



San Joaquin County

Emergency Medical Services Agency



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TO: ALS Personnel
ALS Service Providers
Base Hospital Physicians
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FROM: Katherine Shafer, M.D., EMS Medical Director

SUBJ.: Coronavirus (COVID-19) Minimizing Aerosol-Generating Procedures

COVID-19 is a novel virus that we are all still learning about. The media reports about it are alarming. I know that many of us are concerned about contracting COVID-19 and spreading it to our families and other patients. This is understandable.

Please understand, I recognize that this is a serious illness and I continue to take every step possible based on up to date medical information to protect pre-hospital personnel, your families, and this community. Since January, I have taken a more proactive approach than other counties to protect patients and pre-hospital personnel.

As medical professionals we are surrounded by infectious diseases like Hepatitis C, Tuberculosis, and the flu every day. We successfully use protective precautions with these patients and will do the same with COVID-19.

COVID-19 is primarily droplet transmission, but becomes aerosolized during coughing or aerosol-generating procedures. There is very limited high quality data regarding the amount of aerosol generated by various procedures. Most data is from other countries during SARS and MERS epidemics. Looking at the data and consensus statements, there really is no best option for airway management. Reports from medical sources state that South Korea and Hong Kong had no healthcare worker infections during this pandemic. Literature shows that both South Korea and Hong Kong strictly adhered to Personal Protective Equipment (PPE) and decontamination requirements that are outlined by the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC), the same PPE requirements that I have based my current directive for our pre-hospital personnel. Donning appropriate PPE and decontamination after patient contact are the most important steps in preventing significant exposures.

Some paramedics have requested that I add the use of supraglottic airways, such as I-Gel, to my directive. I-Gel's do not create an optimal seal and will generate aerosols during ventilation. Although the act of intubation is an aerosol-generating procedure, once intubated,

the amount of aerosols being generated is kept to a minimum. Going straight to I-Gel does not create an added protection for prehospital personnel.

A consensus statement from Medical Journal of Australia states, "Positive pressure ventilation during non-invasive ventilation (NIV) or when using a face mask or supraglottic airway are high risk for generating aerosols as the seal they generate is usually inferior to that achieved with a correctly placed and inflated cuffed tracheal tube." From current data and physician consensus, when a good seal is obtained with Bag Valve Mask (BVM) ventilation, overall aerosol-generation is low and potentially lower than any intubation attempt. What is important is that there is a good seal. Prolonged direct laryngoscopy will cause more aerosols, so this should only be attempted if intubation can be done efficiently.

Chest compressions and Cardio Pulmonary Resuscitation (CPR) are also aerosol-generating procedures. The aerosol generation is likely lower than reported during passive oxygenation with Non-rebreather Bag Mask (NRB) and once intubated. Again, the intubation procedure itself does lead to aerosol-generation.

Although there is a general perception that placing a non-rebreather mask with high-flow oxygen is not a significant aerosol procedure, in fact there is some data that suggests otherwise. It is also important to note that adjusting any mask – non-rebreather, nebulizer or Continuous Positive Airway Pressure (CPAP) mask creates aerosols. Placing a NRB on respiratory distress patients will not be adequate for ventilating or oxygenating patients. A patient with a gag reflex who has significant respiratory distress with hypoxia will likely still need CPAP. It is essential to create a good seal to minimize aerosol-generation.

It may be acceptable to hold off on giving a nebulizer treatment to a patient with mild shortness of breath and minimal wheeze or to give four (4) puffs of their albuterol MDI inhaler with a spacer. If nebulizer is indicated and the patient is not in distress requiring rapid transport, it is best to give nebulizer outdoor with crew standing back. A facemask should be placed over nebulizer mask to decrease droplets. I have considered albuterol MDI with spacer in the prehospital setting, but there is a significant shortage and so it will not be a realistic alternative at this time.

Patients requiring nasal cannula should have a facemask placed over their nasal cannula. Normal flow nasal cannula is not an aerosol-generating event.

A list of Aerosol-Generating Events - requiring full PPE (N95/P100, goggles/face shield, gloves, gown)

- Coughing/sneezing
- CPAP or positive pressure ventilation (BVM) with inadequate seal
- High flow nasal oxygen (HFNO)
- Oxygen delivery via simple face mask
- Delivery of nebulized/atomized medications via simple face mask

- Cardiopulmonary resuscitation (prior to intubation)
- Tracheal suction (without a closed system)
- Tracheal extubation
- Laryngoscopy
- Intubation
- Readjusting CPAP or NRB masks

Remember to always wear full PPE with any aerosol-generating procedure including CPR.

I am continuously reviewing data and literature on management of COVID-19 patients and will update my medical direction as needed. Even though COVID-19 is all over the news and I expect an increase in cases over the next few weeks, do not forget that patients continue to have other disease processes as well. Stay protected with appropriate PPE - meaning mask, gloves and eye protection. Wearing appropriate PPE and following recommended decontamination procedures will protect you, other patients, and your families.

If you have any questions regarding this memorandum contact Marissa Matta, Public Information Officer at mamatta@sigov.org or (209) 468-6818.