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CLINICAL BULLETIN

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#2020-04-30-01	Cardiac Arrest Pandemic Response Protocol		30 Apr 2020
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Maine EMS and the Medical Director Practice Board are committed to the timely, effective, and safe care of patients suffering from out-of-hospital cardiac arrest as well as the safety of every EMS clinician providing care in these instances. There are many elements of the existing Maine EMS *Cardiac Arrest Protocol* as well as the *Phase One Pandemic Response Protocol* that are both patient-centric and in the best interest of EMS clinicians. As we continue to learn more surrounding best practices, it is essential to evolve our practices to account for measures which add to patient outcome or to EMS clinician safety.

The included *Cardiac Arrest and Pandemic Response Protocol* and accompanying White Paper represent the MDPB's efforts to evolve current practices by supporting the safety of responding EMS clinicians at the same time as providing excellent care of patients suffering cardiac arrest during the COVID-19 pandemic.

This protocol is not intended to supplant the current *Maine EMS Cardiac Arrest Protocol,* nor does it supersede the *Phase One Pandemic Response Protocol.* Rather, the *Cardiac Arrest and Pandemic Response Protocol* is intended to work in unison with the prior protocols and adds additional measures intended to strengthen EMS clinician safety. The attached protocol is authorized for use immediately upon review of the accompanying White Paper and any necessary EMS Service-specific operational actions needed to enact any of the steps of the protocol.

Questions regarding this clinical bulletin or the accompanying attachments should be directed to Maine EMS.

Attachments:

1) Maine EMS Cardiac Arrest Pandemic Response Protocol
2) Medical Direction and Practice Board White Paper: Approach to Out-of-Hospital Cardiac Arrest During the COVID-19 Pandemic

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The following is a list of what is KNOWN about COVID-19 and the risk of transmission to EMS clinicians.

1) SARS-CoV-2/COVID-19 can be spread by aerosolized particles. Certain procedures may either *generate* or *expose* EMS clinicians to those aerosolized particles.
2) Airborne precautions and proper PPE in the form of goggles, gown, gloves and an N95 mask or equivalent respirator are highly protective, even in the face of exposure to COVID-19 patients.
3) In addition to proper PPE, other infection control measures described in Maine EMS Clinical Bulletins and the *Phase 1 Pandemic Response Protocols* are highly effective, especially social distancing and limiting the number of providers attending to a patient, when possible.

There remain certain unknowns surrounding the care of patients suffering from COVID-19, such as the true risk of each different aerosol-generating procedure to EMS clinicians in proper PPE and the best means to manage a patient's airway that best balances patient outcome and EMS clinician protection.

In addition to these, we also know important fundamental facts surrounding the management of patients suffering out-of-hospital cardiac arrest, including:

1) The most important therapy provided to patients suffering from OHCA is high-performance CPR (HP-CPR).
2) HP-CPR includes compressing at the proper rate and depth, allowing for adequate recoil and minimizing interruptions.

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Based on the KNOWN risks of COVID-19 transmission and what is known regarding the effective management of OHCA, the MDPB recommends the following when caring for a patient with OHCA during the COVID-19 pandemic:

1) **Personal Protective Equipment**
   a. *PPE is the most protective measure EMS clinicians can take when caring for a patient with COVID-19*. Per the Phase 1 Pandemic Response Protocols, **PPE should be worn in all cases of OHCA**. Consider strategies of pre-donning to reduce time to patient care. CPR, assisting ventilations, and placing airways are all aerosol-generating procedures. N95 masks (or equivalent) as well as gowns, gloves, and eye protection are essential prior to management of these patients.

2) Treatment – CPR
   a. While CPR is being performed, please limit the number of providers to those absolutely necessary. EMS Clinicians should establish a 6-foot distance from the patient when not performing procedures.
   b. If available, consider changing chest compressors every 2 minutes to reduce individual provider exposure during CPR.
   c. If available, consider placement of a mechanical CPR device.If such a device is available, initiate resuscitation with manual CPR, placing the device on between the first and second pause for rhythm check, initiating the device as early as the third round of CPR.

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3) Treatment – Airway Management
   a. If available, place a HEPA filter between the BVM and airway device (e.g. Mask, BIAD, or ETT). Place the filter as close to the patient as possible. Minimize any disconnections between the HEPA filter and the patient.
   b. Place a clear plastic shroud over the patient's head and neck, performing all airway management techniques, including ongoing bagging underneath the shroud. This strategy reduces the risk of ongoing exposure to EMS providers.

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The above figures are examples of the clear plastic shroud. The shroud may be placed directly over the patient's head and neck while the EMS clinician managing the airway does so with the airway management device and their hands UNDER the shroud.

Controversy remains regarding the most protective airway management strategy. There is risk inherent in performing the procedure and risk of exposure after the procedure. In balance, the MDPB recommends maintaining the strategy of basic airway measures first, maintaining these measures as long as they are effective. This strategy reduces the risk to providers of performing intubation, which generates significant aerosolized secretions.

CAUTION: FIRE RISK: If a drape is being used AND the patient requires defibrillation, ensure the drape does not accumulate oxygen and that defibrillation pads are not under the drape during defibrillation.

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c. If Blind Insertion Airway Devices are used and the device has a gastric port for insertion of OG tube, consider blocking that port in an effort to further reduce release of aerosolized secretions.

d. If intubation is necessary, it should be performed under the clear plastic shroud to limit exposure to aerosolized respiratory secretions. Consider the following:
   i. Intubation should be performed by the provider most experienced with intubation. No more than 2 attempts should be performed.
   ii. Consider video laryngoscopy, if available and the intubator is experienced in its use.
   iii. Do NOT pause chest compressions to perform intubation. Instead, consider intubating during the 2-minute rhythm/pulse checks.
   iv. Continue ventilations under the clear plastic shroud.

4 .Treatment – Termination of Resuscitation

a. Follow all existing Maine EMS guidelines for Termination of Resuscitation (**Page 46, RED #13)**

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 above[1].

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 "teching" 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 empiricism[6] * 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]

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.

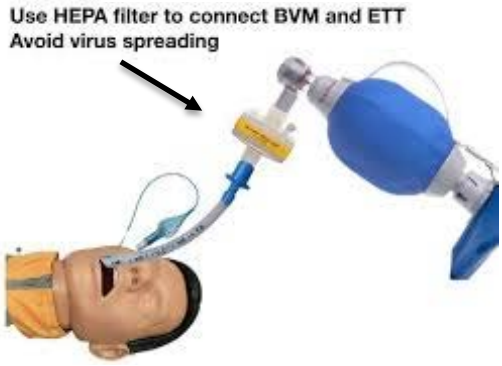
Why is the MDPB asking EMS Clinicians to avoid intubation? Numerous considerations lead to this suggestion, including:

- 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 arrest[1],
- Other means of airway management (including BVM and BIAD) perform equally effective and achieve similar outcomes in out-of-hospital cardiac arrest,

- 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

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.

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