State's 911/Good Samaritan Law
- Resuscitation technique: As there is insufficient data to recommend one resuscitation method over another, clinical directors will need to determine whether rescue breathing, chest compressions, both or neither is most appropriate for inclusion in their training curricula.

Background on Overdose and Naloxone Programs

Medical interventions to prevent opioid overdose deaths have traditionally taken place in emergency departments and in EMS-based pre-hospital settings. For various reasons, individuals who have overdosed do not make it into the timely care of trained medical professionals in those settings. This failure to intercede rapidly has contributed to overdose mortality in NYS and elsewhere and has spurred the development of alternate means to intervene in the community.

The United Nations Office on Drugs and Crime estimates that there were 183,000 drug-related deaths globally in 2012, with drug overdoses, primarily from opioids, being the principal factor.¹ In 2013, drug overdose was the leading cause of injury-related death in the United States, with 16,235 of the 43,982 drug overdose deaths (37%) involving opioid analgesics² and 8,257 (19%) involving heroin.³ In 2012, there were 1,848 deaths due to drug overdose in NYS. Heroin was a factor in 488 of these, and opioid analgesics were involved in 879.⁴ Opioid overdose victims are commonly rescued by community and professional first responders who administer naloxone.

Opioid overdose leads to respiratory depression and causes hypoxia culminating in cardiac arrest. This may be prevented by the administration of naloxone. It overrides the analgesic, euphoric and physiological actions of opioids, including respiratory depression. Naloxone can be administered intravenously, intramuscularly, subcutaneously, by inhalation or intranasally.

In the past decade, significant strides have been made in providing naloxone to trained individuals in community settings to respond to opioid overdoses they may witness or encounter. Recommended training has included guidance in identifying overdoses and taking basic steps to reverse them. These steps include summoning EMS; administering naloxone, either intramuscularly or intranasally; and performing some form of resuscitation, generally mouth-to-mouth rescue breathing. Those targeted for training include opioid users; friends and other social network associates of opioid users; staff in organizations likely to encounter opioid consumers, such as drug treatment programs, syringe exchanges and homeless shelters; and first responder personnel (police, fire, and emergency medical technicians). The duration of trainings ranges from as little as five minutes to more than an hour, depending on the venue and on the individuals receiving the training.

As of 2014, over 150,000 individuals had been trained in 30 states and the District of Columbia, with over 26,000 returning to their sponsoring programs to report naloxone use.⁵ As of November 2015, more than 85,000 individuals have been trained in NYS alone. New York's trained overdose responders have reported using naloxone successfully more than 2,500 times, and this is likely to significantly underrepresent the actual number of reversals.

Community-based naloxone has been associated with a decline in opioid mortality. In an interrupted time series analysis of towns in Massachusetts where community-based naloxone is available, opioid overdose death rate reductions have been greater where enrollment in these programs has been higher.⁶ Naloxone also appears to be cost effective. In a probabilistic analysis, the incremental cost was found to be between \$438 and \$14,000 per quality-adjusted life-year, well within the range of acceptable health care expenditures.⁷

New York State

Since April 2006, New York Public Health Law §3309 and its regulations governing implementation (10 NYCRR 80.138) have allowed programs registered with the NYSDOH to train potential witnesses to an opioid overdose in the recognition of and response to overdose. The NYSDOH and the New York City Department of Health and Mental Hygiene (NYCDOHMH) supply the naloxone to the programs for distribution to trained responders.

Drawing from overdose prevention trainings already operating in the United States, the following elements were in the overdose training curriculum initially developed in NYS:

- Explanation of opioids and naloxone
- Summary of overdose risk factors
- Recognition of an opioid overdose
- Actions to take:
 - call 911
 - perform rescue breathing
 - administer naloxone
 - continue rescue breathing and re-administer naloxone if insufficient response
 - place victim in rescue position if breathing but unresponsive
 - stay with victim until EMS arrives, if possible

To the extent possible, first aid curricula should be guided by supporting evidence. When a clear evidence base is lacking or when conflicting approaches exist, a reasoned examination of the issues, including an assessment of risks and benefits, is in order. The Opioid Overdose Resuscitation Technical Working Group convened by the AIDS Institute's Office of the Medical Director undertook the task of examining the evidence with respect to the "legacy" recommendation to have rescue ventilation as a core element in the training of overdose responders. The most recent American Heart Association (AHA) guidelines prioritize chest compressions and defibrillation for cardiac arrest. Rescue ventilation is part of CPR algorithms designed for professional first responders and health care workers, but CPR training for community responders does not include rescue ventilation anymore. When the Working Group met, the AHA did not include guidelines for responding to an overdose, though the 2010 guidelines mentioned rescue ventilation, along with naloxone for respiratory arrest from opioid overdose.

In 2015, the new guidelines state: "No treatment recommendation can be made for adding naloxone to existing BLS (Basic Life Support) practices for the BLS management of adults and children with suspected opioid-associated cardiac or respiratory arrest in the prehospital setting." However, the guidelines support the provision of overdose education with or without distribution of naloxone.⁸ In late 2014, the World Health Organization (WHO) published a document, "Community Management of Opioid Overdose", in which it is recommended that "in suspected opioid overdose, first responders should focus on airway management, assisting ventilation and administering naloxone".

The goal of the Working Group was to ensure that overdose programs in NYS and elsewhere are given the best possible resuscitation protocol guidance tailored to suspected opioid overdoses in diverse settings. The Working Group included individuals with a range of backgrounds in the areas of emergency medicine, prehospital services, primary care, addiction medicine, cardiology, government, and community naloxone programs. The immediate goal was to develop recommendations to inform opioid overdose training in NYS.

The Target Population for Brief Training

Guidance on resuscitation of overdosed individuals must accommodate the limited timeframes in which a substantial number of trainings take place. Many of these brief trainings are offered by syringe exchange programs, sometimes in the context of a street encounter. These particular trainings generally target individuals who misuse opioids, but their families, friends and others are also welcome to receive training in these settings. This approach assumes that these potential responders are not formally trained in standard full CPR and that they are similar to the general public in their ability to find a pulse and to assess respiration. These characteristics are similar to those assumed for the first-aid responders targeted for chest-compression-only training. One distinguishing feature of trained opioid overdose responders—at least those who are either syringe exchange program participants or those likely to engage with syringe exchange programs—is their greater familiarity with opioids and overdose than the general public.

The Working Group met to:

- Review relevant medical literature on resuscitation.
- Examine data from health departments and other sources on resuscitation practices and outcomes.
- Assess the context both for overdose trainings as well as for overdose reversal.
- Develop guidelines for overdose prevention training regarding the prioritization of rescue breathing and chest compressions in the context of brief trainings in the community.

OVERVIEW OF THE ROLE OF CHEST COMPRESSION ONLY RESUSCITATION

Chest Compressions Only in the Context of Sudden Cardiac Arrest

In 2011, an estimated 326,200 people experienced an out-of-hospital cardiac arrest.⁹ Only a minority receive CPR, for whom survival rates were generally low, in the range of 10-20%.¹⁰ The high death rate due to sudden cardiac arrest motivated experts in resuscitation to explore the hypothesis that hands-only resuscitation (chest compressions only) might be easier than chest compressions with mouth-to-mouth ventilation, and therefore result in a higher percentage of saved lives in these cases.

The AHA now recommends hands-only resuscitation for those untrained in standard CPR.^{11,12} This is based on several premises:

- In sudden cardiac arrest the blood is fully oxygenated, so circulation will provide oxygen to the vital organs.
- Interruption of chest compressions for rescue breathing may decrease efficacy.
- Rescue breathing is distasteful to many bystanders and often done improperly. It may, in fact, be a deterrent to efforts at first aid.
- Hands-only CPR may be easier to teach, particularly for emergency dispatchers over the phone.

A number of studies have shown that hands-only resuscitation is as effective or more effective in sudden cardiac arrest than standard methods (chest compressions with mouth-to-mouth ventilation).^{13,14,15}

Chest Compression Only in the Context of Respiratory Arrest

There is little research in the literature examining the use of hands-only CPR in asphyxia (e.g. drowning, opioid overdose). Two large studies in Japan^{16,17} found higher rates of survival among adult victims of cardiac arrest secondary to non-cardiac causes who received standard CPR vs. hands-only resuscitation, as well as better long-term outcomes among children receiving standard CPR. The study's authors suggest that the hands-only approach be taught to the general public and conventional CPR be taught to those most likely to witness a non-cardiac etiology cardiac arrest.

CURRENTLY RECOMMENDED RESUSCITATION PRACTICES IN THE CONTEXT OF SUSPECTED OPIOID OVERDOSE

Rescue Breathing

Rescue breathing for persons suspected of having an opioid overdose has considerable support among harm reduction programs and in the medical literature.¹⁸ This preference is based on the physiology of an opioid overdose. Opioids suppress the autonomic respiratory response to declining oxygen saturation and rising carbon dioxide levels. If this response remains suppressed, the consequences are hypoxia, acidosis, organ failure and death. The majority, if not all, of the community-based naloxone programs in the United States train responders in a rescue breathing technique. In this technique, the nostrils of the unconscious individual are pinched closed, a seal is formed between the mouths of the victim and the responder, and breaths are introduced every five seconds by the responder.

Further support for rescue breathing comes from the Substance Abuse and Mental Health Services Administration (SAMHSA) in its Opioid Overdose Toolkit.¹⁹ In late 2014, WHO issued guidelines on community management of opioid overdose recommending, "In suspected opioid overdose, first responders should focus on airway management, assisting ventilation and administering naloxone."²⁰ This was rated as a strong recommendation based on a weak quality of evidence.

Rescue breathing without chest compressions is not congruent with the current AHA guidelines for bystander resuscitation. These recommend either full CPR or, in the case of untrained bystanders who witness a sudden collapse or encounter an unconscious individual, chest compression-only resuscitation.²¹ The most recent AHA guidelines prioritize chest compressions and defibrillation for cardiac arrest from cardiac causes.

The AHA recognizes the role of respiratory support in drowning and other respiratory arrests, but only in the context of full CPR. Rescue ventilation is part of CPR algorithms designed for professional first responders and health care workers, but CPR training for community responders is most frequently done as "hands only" to increase participation from lay personnel who may be concerned about infectious disease exposure from mouth to mouth and may have trouble with the psychomotor task of both compressions and ventilations.

Chest Compressions in the Context of Suspected Opioid Overdose

Overdose prevention programs in some countries recommended other protocols as part of training on the use of naloxone. Community overdose programs in the United Kingdom and the State of South Australia recommend training in full CPR. A Canadian program, Preventing Overdose in Toronto (POINT), teaches chest compression only based on a set of observations:

“1) first responders are unable to identify unresponsive pulseless patients reliably, 2) naloxone administration has no role in cardiac arrest (including those due to opioid overdose), 3) ventilations may complicate bystander resuscitation, making it harder to teach, learn, execute and perform under challenging circumstances, and 4) significant numbers of opioid-related deaths involve polysubstance overdose with cardiotoxic drugs.”²²

OBSERVATIONS OF PRACTICES IN THE FIELD

In Massachusetts, 32% of 3349 people reporting overdose reversals reported doing mouth-to-mouth rescue breathing.²³ NYS finds similar numbers overall; further analysis of NYS data find that about 70% report rescue breathing when the overdose victim is perceived not to be breathing. The POINT program in Canada reported that chest compressions were performed in 46 of 112 administrations of naloxone.

NYCDOHMH has completed a prospective study following 398 people who received brief training including rescue breathing and were furnished with naloxone.²⁴ Subjects were asked if they performed rescue breathing and/or chest compressions, differentiating between the two practices. Of 153 subjects who answered the question positively only 15% reported rescue breathing alone, with 52% reporting doing chest compressions only and 33% reported doing both. It is notable that the strongest data available that address the impact of naloxone training and distribution comes from Massachusetts where program participants are taught rescue breathing. However, the NYCDOHMH data suggest that training and practice are not congruent.

Discussion:

The Working Group members were in full agreement that there are insufficient data to make a strong recommendation prioritizing chest compressions and/or rescue breathing. This, coupled with the uncontested benefit of timely administration of naloxone, is the basis for the Working Group’s primary recommendation that administration of naloxone in the case of a suspected overdose naloxone administration should precede any other means for resuscitation.

The Working Group members also concluded that relative primacy of calling EMS and administering naloxone may be influenced by many factors, and the trained responder should exercise judgment in determining which to undertake first. Based on the experience of members and in a mention in the literature, the Working Group also noted that painful stimulation, such as that associated with chest compressions, can induce respiration.²⁵

Recommendations (Please refer to rating scheme in the Appendix – Strength of Recommendation and Quality of Evidence for Recommendation/Statement):

- Administration of naloxone and calling EMS are the highest priorities in responding to a potential opioid overdose. A-II
- Because painful stimulation has a role in both assessing an overdose as well as possibly in inducing respiration, it should be emphasized in training. A-II
- As there is insufficient data to recommend one resuscitation method over another, clinical directors will need to determine whether rescue breathing, chest compressions, both or neither is most appropriate for inclusion in their training curricula. C-III considerations are found in the Appendix.

The NYSDOH recommends that the basic curriculum for Trained Overdose Responders include the following as essential components:

- Role of naloxone
- Recognition of a potential opioid overdose
- Confirmation of unresponsiveness with the sternal rub
- Administration of naloxone and calling EMS
- Re-administration of naloxone if response is inadequate
- Either remaining with the revived person until EMS arrives or otherwise ensuring that the revived person is monitored for several hours, preferably in a medical setting
- Legality of naloxone possession and administration in NYS
- Rescue position

The following elements should also be included when possible:

- Hands-on practice with a demonstration kit is a high priority; the formulations distributed by NYS require assembly which should be practiced, but lack of access to practice materials should not prevent the receipt of a kit.
- Risk factors for overdose fatality, with an emphasis on using alone, the loss of tolerance and mixing drugs. For individuals in substance abuse treatment or for individuals transitioning to the community from correctional settings, the impact of loss of tolerance is an essential topic.
- New York State's 911/Good Samaritan Law.
- Resuscitation technique: As there is insufficient data to recommend one resuscitation method over another, clinical directors will need to determine whether rescue breathing, chest compressions, both or neither is most appropriate for inclusion in their training curricula.

Appendix

CONSIDERATION FOR THE CHOICE OF RESUSCITATION TECHNIQUES

(Please refer to rating scheme in the Appendix – Quality of Evidence for Recommendation/Statement)

Potential benefits of teaching rescue breathing only:

- It is physiologically responsive to the hypoxia in an opioid overdose. III
- Data from MA suggest that it is reasonably well accepted and implemented. II
- When responders do not call EMS promptly for an opioid overdose—or when the EMS response is delayed—respiration support is vital. III
- The importance of respiration support increases if naloxone is not available. III
- Opioid overdose programs may be the only source of instruction on rescue breathing for overdose responders. III
- Rescue breathing has been widely embraced by community naloxone distribution programs. II
- Rescue breathing alone may be more beneficial for individuals having an opioid overdose, as opposed to those who are experiencing a sudden cardiac arrest. III
- Rescue breathing alone avoids the unlikely consequences of compression-associated trauma, e.g. rib fractures or chest trauma. III

Potential problems with teaching rescue breathing only:

- This approach does nothing to address an underlying cardiac arrest, if one has taken place. III
- There are no data on effectiveness of rescue breathing alone in any setting. III
- Learning and retaining skills on effective rescue breathing is challenging. I
- Poorly done rescue breathing may increase risk of aspiration. III
- Sudden cardiac arrest occurs with a greater frequency than opioid overdose, and training for intervention in cardiac arrest is a broader public health intervention. II

Potential benefits of teaching chest compression only:

- It is clearly beneficial for sudden cardiac arrest when coupled with timely intervention by EMS. I
- It is easy to teach. III
- More stimulation is provided by compressions than by mouth to mouth ventilation. III
- Naloxone restores respirations so the addition of chest compressions addresses the possibility of cardiac arrest; the time to the onset of action of naloxone may be brief enough that provision of respirations becomes a lower priority. III
- Chest compressions are consistent with 911 call-taker / dispatch instructions in areas which do not screen for asphyxia. III
- Chest compressions may result in passive ventilation. III

Potential problems with teaching chest compressions only:

- In an opioid overdose, the blood and organs become depleted of oxygen. Little data exist on how much air is moved by chest compressions and none on the role in a patient who is already hypoxic. III
- There are no data on the effectiveness of chest compressions only in the setting of opioid overdoses. III

Teaching both:

- While teaching both techniques may be optimal and possible in some training settings, it is probably not feasible in brief trainings. III

Teaching neither:

- Teaching rescue breathing or chest compression might reduce the time available to teach about the administration of naloxone in time-limited trainings. However, it appears from the literature that doing one or the other is likely to be better than nothing. III

RATING SCHEME FOR RECOMMENDATIONS**Strength of Recommendation/Statement**

- A: Strong recommendation for the statement.
- B: Moderate recommendation for the statement.
- C: Optional recommendation.

Quality of Evidence for Recommendation/Statement

- I: One or more randomized trials with clinical outcomes and/or validated laboratory endpoints.
- II: One or more well designed, nonrandomized trials or observational cohort studies with long-term clinical outcomes.
- III: Expert opinion.

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