

Medical Direction and Practice Board White Paper

Approach to Out-of-Hospital Cardiac Arrest During the COVID-19 Pandemic

Background:

The approach to out-of-hospital cardiac arrest (OHCA) has evolved to focus on the provision of early, high-performance CPR. High-performance CPR is the factor most closely linked to positive outcomes after a patient suffers cardiac arrest. Other interventions such as defibrillation, when appropriate, medications, and considering possible causes of OHCA are important as well. Therapies such as pre-hospital intubation have less of an impact on patient outcome than the above¹.

During the COVID-19 pandemic, we have been forced to reconsider some elements of the approach to the patient suffering OHCA. While cardiac arrest and interventions to treat OHCA have been well studied, the science regarding the novel coronavirus is young and evolving. Like you, the MDPB is committed to learning as much as possible regarding COVID-19. The evidence surrounding the disease is rapidly being developed, and the MDPB is committed to evolving its clinical guidance as increasing evidence mounts. Regardless of the change in medical knowledge, the MDPB continues to value two important principles: that the safety of EMS clinicians is ensured in all instances, and that care of our patients is timely and excellent. In the case of OHCA, many agencies have recently published interim guidance, including the AHA, CDC, WHO, and various others. The following is the MDPB's interpretation of those guidances as they pertain to our patient population. It is intended to act as a support document to the *Maine EMS Cardiac Arrest and Pandemic Response Protocol*.

Safety of EMS Clinicians During OHCA in the Era of COVID-19

The MDPB is committed to EMS clinician safety and the safety of the extended EMS community, including our collective loved ones. The MDPB is also focused on continuing to take excellent care of patients, including patients suffering from out-of-hospital cardiac arrest, and believes the below strategies allow for both EMS safety and excellent patient care.

PPE

SARS-CoV-2/COVID-19 is spread by droplets and aerosols formed by the infected patient breathing. Coughing, sneezing and any airway management technique may generate aerosols which are smaller particles that remain suspended in air for a longer period of time and travel greater distances than droplets. Placing a surgical mask over the patient's face is the most effective way to contain droplets and aerosols, but airway management during CPR does not allow for this strategy. Thus, providers must don appropriate PPE including gown, gloves, goggles and an N-95 mask (or equivalent respirator) prior to providing care for OHCA patients. While this level of PPE is only necessary when treating patients who have been diagnosed with or are suspected of COVID-19, the distinction between patients with suspicion for COVID and patients without suspicion for COVID will be difficult to make accurately in real time when approaching an OHCA patient. Therefore, during all phases of pandemic response, the MDPB recommends a conservative approach to safety and recommends donning airborne PPE when approaching any OHCA. Balancing the benefit of prompt response to a patient suffering from OHCA against the necessity for strategic donning of airborne PPE, the MDPB suggests that the provider "teaching" the call safely don as much PPE as possible during the response to the scene so that assessment and high-quality CPR can be implemented as soon as possible upon arrival.

Available evidence and experience all support that using complete PPE is highly effective in preventing transmission, even during risky procedures and will keep providers from becoming ill or missing work due to a quarantine after an exposure^{2,3}. *Proper PPE is the most protective measure we can take when caring for a patient suffering from COVID-19.*

Medical Direction and Practice Board White Paper Approach to Out-of-Hospital Cardiac Arrest During the COVID-19 Pandemic

CPR

The act of performing chest compressions may place the chest compressor at risk due to proximity to the patient and due to the potential to aerosolize secretions while compressing the chest. The first steps in safety include foundational infection control practices, such as maintaining distance when not providing direct patient care. Much remains to be learned regarding COVID-19, but most experts use 6 feet as the definition of “close proximity” and suggest that maintaining a 6-foot distance from a patient with COVID-19 is safe. This operationally translates to keeping anyone not performing essential functions or procedures away from the patient during cardiac arrest resuscitation. The MDPB recognizes though that in some resuscitations it is impossible to avoid close proximity.

In addition to proximity to a patient, time is another important consideration that factors into risk when considering an exposure. Different expert organizations qualify an exposure as “high risk” when it lasts longer than 10 or 15 minutes^{4,5}. During CPR, be vigilant about rotating compressors every 2 minutes, when available. Fatigue will occur more quickly when breathing through an N95 mask. Also, While CPR will create a high droplet / aerosol environment, changing compressors frequently will minimize individual exposure.

If available, consider utilizing mechanical CPR. This will eliminate exposure to a human compressor. Remember that manual CPR will be necessary while mechanical CPR is being set up. If opting to utilize such a device, it is essential to consider how to sterilize this device after the call.

Barriers

Many physicians and health care systems are trialing barriers to block the spread of aerosolized particles during aerosol-generating procedures. These may be in the form of boxes, tents or shrouds. The hope is to contain any droplets or aerosolized particles inside the barrier, thus preventing exposure to healthcare workers. While the evidence is uncertain to support these practices in patients with COVID-19, focused empiricism⁶ * suggests these techniques could have meaningful benefit. During either CPR or airway management, a plastic shroud should be used to help contain aerosols. This technique is not yet well studied but should complement PPE and other protective practices.



Focused Empiricism is a term that has been used in the pre-hospital and military experience. In particular the National Academies of Science Engineering Medicine's "A National Trauma Care System Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths After Injury" defines the term as "An approach to process improvement under circumstances in which: (1) high-quality data are not available to inform clinical practice changes, (2) there is extreme urgency to improve outcomes because of high morbidity and mortality rates, and (3) data collection is possible."⁶

Medical Direction and Practice Board White Paper Approach to Out-of-Hospital Cardiac Arrest During the COVID-19 Pandemic

These devices may be as simple as a piece of clear plastic that is draped over the patient's head and neck. Some have made more elaborate devices that are more akin to tents, as demonstrated in the photo to the right. While this is one example of a clear plastic shroud, the structure of the tent is not necessary for application during CPR or airway management but may be more appropriate for other aerosol-generating procedures when the patient is awake.

Use caution if the shroud is in place and a defibrillation is indicated. The shroud may trap oxygen and create a flammable environment. Be sure that the defibrillation pads are **outside** of the shroud.

Airway

Like CPR, airway management procedures may generate aerosols. The risk related to airway management comes in two stages:

- 1) During the *placement* of the device, and
- 2) During the *use* of the device

Risk related to placement is due to physical proximity to the airway during placement and resultant exposure to aerosolized particles. Risk related to use of a device is due to insufficient seals between the device and the patient. This includes poor facemask seals, poorly seated BIADs or insufficiently inflated ETT balloons. The Maine EMS strategy of airway management has always stressed the goals of oxygenation, ventilation and protection of the airway and using the simplest strategy that meets those goals. This practice should continue, and in the context of COVID-19, is more important than ever for not only patient outcome, but for EMS clinician safety. *Please avoid intubation whenever possible* as this procedure requires close proximity to the airway and is therefore a higher risk procedure. Begin with the least invasive means possible, pausing at the procedure that meets the patient's airway management needs. Please consider starting during the arrest phase with BVM and OPA/NPA. If additional measures are required in the ROSC phase, begin with Blind Insertion Airway Devices.

Why is the MDPB asking EMS Clinicians to avoid intubation? Numerous considerations lead to this suggestion, including:

- Concern for increased risk to intubator if patient is infected with SARS – CoV-2/COVID-19,
- Intubation provides no evidenced-based advantage to patient outcomes in out-of-hospital cardiac arrest¹,
- Other means of airway management (including BVM and BIAD) perform equally effective and achieve similar outcomes in out-of-hospital cardiac arrest,



Medical Direction and Practice Board White Paper Approach to Out-of-Hospital Cardiac Arrest During the COVID-19 Pandemic

- Scenarios where laryngoscopy/intubation is the best airway management in pre-hospital care are rare. Examples include (but are not limited to): airway occlusion with foreign body, excessive secretions, unable to successfully ventilate by other means.

When using a BVM, use two hands to obtain the best seal possible and minimize environmental contamination with aerosols. When performing this, or any other airway management procedure, doing so under a clear plastic shroud is intended to contain any aerosolized particles or droplets and thus protect providers.

Another protective strategy is the use of high efficiency particulate air (HEPA) filters. These devices should be placed between the airway management device and the BVM, as close to the patient as possible. Used in this fashion, these devices will filter up to 99.97% of respiratory aerosols. When used with a HEPA filter and adequate cuff pressure, endotracheal tubes may provide superior safety from exposure to aerosolized particles, however, when used without a HEPA filter, there is no added safety with intubation when compared to other means of airway management.

Some BIADs have gastric ports. When present, please consider blocking these ports in an effort to reduce exposure to aerosolized particles.

The MDPB anticipates that using the above strategies will significantly reduce the need to proceed to intubation. In the event that the patient requires intubation, please consider the following steps to ensure provider safety:

- 1) The provider most experienced in intubation should perform the procedure.
- 2) Limit to two attempts and then refer to the Maine EMS *Failed Intubation Algorithm*, **Blue 5**.
- 3) If available, and the operator is experienced in its use, consider use of video laryngoscopy, which allows for greater distance between the patient and the intubator.

Some organizations have recommended pausing chest compressions for intubation in an effort to improve placement of the ETT. The MDPB is **NOT** recommending pauses in chest compressions during airway management. While this step may facilitate intubation, it is not clear that pauses in chest compressions improve safety to EMS clinicians. In addition, it is known that pauses in chest compressions do lead to very poor patient outcomes. Instead, the MDPB recommends minimizing pauses in chest compressions, using strategies other than intubation to manage the airway of OHCA patients, and, when absolutely necessary, consider strategies that allow for ETT placement during natural pauses in chest compressions, such as prepositioning the laryngoscope prior to rhythm check and then placing ETT during rhythm check. In addition, and in an effort to maintain EMS clinician safety, the MDPB recommends performing intubation in as short a time as possible (preferably less than 10 seconds) with the tools and hands *under* a clear plastic shroud while the clinician's head is *outside* of the shroud.

The members of the MDPB are highly committed to both EMS clinician safety and patient care. While there remain many unknowns at this time in our collective response to COVID-19, there are also known factors in this response, including the protective benefit of proper PPE and the importance of high-performance CPR. The MDPB believes that the above practices, in combination with provider safety and



Use HEPA filter to connect BVM and ETT
Avoid virus spreading



Medical Direction and Practice Board White Paper
Approach to Out-of-Hospital Cardiac Arrest During the COVID-19 Pandemic

excellence in patient care, are essential as we continue to respond during this pandemic. We thank you, for everything you are doing during this event and for continuing to serve the citizens of Maine. For questions, please contact any MDPB member.

Works cited:

1. Ian G. Stiell, M.D., George A. Wells, Ph.D., Brian Field, A.C.P., M.B.A., Daniel W. Spaite, M.D., Lisa P. Nesbitt, M.H.A., Valerie J. De Maio, M.D., Graham Nichol, M.D., M.P.H., Donna Cousineau, B.Sc.N., Josée Blackburn, B.Sc., Doug Munkley, M.D., Lorraine Luinstra-Toohey, B.Sc.N., M.H.A., Tony Campeau, M.Ed., et al., for the Ontario Prehospital Advanced Life Support Study Group. Advanced Cardiac Life Support in Out-of-Hospital Cardiac Arrest. *NEJM. N Engl J Med* August 12, 2004; 351:647-656.
2. Seto WH1, Tsang D, Yung RW, Ching TY, Ng TK, Ho M, Ho LM, Peiris JS; Advisors of Expert SARS group of Hospital Authority. Effectiveness of precautions against droplets and contact in prevention of nosocomial transmission of severe acute respiratory syndrome (SARS). *Lancet.* 2003 May 3;361(9368):1519-20.
3. L. Clifford McDonald, Andrew E. Simor, Ih-Jen Su, Susan Maloney, Marianna Ofner, Kow-Tong Chen, James F. Lando, Allison McGeer, Min-Ling Lee, and Daniel B. Jernigan. SARS in Healthcare Facilities, Toronto and Taiwan. *Emerg Infect Dis.* 2004 May; 10(5): 777–781.
4. Home care for patients with COVID-19 presenting with mild symptoms and management of their contacts. WHO Interim Guidance, 17 March 2020. [https://www.who.int/publications-detail/home-care-for-patients-with-suspected-novel-coronavirus-\(ncov\)-infection-presenting-with-mild-symptoms-and-management-of-contacts](https://www.who.int/publications-detail/home-care-for-patients-with-suspected-novel-coronavirus-(ncov)-infection-presenting-with-mild-symptoms-and-management-of-contacts)
5. Public Health Recommendations for Community-Related Exposure. CDC 3/30/2020. <https://www.cdc.gov/coronavirus/2019-ncov/php/public-health-recommendations.html>
6. A National Trauma Care System Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths After Injury, The National Academies of Sciences Engineering Medicine, 2016. Available at <https://www.nap.edu/catalog/23511/a-national-trauma-care-system-integrating-military-and-civilian-trauma>