Texas NAEMSP Practice Guidelines During the COVID-19 Pandemic, Rob Dickson, MD\textsuperscript{1,2}, Justin Fairless, DO\textsuperscript{3,4}, Jeff Jarvis, MD\textsuperscript{5,6}, Marie Manning, MD, Margaret Strecker-McGraw, MD\textsuperscript{6,7}, Ronna Miller, MD\textsuperscript{8}, Casey Patrick, MD\textsuperscript{1,2}, Taylor Ratcliff, MD\textsuperscript{6,7}, Gerad Troutman, MD\textsuperscript{9,10}, Hemant Vankawala, MD\textsuperscript{11,12}

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2. Baylor College of Medicine.
3. TCU/UNT Health Science Center
4. Native Air TX/NM, Air Methods Corporation
5. Williamson County EMS
6. Baylor Scott & White Health
7. American Medical Response
8. UT Southwestern Medical Center at Dallas
9. Texas Tech University Health Sciences Center,
10. UMC EMS. Lubbock, TX
11. Big Bend National Park EMS
12. Terlingua Fire & EMS

Introduction:

Texas NAEMSP has developed guidelines to help EMS agencies navigate protocol changes and best practices during the COVID-19 pandemic. These guidelines were quickly developed by the authors to meet the needs of their agencies and patient populations. EMS medical directors are encouraged to review and adopt these guidelines as best makes sense for their own individual departments and patient populations. Because of the time-sensitive nature of this pandemic, information contained in these guidelines is subject to change rapidly. Be sure to consult current CDC guidelines prior to implementing any changes.

This paper is organized into six sections:
1) Cardiopulmonary Resuscitation (CPR) Procedures
2) Airway Management
3) Dispositions and Destinations
4) Infants and Children
5) PPE Use, Re-Use and Decontamination
6) Isolation and Testing of First Responders

Section 1: Cardiopulmonary Resuscitation (CPR) Procedures:

1) If bystander CPR is started prior to EMS arrival, “hands-only” CPR should be utilized with a barrier over the face to limit the release of aerosolized particles. If a face mask is not available, other options could include a shirt, towel, or other readily available facial covering. See Figure 1.

2) All patients found in cardiac arrest should be assumed as high risk for COVID infection until proven otherwise. Full PPE is recommended. Precautions can be altered as more information is gathered, but responders should err on the side of caution when faced with uncertainty.
3) All providers entering the room or arriving on scene should be appropriately trained in the use of PPE. “Airborne PLUS” precautions should be utilized, which includes an N-95 respirator (or higher), eye protection (goggles or face shield that fully covers the front and sides of the face), gown, and gloves.

4) It is recommended that the fewest number of caregivers as possible enter the room or come into close proximity with the patient on scene. Close proximity is considered within 6 feet of the patient.

5) Keep the patient separated from other people as much as possible. Utilize law enforcement for bystander control, as needed.

6) Consider using mechanical barriers to CPR and airway management. The barriers should be utilized in addition to the usual personal PPE and create an additional layer of protection between the provider and the patient. An additional benefit of these barriers is to prevent contamination of the provider’s PPE during intubation and CPR.

7) Examples of appropriate barriers include any impermeable and translucent material that is either disposable or can be decontaminated. Synthetic plastic or vinyl sheeting has often been utilized and can be done so in conjunction with PVC pipes or other methods to elevate the space between the patient and the barrier device.

8) BLS and First Responders arriving on scene should consider “hands-only” CPR with a surgical mask or face mask covering the oropharynx. A BVM (with HEPA exhalation filter) may be applied over the face with a tight 2-hand seal held without bagging. See Figure 2.

9) Ventricular fibrillation is a commonly seen arrhythmia in cardiopulmonary arrest associated with COVID-19. The first ACLS provider to don PPE should bring the defibrillator to the bedside and deliver the first shock, if indicated, per ACLS protocol. See Figure 3.

10) Ventricular fibrillation and ventricular tachycardia arrests are presumed to be cardiac in nature, and therefore don’t require ventilation. For these patients, we suggest chest compression only CPR for the first 2 rounds of CPR.

11) If ACLS is not immediately available, the first BLS provider to don PPE should bring the AED to the bedside to analyze the rhythm and deliver the first shock, if indicated.

12) PEA and asystolic arrests should be presumed to be hypoxic, and intubation is the safest procedure. If for some reason there is a delay to intubation equipment being available, chest compression only CPR is reasonable, with the airway covered with a BVM using a tight 2 hand seal, but not providing ventilations.

13) All healthcare providers should don PPE before entering the room or proximity to the patient on the scene before ventilations or chest compressions are started.

14) For airway management, intubation is greatly preferred over any other option. Unlike our normal ACLS teaching, we are willing to accept a brief pause in CPR to achieve intubation. Because CPR is aerosol producing, chest compressions should not continue during the intubation attempt.

15) Alternatively, instead of BVM ventilation, a face mask oxygen delivery device can be utilized if chest compressions only CPR is being performed, per agency protocols.

16) Early intubation is recommended to reduce exhalation volumes outside of a contained airway circuit. Video laryngoscopy is recommended, if available, to decrease exposure.

17) If ALS is not available or if agency protocol dictates, a supraglottic airway should be placed as soon as possible, with an exhalation HEPA filter and ETCO2 detector, if available.

EMS Transport of CPR Patients:

1) If possible, the patient should not be moved during active CPR due to the high risk of aerosol contamination.
2) The EMS Provider should notify the receiving emergency department of a potential COVID-19 patient prior to arrival to allow for appropriate infection control preparation, which may take additional time.

3) Family members and other contacts of patients should not ride in the transport vehicle, if at all possible. If riding in the vehicle, they should wear a surgical mask and not sit in the patient compartment.

4) Isolate the transport vehicle driver or pilot from the patient compartment as much as reasonably possible and keep pass through doors and windows tightly shut. If a vehicle without an isolated driver compartment and ventilation must be used, open the outside air vents in the driver area and turn on the rear exhaust ventilation fans to the highest setting. This will create a negative pressure gradient in the patient area.

**Termination of Resuscitation:**

1) Field termination of resuscitation of the suspected or confirmed COVID-19 cardiopulmonary arrest patient involves multiple ethical considerations.

2) Many EMS systems are employing a shortened time of resuscitation, factoring in typical variables of witnessed or unwitnessed arrest, if bystander CPR was provided prior to first EMS arrival, the dysrhythmias encountered, responses to resuscitative interventions, and if available, trends in capnometry or preferred waveform capnography.

3) In the situation of a laboratory confirmed COVID-19 patient that declines into sudden cardiopulmonary arrest, some EMS physician medical directors are utilizing early research findings that portend a particularly grim prognosis and avoiding initiation of resuscitation.

4) Such decisions should be the purview of the respective jurisdictional EMS physician medical director(s), with cited evidence-based resources.

5) Older patients (>65 years old), with ARDS and multi-organ failure have a high mortality rate and the chances of a successful resuscitation is low. Consideration of obtaining a DNR utilizing OLMC and family discussion may be considered.

6) Conversely, COVID-19 patients may have reversible causes of cardiac arrest that can be successfully treated. Examples of these include tension pneumothorax, mucous plugging, cardiac dysrhythmias, etc.

**FIGURE 1:**
COVID-19 and Adult CPR

If an adult’s heart stops and you’re worried that they may have COVID-19, you can still help by performing Hands-Only CPR.

**Step 1**
Phone 9-1-1 and get an AED.

**Step 2**
Cover your own mouth and nose with a face mask or cloth.

**Step 3**
Cover the person’s mouth and nose with a face mask or cloth.
Perform Hands-Only CPR. Push hard and fast on the center of the chest at a rate of 100 to 120 compressions per minute.

**Step 4**
Use an AED as soon as it is available.
FIGURE 2:

BLS Healthcare Provider Adult Cardiac Arrest Algorithm for Suspected or Confirmed COVID-19 Patients

Updated April 2020

Verify scene safety
- Don PPE
- Limit personnel

Victim is unresponsive. Shout for nearby help. Activate emergency response system via mobile device (if appropriate). Get AED and emergency equipment (or send someone to do so).

- Provide rescue breathing using bag-mask device with filter and tight seal.
- 1 breath every 5-6 seconds, or about 10-12 breaths/min.
- Activate emergency response system (if not already done) after 2 minutes.
- Continue rescue breathing: check pulse about every 2 minutes. If no pulse, begin CPR (go to "CPR" box).
- If possible opioid overdose, administer naloxone if available per protocol.

Monitor until emergency responders arrive.

Normal breathing, has pulse

Look for no breathing or only gasping and check pulse (simultaneously). Is pulse definitely felt within 10 seconds?

No normal breathing, has pulse

No breathing or only gasping, no pulse

By this time in all scenarios, emergency response system or backup is activated, and AED and emergency equipment are retrieved or someone is retrieving them.

CPR
Begin cycles of 30 compressions and 2 breaths using bag-mask device with filter and tight seal
OR
continuous compressions with passive oxygenation using face mask.
Use AED as soon as it is available.

AED arrives.

Check rhythm. Shockable rhythm?

Yes, shockable
Give 1 shock. Resume CPR immediately for about 2 minutes (until prompted by AED to allow rhythm check). Continue until ALS providers take over or victim starts to move.

No, nonshockable
Resume CPR immediately for about 2 minutes (until prompted by AED to allow rhythm check). Continue until ALS providers take over or victim starts to move.
FIGURE 3:

ACLS Cardiac Arrest Algorithm for Suspected or Confirmed COVID-19 Patients

Updated April 2020

Don PPE
- Limit personnel
- Consider resuscitation appropriateness

Start CPR
- Give oxygen (limit aerosolization)
- Attach monitor/defibrillator
- Prepare to intubate

2

Rhythm shockable?
3

VF, VT

Shock

Yes

No

Asystole/PEA

Prioritize Intubation / Resume CPR
- Pause chest compressions for intubation
- If intubation delayed, consider supraglottic airway or bag-mask device with valve and tight seal
- Connect to ventilator with filter when possible

4

CPR 2 min
- IV/IO access

Rhythm shockable?
5

Shock

Yes

No

CPR 2 min
- Epinephrine every 3-5 min
- Consider mechanical compression device

6

2

Rhythm shockable?

Yes

No

CPR 2 min
- Amiodarone or lidocaine
- Treat reversible causes

7

Shock

Rhythm shockable?

Yes

No

Yes

No

2

CPR 2 min
- IV/IO access
- Epinephrine every 3-5 min
- Consider mechanical compression device

11

CPR 2 min
- Treat reversible causes

12

If no signs of return of spontaneous circulation (ROSC), go to 10 or 11
- If ROSC, go to Post-Cardiac Arrest Care

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Section 2: Airway Management:

When approaching airway management in the era of COVID-19, several overarching themes emerge that differ significantly from classic teaching.

GENERAL PROTECTION
1. Sars-Cov-2 is believed to transmitted primarily via large droplet transmission unless these droplets are aerosolized by either the patient or healthcare provider. However, evidence from influenza suggests airborne transmission is likely possible as well. At this time, we feel making a clear distinction between droplet and aerosol transmission is less important than developing best practices for overall prevention of health care infections.
2. To contain patient produced droplet dispersal, it is recommended to place a surgical mask on the patient immediately upon contact and to keep that in place throughout transport. These masks should be placed over any canula or oxygen delivery mask if either are added for oxygen supplementation.
3. The primary iatrogenic sources of aerosol generation are high pressure, high flow and airway manipulation.
4. Viral HEPA filters are a must in any airway management situation and they must be placed as close to the patient in the expiratory pathway as possible.
5. While the pathophysiology of COVID-19 is still in many ways a mystery, with continuous new developments. There does seem to be a significant cohort who present with “silent” or “happy” hypoxia. Prehospital providers must be vigilant to treat the patient and not act solely on low oxygen saturation values.

DEFINITIVE AIRWAY MANAGMENT
1. Droplet and/or aerosol spread is likely be mitigated by moving the airway manager further away from the patient. Because of this, video laryngoscopy is preferred over direct laryngoscopy. Additionally, devices with a video screen separate from the laryngoscope may be safer as well.
2. Intubation has been shown to increase viral transmission in past viral outbreaks. The most experienced operator must intubate as prolonged time in the airway likely correlates with greater viral exposure risk.
3. There is debate whether supraglottic airways impart increased droplet exposure risk due to lack of complete glottic seal (as opposed to endotracheal tube balloon occlusion). One could also argue for SGA use based on decreased time and increased ease of insertion relative to endotracheal intubation. For these reasons, we feel both options may be considered depending on clinical presentation and service characteristics.
4. Sedation only intubation is strongly discouraged due to high risk of patient coughing and gagging.
5. For paralysis, rocuronium is preferred over succinylcholine due to the increased length of action. This minimizes the risk of the patient waking mid-procedure to cough and/or thrash. However, COVID-19 has not changed the necessity for resuscitation prior to intubation and we advise avoidance of paralytic administration if the patient is hypoxic after taking maximum pre-oxygenation steps (via BVM or NIPPV with tight mask fit being key) and/or hypotensive after blood pressure augmentation efforts.
6. Consideration of pre-treatment with lidocaine or fentanyl prior to airway manipulation is advised in effort to minimize patient coughing during manipulation.
7. Routine airway suctioning should be avoided at all costs as suction is considered an AGP and it can also stimulate coughing if the patient is not adequately sedated and/or paralyzed.
8. Barrier devices (plastic boxes/drapes) are not advised during definitive airway placement as there is no clear evidence that these are protective, and we feel they could inhibit rapid SGA/ETT placement. However, covering the patient’s face/neck and chest following device placement is a reasonable option during transport.
9. Maintenance of a closed system is vital following ETT/SGA placement. Keep the SGA gastric port covered (tape is adequate) and clamp the endotracheal tube or cover the opening of the SGA if opening the system for any reason.

10. Place the viral HEPA as soon as possible pre or post airway procedure as to avoid as much contamination as possible.

NON-INVASIVE VENTILATION

1. The safety and efficacy of NIPPV in COVID-19 is currently quite divisive among emergency medicine and critical care thought leaders. Data from the past MERS epidemic suggest questionable utility of NIPPV with a high failure rate and progression to intubation.

2. Additionally, increased viral transmission has been documented in the past SARS epidemic. At this time, we recommend extreme caution if the choice is made to utilize NIPPV in the prehospital setting with a requirement of a viral filter, non-agitated patient and tight mask seal, all in effort to minimize aerosol generation.

BAG-VALVE MASK AND OXYGEN CONSIDERATIONS

1. Two-hand bag-valve mask ventilation technique in the “V-E” fashion is advised in effort to create the tightest seal possible.

2. The exact oxygen flow that becomes “aerosol generating” is unknown. Several sources, however, reference 6 liters per minute or greater.

NEBULIZED MEDICATION

1. Nebulization of medication (mainly albuterol) is not advised in the era of COVID-19. This prompts several pharmacologic detours, especially in the moderate to severe, young asthmatic patient. We encourage the use of early intramuscular epinephrine in these patients to achieve β-agonist effects.

2. Terbutaline may be considered for asthma exacerbations as well, depending on familiarity and availability.

3. For both asthma and COPD flares, metered dose inhaler (MDI) or HFA albuterol is advised if available.

4. Multiple studies demonstrate equivalence, if not superiority, of MDI albuterol when compared to the nebulized form. Sourcing inhalers is becoming increasingly difficult, so we advise protocol alterations allowing paramedics to bring and administer the patient’s home inhalers if available.

AEROSOL GENERATING PROCEDURES

1. BVM
2. NIPPV
3. Intubation
4. Suction
5. Nebulized Medication
6. Nasal canula oxygen >6L
7. Patient coughing, speaking, sneezing = droplet expulsion
**Figure 4**

**TEXAS NAE MSP COVID-19 AIRWAY ALGORITHM**

- **HYPOXIA DYSPEA RESPIRATORY FAILURE**
  - **AGITATION APNEA ALTERED -AAA-**
    - **YES**
      - KETAMINE FOR INDUCTION
      - PRE-OX VIA BVM/NIV WITH VIRAL FILTER
      - DSI WITH ETT/SGA
    - **FAILS -AAA-**
    - IF STABILIZES
      - **NO**
      - NC UP TO 6L SURGICAL MASK ON PATIENT
      - NRB/COVER VENTS/SURGICAL MASK
      - TRANSPORT

**TOLERATE HYPOXIA - TREAT PATIENT NOT SATS**
**PARALYTIC HARD STOPS STILL APPLY - SBP<90 OR SATS<94%**
**COVER ALL OPEN PORTS**
Section 3: Disposition and Destinations:

The COVID-19 pandemic catapulted the practice of evaluating patients for dispositions to alternate destinations as a priority for EMS systems worldwide. In most systems we’ve struggled to develop alternatives for patients with minor illness or injury.

For EMS medical directors this COVID-19 crisis is an opportunity to develop novel guidelines and best practice for appropriate triage of EMS patients to these alternative dispositions.

Development of alternative disposition or non-transport guidelines should begin with a patient safety conscious focus and have direct EMS medical director oversight including a robust quality assurance and improvement program.\textsuperscript{14}

Previous studies of alternate disposition strategies by EMS providers demonstrate positive patient satisfaction scores and a low incidence of adverse events\textsuperscript{15,16}

**Appropriate Patient Selection**

Developing a non-transport or transport to an alternate destination begins with clearly delineating the inclusion and exclusion criteria.

The inclusion must describe for medics the type of eligible patients along with a complete examination including a full set of vital signs.

Once the field provider determines appropriateness to leave a patient in the field or takes to an alternate disposition, this decision should be vetted by a supervisor or the on call medical control (see Figure 1 for an example from Montgomery County Hospital District and Figure 2 for an example from UMC EMS in Lubbock, TX)

**Special Populations/Facilities**

Alternate dispositions from facilities that have some sort of accessible in house medical care bring up a special situation. Nursing homes, skilled nursing facilities, prisons, and other units have some access to physicians/providers directly as these units have a medical director and it is common that they have rounds or other patient/physician relationships established.

Most EMS referrals from these facilities come from a simple phone call to the physician which suggests the patient may need EMS and emergency care. Many of these calls can be averted by bedside or telehealth evaluation by these providers and EMS can have a lower threshold to leave patients on scene with further follow-up or outpatient workup by the patient’s physician in a short period of time.

Additional criteria can be developed for these special population patients with readily available healthcare monitoring. (see figure 3 for an example from UMC EMS in Lubbock, TX)

**Quality Assurance Process**

A robust mechanism of quality assurance should consist of a process where patients can be followed up to monitor for missed diagnosis and unexpected adverse events.
At MCHD the Pulsara mobile app is utilized for real time consults with medical control prior to any alternative disposition being approved and each patient flagged in ePCR is followed up by a call center medic within 24 hours.

For the field medic choosing alternate disposition it’s important to utilize scripting that reassures the patient that this decision is in the patient's best interest and it’s not a refusal of care but a complete evaluation and triage to appropriate follow up for their individual complaint.

If there is concern by the call center medic a Pulsara Patient contact can be made where the call center initiates a one way HIPPA compliant telehealth visit with the patient utilizing a one touch technology sent in a text message to the patient's phone by the app. A follow up patient list is maintained by call center personnel as well as a back end admin dashboard for the call center contacts on Pulsara Patient.
History and Physical:

<table>
<thead>
<tr>
<th>Historical Findings</th>
<th>Physical Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Well appearing</td>
<td>- Non-life threatening injury/illness</td>
</tr>
<tr>
<td>- No current chest pain, syncope or hemodynamic compromise</td>
<td>- Nasal congestion</td>
</tr>
<tr>
<td>- No immunosuppressed state (active chemotherapy treatment, any organ transplant)</td>
<td>- Cough</td>
</tr>
<tr>
<td>- Not medically fragile</td>
<td>- Chills</td>
</tr>
<tr>
<td></td>
<td>- Body aches</td>
</tr>
<tr>
<td></td>
<td>- Headache</td>
</tr>
</tbody>
</table>

Assessment:
- Medical assessment with full set of vital signs
- Complete medication list (specific attention to suffixes: -vir, -mab, and -nib)

Clinical decision making inclusion criteria
Outpatient testing and follow up criteria (all must be positive)

<table>
<thead>
<tr>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Discuss process with patient using the scripting tool below</td>
</tr>
<tr>
<td>- Consult with District Chief</td>
</tr>
<tr>
<td>- Encourage transport POV to an urgent care center and/or have patient follow up with the MCHD Medical Call Center (936-523-5040)</td>
</tr>
<tr>
<td>o Call Center Hours- 0800-2000</td>
</tr>
</tbody>
</table>

Critical Points:
- This guideline will serve as a process for reducing ED crowding during high volume times
- Ensure PPE is worn if the patient screens positive for a communicable disease
- MD consult as needed for guidance
Emerging Infectious Disease (suspected CoVID-19) Non-Transport

Non-Transport guidance to reduce exposure and spread

<table>
<thead>
<tr>
<th>History</th>
<th>Signs and Symptoms</th>
<th>Differential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flu-like illness</td>
<td>Fever greater than 100.4°F</td>
<td>Cancer / tumors / lymphomas</td>
</tr>
<tr>
<td>Rhinorrhea/nasal congestion</td>
<td>Rhinorrhea/nasal congestion</td>
<td>Medication or drug reaction</td>
</tr>
<tr>
<td>Productive cough</td>
<td>Productive cough</td>
<td>Hyperthyroidism</td>
</tr>
<tr>
<td>Chills</td>
<td>Chills</td>
<td>Heat-related emergency</td>
</tr>
<tr>
<td>Weakness and/or flu-like symptoms</td>
<td>Weakness and/or flu-like symptoms</td>
<td>Meningitis</td>
</tr>
<tr>
<td>Body aches</td>
<td>Body aches</td>
<td>Bacterial infection</td>
</tr>
</tbody>
</table>

**Communications Center indicates positive CoVID-19 or High suspicion of CoVID-19**

- PPE must protect from droplet/fluid contamination
  - Universal precautions with proper PPE required.
  - N95 mask, impermeable gown, gloves, eye protection.
  - Limit patient contact to one provider only if at all possible.
  - All providers should attempt to maintain a distance of 6 feet or more from the patient when feasible and does not interfere with indicated patient care.

**Perform assessment:**
- Age greater than 17 and less than 60 years old
- Respiratory rate between 8 and 20 bpm
- Pulse oximetry greater than 94% on room air
- Heart rate less than 120 bpm
- Systolic BP greater than 100 mmHg
- Fever greater than 100.4°F or patient reports feeling warm/feverish
- One or more viral symptoms present (cough, fever, nasal/chest congestion, sore throat, body aches)

Do ALL criteria above apply?

**Destination Guidelines**

If the patient is transported to the hospital:
- **Radio report:** Proceed with normal report to receiving facility including using plain language.
- **At destination:** The driver will make contact with the hospital staff while the patient/primary provider remains in the unit.
- Once patient has been cleared from the ambulance, carefully remove PPE and discard in the waste container in the patient’s room by the door.
- **Ambulance cleaning:** Carefully clean/disinfect the ambulance and any surfaces contacted by the patient or provider before returning to service.

If patient consents to non-transport:
- Highest EMT certification must assume care.
- Discuss non-transport, self-quarantine, and when to seek care following checklist (see PEARLS).
- Patient must make this decision on own, appears to be competent to make this decision, and has an appropriate support system in place in case EMS needs to be called on patient’s behalf (see PEARLS).

Transport or contact Medical Control if patient does not meet criteria.

Protocol 118
# Emerging Infectious Disease (suspected COVID-19)

## Nursing Facility Resident Care Guidelines

### History for high suspicion of COVID-19
- Flu-like illness

### Signs and Symptoms of COVID-19
- Fever greater than 100.4°F
- Rhinorrhea/nasal congestion
- Productive cough
- Chills
- Weakness and/or flu-like symptoms
- Body aches

### Differential
- Cancer / tumors / lymphomas
- Medication or drug reaction
- Hyperthyroidism
- Heat-related emergency
- Meningitis
- Bacterial infection

---

**Scene is an assisted living facility, skilled nursing facility, or residential rehabilitation facility?**

- **Yes**
  - Universal precautions with proper PPE required.
    - N95 mask, impermeable gown, gloves, eye protection.
    - Limit patient contact to one provider only if at all possible.
    - All providers should attempt to maintain a distance of 6 feet or more from the patient when feasible and does not interfere with indicated patient care.

- **No**
  - Exit to the appropriate protocol.

**Are any of the following present?**
- Severe chest pain, or
- Obvious respiratory distress, or
- Syncope, altered mental status/acute neurological change, or
- Trauma/significant hemorrhage

- **Yes**
  - Performs assessment:
    - Respiratory rate is between 8 and 20 bpm
    - Pulse oximetry greater than 88% on room air or nasal cannula
    - Heart rate greater than 50 bpm and less than 100 bpm
    - Systolic BP greater than 100 mmHg and less than 180 mmHg

- **No**
  - Exit to appropriate protocol and transport patient to preferred facility.

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**Do not move the patient to the ambulance.**

Per City of Lubbock Health Department’s “Order Restricting Patient Transport” (see PEARLS), the patient will not be transported to the hospital unless determined as medically-necessary by a physician.

If the patient’s physician, physician assistant, or nurse practitioner is at bedside, review this protocol with him or her. If that provider confirms patient transport to the hospital is medically-necessary, follow their request. Document the name and licensure of the provider in your patient care report.

Otherwise, nursing facility staff will assume care of the patient. The patient will remain on scene.

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**Protocol 11D**
Section 4: Infants, Children and Teenagers

Early in the global COVID-19 pandemic it seemed as though infants and children were relatively spared from the illness. Unfortunately, this has not proved to be the case.

The purpose of this section is to provide situational awareness for the often atypical and sometimes life-threatening presentation of COVID-19 in the pediatric age group, with two goals:

1. Prompt transport to an appropriate E.D. for evaluation and treatment of an ill infant, child or teenager with known or possible COVID-19;

2. Reduced risk of transmission to EMS Professionals of the SARS-CoV-2 virus that causes COVID-19 through use of appropriate PPE and infection control procedures.

According to the CDC, as of 18 May 2020, infants & children overall account for less than 5% of cases in the US18 (approximately 6% in Dallas County19 and 4.5% in Texas20, as of 18 May 2020). They typically have only mild symptoms. Recently, however, several hundred US cases have been reported of an acute, potentially fatal, multi-system, inflammatory syndrome with ATYPICAL signs and symptoms associated with pediatric COVID-1921-28. This newly recognized syndrome is called “Multisystem Inflammatory Syndrome in Children (MIS-C) associated with COVID-1923,29. It may be seen in patients up to 1929 or 2123 years of age. Additionally, infants and children often efficiently spread the COVID-19 virus to others, even when they are asymptomatic30-32.

A high index of suspicion for COVID-19 MUST therefore be maintained when caring for any infant or child during the COVID-19 pandemic, even for those with mild symptoms and for those with atypical signs and symptoms that could be caused by COVID-19. Moreover, similar to adults, EMS Clinical Practice Guidelines and procedures should be modified when possible, in order to minimize use of Aerosol Generating Procedures (AGPs)† that increase the risk of virus transmission to EMS Professionals.

1. Use appropriate PPE for all team members within 6 feet of patient (Figure 8 below):

   a. “PPE before ABCs”:
      i. Minimum PPE for all patient care: Surgical mask + eye protection + gloves
      ii. Suspected COVID-19 PPE: Surgical mask/N95 + eye protection + gloves + gown
      iii. AGP PPE: N95 + eye protection + gloves + gown
   b. Scout should perform initial screening* in PPE, with 6-ft standoff
   c. Surgical mask for patient (at least 2 years old), if tolerated, and for family members on-scene (“source control”)
2. Consider the possibility that ANY infant, child or teen may have COVID-19 (refer to Sepsis CPG33):
   a. *Less likely to have typical “adult” symptoms (fever, cough or shortness of breath)
   b. *May have only mild, cold-like symptoms, such as nasal congestion, runny nose or sore throat
   c. *Evaluate for any worrisome signs and symptoms, with (or without) fever, such as:
      i. GI symptoms (e.g. abdominal pain, nausea, vomiting and/or diarrhea);
      ii. Conjunctivitis (“pink eye”) in both eyes, usually without purulent discharge;
      iii. Skin rash (link) (e.g. red rash and/or peeling & swelling of hands/feet or perineum);
      Also: discolored blotches (resembling frostbite) on toes, a.k.a. “COVID toes”;
      iv. Mucosal lesions involving lips, tongue (“strawberry tongue”) or oral mucosa;
iv. **Neurological symptoms** (e.g. headache, weakness, lethargy, irritability or poor feeding); **OR**

v. **Signs and symptoms of “warm” shock** (e.g. tachycardia, tachypnea, altered mental status, brisk capillary refill or PetCO2 less than 30 mmHg) **or “cold” shock** (e.g. narrow pulse pressure, cool and pale extremities or delayed capillary refill):

   Reminder: hypotension is a late sign in pediatric sepsis

vi. **Cardiac arrest**

   d. **NOTE:** MIS-C may develop days or weeks after previous known/suspected COVID-19 illness (and PCR testing may be negative, although serology testing may be positive)

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**Figure 9:** Signs and symptoms of Kawasaki Disease, which are similar to those in infants and children with MIS-C (Courtesy of Kawasaki Kids Foundation, with permission)

Figures 9-13 show findings of Kawasaki Disease, which are similar to those that may be seen in MIS-C. Figure 14 shows the blotchy, discolored patches on the toes, resembling frostbite, that may be seen in COVID-19 illness (“COVID toes”), including in cases without MIS-C.
Figure 9: Conjunctivitis (Courtesy of Kawasaki Disease Foundation, with permission)

Figure 10: Strawberry tongue and hemorrhagic crusting of lips (Courtesy of Kawasaki Disease Foundation, with permission)

Figure 11: Peeling skin (desquamation) on fingers (Public Health Image Library)
Figure 12: Skin rash (Courtesy of Kawasaki Disease Foundation, with permission)

Figure 13: Rash on leg and erythema of sole of foot
(Courtesy of Kawasaki Disease Foundation, with permission)

Figure 14: “COVID toes” (Courtesy of Dr. Amy Paller, Northwestern University, with permission)
3. Minimize use of AGPs† to reduce risk of disease spread (refer to EMS Alert 20-00635 for details):
   a. If possible, perform AGPs in an open space (e.g. outside the ambulance) or in a stationary
      ambulance with the rear doors opened and HVAC system activated
   b. Minimize the number of personnel within 6 feet of patient, especially during AGPs
   c. “Source control”: apply surgical mask for patient, if tolerated (reapply over nasal cannula or
      NRBM if patient requires supplemental oxygen) and for parents/caregivers
   d. Supplemental oxygen: use minimal flow to achieve SpO2 of at least 94%
   e. Nebulized medications**: use only if wheezes + current/past history consistent with asthma (or
      other chronic condition) OR if signs/symptoms consistent with croup (nebulized epinephrine):
      i. If available, assist pt. with his/her own MDI instead of using nebulized medications
   f. Intranasal meds: Avoid IN meds, in favor of IM or IV/IO, when possible (refer to PEDI-Guide34)
   g. **IM epinephrine (1 mg/mL): use early for moderate-severe asthma or other bronchospasm
      (especially anaphylaxis), before or instead of nebulized bronchodilators (refer to PEDI-Guide34)
   h. Assisted ventilation: Use 2-person technique and maintain tight seal for BVM ventilation: i. Use
      PEEP valve, if available
      i. Advanced airway: SGA (King or i-gel, if available) preferred over ET intubation:
      ii. Use pediatric viral/HEPA filter, if available (pre-place onto SGA before insertion)
      iii. Because of device dead-space, it may be difficult to deliver proper tidal volume to
      smaller infants & children with an adult viral filter (consult device manufacturer guidance)
   j. CPR: Place advanced airway as soon as possible (without interrupting chest compressions):
      i. For infants & children: minimum on-scene resuscitation = 10 minutes (unless ROSC)
      and NO field termination of resuscitation without explicit BioTel authorization

4. ALWAYS offer and strongly encourage transport to an appropriate ED for ANY ill infant or child
   (14 years old or less) with known or suspected COVID-19 (even if symptoms appear mild or
   atypical), especially for any pediatric patient with a chronic, underlying medical condition27:
   a. Any non-transport for pediatric patients with fever or any of the worrisome signs or
      symptoms listed in section 2 should be directly authorized by online medical control
      physician.

5. Notify online medical control and/or receiving hospital directly while en route if suspected
   COVID-19 patient.

As the science evolves on this new, potentially fatal, inflammatory syndrome associated with COVID-19,
the safest plan is to transport symptomatic pediatric patients to the E.D.

Summary: COVID-19 can and does affect the pediatric age group, often with signs and symptoms that
differ from those in adults. A newly described, multi-inflammatory syndrome is a rare, but life-threatening
complication. EMS Professionals need to use appropriate PPE, infection control and modified patient care
protocols and procedures in order to ensure that infants and children with known or suspected COVID-19
are transported for prompt ED evaluation and to minimize risk of viral transmission to personnel.

†Aerosol-generating procedures (AGPs): nebulization; airway suctioning; bag-valve-mask (BVM)
ventilation; high-flow nasal cannula (≥ 6LPM) 100% O2 non-rebreather mask (NRBM); non-invasive
positive pressure ventilation support (CPAP and BiPAP); advanced airway insertion (SGA or ETT); and
CPR.
Section 5: PPE Use, Re-Use and Decontamination:

- Minimize the number of individuals who need to use respiratory protection and personal protective equipment through the preferential use of the “scout concept”. Single provider, in PPE, which consists of a fit-tested N95 mask, goggles, impermeable gown and gloves enters the scene with the minimum necessary equipment.

- Scout places surgical mask over patient, begins assessment and treatment

- Scout requests additional personnel and equipment as necessary.

- Additional prehospital providers, entering the scene, must don similar PPE.

- Use of alternative devices, if N95 is not available, to include: surgical masks, face-shields, safety glasses, gloves, distancing.

- Prioritize the use of N95 respirators for procedures that are considered “aerosolizing procedures”: suctioning, nebulizing, intubation only if N95 respirators are in low supply.

- Use mechanical controls, when possible: Close window or door between driver and patient compartment. Use HVAC controls in patient compartment and set air exchanger to open/exhaust. Place viral filters on all exhalation ports, intubation circuits to diminish viral load in aerosols.

- Implement practices allowing extended use and/or limited reuse of N95 respirators, when acceptable and necessary. 36,37

PPE Decontamination and Re-use:

The extended and limited reuse of personal protective equipment (PPE) in the setting of a national shortage of such materials has been extensively discussed and studied in the wake of SARS-CoV-2. There are multiple proposed methods by which safe reuse of N95 respirators in particular can be obtained, which will be discussed below. Although at present the CDC/NIOSH (the National Institute for Occupational Safety and Health) does not recommend any specific decontamination method for between uses of N95 respirators, they do advise, that any method chosen by an institution follows manufacturer guidelines on maximum number of donning, and that care is taken to preserve the integrity of all components of the mask. 38 Additionally, it is advised that a surgical mask be worn over the N95 respirator to protect the respirator and allow for longer use.

In terms of decontamination for masks to be used over multiple days, the FDA has as of March 28, 2020 approved the Battelle Decontamination System. This proprietary system, which uses vapor phase hydrogen peroxide (VPHP) to saturate masks over a period of 150 minutes, is approved for 20 decontamination cycles per respirator and has been shown to result in masks with acceptable sporicidal and viricidal activity, filtration efficiency, breathability, form fit testing and strap integrity testing. The use of hydrogen peroxide vapor as a method of decontamination has been supported by research as effective in the past. 39

In March 2020, 3M research additionally published their findings to date on methods of disinfecting filtering facepiece respirators (such as N95 respirators), and concluded that although there is not currently a completely safe and effective method of decontamination, methods such as ultraviolet germicidal irradiation (UVGI) in which masks were exposed to 15 minutes of unilateral UV radiation lamps did not
cause physical damage to the masks or apparently compromise their fitting. In a study by JEFF (2010), in addition to UVGI, sterilization with 100% ethylene oxide for one hour did not result in physical damage to masks, and is theoretically capable of sufficient decontamination. Methods such as saturation with bleach, moist heat, submersion in hydrogen peroxide and microwave generated steam are not advised due to the physical damage such methods cause to respirators (3M, 2020).

Despite there being a number of potentially safe options for the decontamination of N95 masks that allows for their reuse over multiple days, there is mass consensus that under certain circumstances, masks should be discarded without decontamination. All masks that are grossly contaminated with blood, respiratory secretions or other bodily fluids should be discarded; masks that are otherwise soiled should be disposed of; and any mask that causes the user to have increased difficulty breathing should likewise be discarded. The CDC via NIOSH additionally advises that masks should be discarded following their use during aerosolizing procedures such as intubation, and after encounters with patients for which advanced droplet precautions for an infectious disease process other than SARS-CoV-2 are in place.

Users should also be aware that in reusing N95s, it is important to recognize that the surface of the respirator is a contaminated surface. As such, users should use gloves when adjusting or removing their masks, and be aware that potential exposure is highest during the process of respirator donning/removal. Appropriate precautions such as hand washing and glove use should therefore be taken before and after donning, adjusting, or doffing respirators.

**Section 6: Isolation and Testing of First Responders:**

The decision to isolate or test a public safety provider is a multifactorial decision that requires consideration of the nature of the exposure, the criticality of the provider’s role and the severity of the need for them to return to work. As COVID-19 has progressed, many agencies have matured from a “go home just in case” strategy to one of “working if you aren’t sick”. Despite those decisions there is some expert opinion agencies can take into account and some maturing evidence to examine regarding testing.

The CDC defines a healthcare worker (HCW) exposure as:

- Any unprotected exposure (e.g., not wearing recommended PPE)
- High, medium or low risk (Table 1)
- Dependent on the amount of patient “exposure” (i.e. performing CPR, aerosolizing procedures, etc.)
- Wearing eye and respiratory protection makes nearly all exposures “low risk”.

They are of course presumed infections if they develop fever or respiratory symptoms (e.g., cough, shortness of breath, sore throat). Table 1 taken from the CDC website gives examples of different situations that would constitute those exposures.
As you can see there is also a difference regarding exposures from patients with “source control” (i.e. wearing a face mask) and those who are not.

<table>
<thead>
<tr>
<th>Epidemiologic risk factors</th>
<th>Exposure category</th>
<th>Recommended Monitoring for COVID-19 (until 14 days after last potential exposure)</th>
<th>Work Restrictions for Asymptomatic HCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prolonged close contact with a patient with COVID-19 (beginning 48 hours before symptom onset) who was wearing a cloth face covering or facemask (i.e., source control)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HCP PPE: None</td>
<td>Medium</td>
<td>Active</td>
<td>Exclude from work for 14 days after last exposure</td>
</tr>
<tr>
<td>HCP PPE: Not wearing a facemask or respirator</td>
<td>Medium</td>
<td>Active</td>
<td>Exclude from work for 14 days after last exposure</td>
</tr>
<tr>
<td>HCP PPE: Not wearing eye protection</td>
<td>Low</td>
<td>Self with delegated supervision</td>
<td>None</td>
</tr>
<tr>
<td>HCP PPE: Not wearing gown or gloves⁴</td>
<td>Low</td>
<td>Self with delegated supervision</td>
<td>None</td>
</tr>
<tr>
<td>HCP PPE: Wearing all recommended PPE (except wearing a facemask instead of a respirator)</td>
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<td>Self with delegated supervision</td>
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<td>Active</td>
<td>Exclude from work for 14 days after last exposure</td>
</tr>
<tr>
<td>HCP PPE: Not wearing a facemask or respirator</td>
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<td>Active</td>
<td>Exclude from work for 14 days after last exposure</td>
</tr>
<tr>
<td>HCP PPE: Not wearing eye protection⁵</td>
<td>Medium</td>
<td>Active</td>
<td>Exclude from work for 14 days after last exposure</td>
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<td>HCP PPE: Not wearing gown or gloves⁵</td>
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<td>Self with delegated supervision</td>
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<td>None</td>
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The impact for the agency lies in the corresponding CDC guidance to exclude the HCW from duty for 14 days if they sustain a medium or high-risk exposure. As an example, that guidance would suggest that any healthcare worker attending a cardiac arrest or intubating a patient without full PPE (gown, gloves,
mask, eye protection) would need to be sent home for 14 days of active monitoring. The CDC does concede at the bottom of the document that “facilities could ‘consider’ allowing COVID-19 exposed but asymptomatic HCW to continue to work after options to improve staffing have been exhausted and in consultation with their occupational health program.” These HCW would need to evaluate symptoms daily and wear a facemask at work for 14 days if there is a sufficient supply and be sent home immediately if they develop symptoms of infection.

Current CDC isolation recommendations recognize both and testing based and non-testing-based strategies.

**Provider with Illness Symptoms - Non-testing Based Strategy**
- Exclude from work until:
  - Afebrile with improvement in respiratory symptoms for at least 72 hours.
  - Free from use of antipyretics.
  - Cannot be sooner than 7 days from onset of illness regardless of when symptoms resolve.

**Provider with Illness Symptoms – Testing Based Strategy**
- Exclude from work until:
  - Employee has recovered been without fever and respiratory symptoms.
  - Free from use of antipyretics.
  - Then perform two separate negative molecular assays (nasopharyngeal PCR) at least 24 hours apart.

**Provider with Exposure – Non-testing Based Strategy**
- High or medium risk exposure, exclude from work for 14 days after last exposure.
- Low risk exposure, may remain at work, self-monitoring with delegated supervision.

With lab turn-around times ranging from hours to days in many areas, the two consecutive test strategy might in fact take longer than the no testing-based strategy. Additionally, the CDC does not currently recognize a strategy to test high risk exposed employees to get them back to work sooner. Based on these issues many public safety agencies are trying to determine the value of either molecular PCR or antibody testing before the 14-day monitoring period in medium and high-risk exposures.

Reports from Chinese COVID-19 data suggest the median incubation period is approximately 5 days, with only 2.5% of patients showing evidence of infection on day 2 and nearly 98% of patients showing symptoms by approximately day 11. However, this data is based on symptomatology not virology. This also does not take into account multiple reports of asymptomatic infection. In totality, the decision on which employee to test and when, is not backed by any clear data. Based on what data we do have; it may be reasonable for an agency to test an exposed employee who remains asymptomatic on day 11 following a medium or high-risk exposure. This would theoretically give the agency a reported 98% assurance that the exposed employee will not become COVID-19 positive. As compared to a non-testing based 14 day waiting period this would at best save the agency 2-3 days of employee suspension time.

A discussion about when to test an employee should also be accompanied by a discussion of the value of the test. Although the true specificity and sensitivity of both the viral PCR and antibody testing are not known for COVID-19, experts do suspect poor detection rates with the viral PCR COVID-19 testing compared to other “gold standard” PCR detected infections. Summarized:
- Finger-stick blood testing for antibodies to COVID-19 likely has good sensitivity and specificity, 90% in both cases but only when testing is applied at the correct time.
• IgM antibody detection, suggesting acute infection, may not appear until day 10 or 11 following exposure.
• IgG antibody detection suggesting recovery may not appear until day 14 or 15 following exposure.

Combining PCR and antibody testing together improves detection of true positive COVID-19 patients but does not seem to help get the employee back to work at a faster rate.

**Conclusion:**

Texas NAEMSP recommends EMS departments continue to work together to share best practices and protocol modifications necessary to keep our patients and crews safe.

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