How many times does your hand touch the mic? The one you put your face next to?

Wipe the mic, prevent the spread.

CHARLES COUNTY EMERGENCY SERVICES

SPECIAL ORDER 2020-01

Transport of Infectious Disease Patients Under Investigation for Coronavirus Disease 2019 (COVID-19)

EMERGENCY MEDICAL SERVICES

Issue Date: 03/03/2020 **Revised:** 04/06/2020

Expiration Date: N/A

1. OVERVIEW

With the annual occurrence of influenza season, and with the recent developments regarding the Coronavirus, we are all reminded that the manner in which we approach infection control incidents is of the utmost importance. Many within the Charles County Department of Emergency Services (CCDES), Charles County Association of Emergency Medical Services (CCAEMS) and the Office of the Medical Director are remaining vigilant to emerging issues related to infection control. Of concern is the Coronavirus outbreak which originated in the Wuhan province of China, and the subsequent cases that have occurred here in the United States and elsewhere throughout the world. This policy and procedure outline the preparation, mobilization, and demobilization required for care and transport of suspected and known Coronavirus 2019 patients.

2. DEFINTIONS

- **Close Contact** - Close contact is defined as being within six (6) feet of a COVID-19 patient or being within the patient's care area or room for a prolonged period of time. Brief interactions such as walking by a person or moving past their room do not constitute close contact.

- **Coronavirus 2019** - A novel coronavirus is a new coronavirus that has not been previously identified. The virus causing coronavirus disease 2019 (COVID-19), is not the same as the coronaviruses that commonly circulate among humans and cause mild illness, like the common cold. On February 11, 2020 the World Health Organization announced an official name for the disease that is causing the 2019 novel coronavirus outbreak, first identified in Wuhan China. The new name of this disease is coronavirus disease 2019, abbreviated as COVID-19. In COVID-19, 'CO' stands for 'corona,' 'VI' for 'virus,' and 'D' for disease. Formerly, his disease was referred to as "2019 novel coronavirus" or "2019-nCoV". There are many types off human coronaviruses including some that commonly cause mild upper-respiratory tract illnesses. COVID-19 is a new disease, caused be a novel (or new) coronavirus that has not previously been seen in humans.

- **Non-exposure** – The following individuals are NOT considered "exposed" to COVID-19:
    - EMS clinicians who are farther than six (6) feet from the patient or,
    - EMS clinicians who are within six (6) feet of the patient for less than five (5) minutes and not performing respiratory procedures,
    - EMS clinicians who are wearing appropriate PPE when interacting with a PUI patient.

- **Person Under Investigation (PUI)** – A person who meets the CDC established criteria for COVID-19 symptoms and epidemiological risk factors. Symptoms include a fever, cough, sore throat and lower respiratory infection.

- **Personal Protection Equipment (PPE) –** For the purpose of this Special Order, PPE is considered those items in accordance with the recommendations of the Maryland Institute for Emergency Medical Services Systems – Infection Control and PPE Guidance (attachment). Such items included are gloves, respiratory protection masks, eye protection and gowns.

- **Seasonal Flu -** Influenza is spread by cough, sneeze, or by common contact with virus-contaminated surfaces.

- **Suspected Low Risk Exposure** – This event is defined when an EMS Clinician comes in contact with a known COVID-19 patient and the following are place:
    - The patient is wearing a mask, and
    - The EMS Clinician is wearing all appropriate PPE.

- **Suspected Moderate to High Risk Exposure** – This event is defined when an EMS Clinician comes in contact with a PUI and/or known COVID-19 patient, and the following are true:
    - There is a prolonged (greater than 5 minutes) close contact within six (6) feet of a suspected PUI and/or known COVID-19 patient without appropriate PPE,
    - An EMS clinician performs any respiratory procedures (intubation, nebulizer treatments, CPAP, oxygen) without wearing appropriate PPE.
    - An EMS clinician comes in direct exposure to respiratory secretions.

3. GENERAL

The information contained in this procedure is intended to be consistent with the EMS and PSAP interim guidance given by the Centers for Disease Control (CDC) and Prevention and by MIEMSS for management of patients with known or suspected COVID-19. In some cases, our local implementation of infection control procedures will exceed those recommended by the CDC. In addition, as this is a rapidly emerging situation, the policy is subject to frequent changes. It is our goal to update this plan in accordance with changes recommended by MIEMSS and/or the CDC as they develop.

EMS Clinicians are on the front lines of this evolving world respiratory infection. You are our first responders and fill a critical role in this emerging infection. Although many things are still unknown about the virus causing COVID-19, patterns are beginning to emerge. The graphic below demonstrates how many close contacts one symptomatic patient can expose or infect. You will see that as of February, 2020, the Corona virus exposes and potentially infects 2.5 additional patients for every source patient placing it in a class of communicability similar to Influenza, As seen from the graph, the Corona virus is nowhere near as infectious as measles or mumps.

4. PROCEDURES

A. PATIENT SCREENING

1. Utilizing the State's Emergency Infectious Diseases Surveillance Tool, the Charles County 911 Communications Center will begin to screen callers requesting emergency medical services for possible COVID-19 symptoms to include the presence of respiratory illness, cough or fever. Additional factors may include travel to a COVID-19 outbreak country, or travel on a cruise ship porting at areas with COVID-19 outbreaks within fourteen (14) days as well as close contact with someone who has laboratory confirmed COVID-19 within the previous fourteen (14) days as well.

2. Possible identified symptoms indicating a suspected PUI include the presence of fever, sore throat, cough, and lower respiratory symptoms. Per the CDC, as of 03-20-2020.

3. An incident involving a patient that has complaints of respiratory illness, sore throat, cough and/or fever shall be considered a PUI incident.

4. 911 Communications Center shall communicate to field personnel the aforementioned findings of a respiratory illness, sore throat, cough and/or fever so that proper PPE selection and procedures can be made prior to patient contact.

5. 911 Communications personnel have been instructed to not use the term PUI or Person Under Investigation on radio communications.

6. The same indicators of a suspected PUI should be used in field screenings of patients. Field screening questions should be asked at a distance of six (6) feet or more if possible, prior to implementing direct patient contact.

B. RESPONSE

1. When the Charles County 911 Communications Center determines there is a patient that conforms to the COVID-19 PUI criteria, the closest appropriate EMS units will be dispatched.

2. All personnel who are dispatched to the scene of a known or suspected COVID-19 PUI must don the appropriate PPE prior to entering the scene. This PPE is defined in the Maryland Institute for Emergency Medical Services Systems – Infection Control and PPE Guidance (attachment).

3. For patient encounters in which a potential PUI patient Incident has not been identified at the time of dispatch dispatched yet on-scene providers suspect the patient may be a PUI candidate, prior to establishing close contact; personnel should remotely interview and assess the patient from outside of a six (6) feet perimeter to determine whether the patient meets the criteria for being a COVID-19 PUI. If the patient meets the established criteria; immediately back out of the scene and don the appropriate level of PPE.

4. If however, a crew establishes close contact with a PUI patient prior to donning the appropriate PPE personnel should, in a professional and compassionate manner, explain to the patient that additional PPE precautions will need to be taken given the patient's situation, that there will be a slight delay to their care and remove themselves from the patient's room.

5. Ambulance crews should be limited to an officer (EMT/Paramedic) and a driver (EMT/Paramedic). This includes the prohibition of citizen ride-alongs and EMS program students riding from riding with EMS crews.

6. The number of EMS clinicians and other first responders encountering patient contact should be limited to the minimum number of personnel necessary to treat and safely care for the patient.

    a. If possible, only a single EMS clinician should make contact with the patient.
    b. Once the patient is assessed, the single lead EMS clinician can call in additional resources as required.

7. Once a clinical assessment has determined that the patient is ambulatory, have them come to you or even meet you outside as to limit contact and additional exposure potential.

8. Personnel who are pregnant or immunocompromised should not provide care for known or suspected COVID-19 patients.

C. TREATMENT AND TRANSPORT

1. Place a surgical mask on the patient if possible. If an oxygen mask or nasal canula is clinically indicated, a surgical mask should be placed over the device.

2. Have patient utilize alcohol-based hand cleaner if feasible.

3. All persons in the patient compartment shall be using appropriate PPE.

4. Isolate the driver's compartment from the patient treatment compartment by either shutting the door or window. If the ambulance is not equipped with a mechanical way to isolate the two compartments, a piece of plastic may be affixed to the opening.

5. Contact the receiving hospital via EMRC prior to initiating transport. You must notify the ED staff that the patient is complaining of respiratory illness and/or fever.

6. Family members and other contacts of patients (outside of parents or legal guardians) should not ride in the transport vehicle, if possible. If it is necessary for a family member, parent or guardian to ride in the transport vehicle, they too should wear a facemask.

7. Transport to the closest appropriate hospital-based emergency department.

8. Limit the number of EMS clinicians providing patient care in the back of the ambulance to the absolute minimum required to competently and efficiently provide medical treatment.

    a. This includes restricting citizen ride-alongs,
    b. and EMS program students.

9. Drivers, if they provide direct patient care (e.g., moving patients onto stretchers), should wear all recommended PPE. After completing patient care and before entering an isolated driver's compartment, the driver should remove and dispose of PPE and perform hand hygiene to avoid soiling the compartment.

10. Potential limitation of procedures:

    a. Patients should be provided the care they need, and the procedures that are indicated.
    b. Aerosolized (nebulizer) treatments and CPAP should be avoided except for patients experiencing severe distress.
    c. Minimize intranasal administration of medications.
    d. Minimize endotracheal intubation, instead utilize supraglottic airways (LMA's or King LT) whenever possible.
    e. Non-essential (lifesaving) interventions, such as elective IVs or elective advanced airway procedures should be deferred to the hospital setting when treatment indications are such that deferral of those procedures is appropriate.
    f. Life-saving procedures that are indicated by protocol shall be instituted by providers using the appropriate PPE.
    g. Aeromedical transport is not recommended.

11. Prior to arrival at Charles Regional Medical Center, consult with the 911 Communications Center when you are three (3) minutes out. The 911 Communications Center will notify the ED staff.

    a. ED staff will come out to meet the transporting EMS clinicians and transition patient care.
    b. Patient turnover should be conducted outside of the ED.
    c. Decon and resupply should be conducted outside of the ED.
    d. EMS clinicians should refrain from entering the ED while this Special Order is in place.
    e. If you need to enter the ED, you are required to don a face mask.

12. If a family member or the patient's legal guardian accompanied the patient to the ED, they are not to follow the patient into the ED. Instead, instruct them to report to the waiting area and await further instruction from ED staff.

13. If the patient is receiving a nebulized medication treatment or CPAP, that treatment should be suspended while transferring the patient through public areas. Example: Hallways, patient care areas, and waiting areas.

D. DECONTAMINATION OF PERSONNEL:

1. On arrival, after the patient is released to the facility, EMS clinicians should remove and discard PPE and perform hand hygiene. Used PPE should be discarded in accordance with routine procedures.

2. If effective PPE was not in place for a portion of the incident, and a provider was in close contact with a COVID-19 PUI, decontamination measures for that provider will be commensurate with the level of contamination.

    a. Any known areas of contamination should be washed with soap and water. Do not use bleach or hospital disinfectant on skin. An alcohol-based gel or foam can be used following washing with soap and water. Shower as required.
    b. Clothing should be removed and placed in double red biohazardous waste bags.
    c. Once decontaminated, a person cannot spread the virus unless they actually contract the virus (develop an infection). If infection occurs, symptoms can develop in two (2) to fourteen (14) days from exposure.

E. DECONTAMINATION PROCEDURES FOR AMBULANCES AT CRMC

1. After transporting the patient, leave the rear doors of the transport vehicle open to allow for sufficient air exchange to remove potentially infectious particles. The time to complete the patient transfer process to the receiving facility and complete all documentation should provide sufficient air exchange.

2. The County has contracted a certified cleaning company to sanitize the patient care compartment of each ambulance using EPA certified disinfectants. This is for transports to Charles Regional Medical Center only.

3. With the ambulance turned off and wearing the proper level of PPE:

    a. Pick up and bag all gross contamination (to include bodily fluids), trash and medical waste.
    b. Remove all items from the patient compartment you do not want sanitized.
    c. Close all cabinets and medical bags that you do not want sanitized.
    d. Make sure the driver's compartment is isolated from the patient compartment.

4. The County's contractors will sanitize the rear patient compartment using a fogging process.

5. The sanitization process should take no longer than twenty (20) minutes to complete followed by a manual wipe down of the patient compartment.

6. The EMS crew is responsible for the proper decontamination of the stretcher, portable radio, associated professional equipment and front driver's cab.

F. SUPPLEMENTAL DECON OF APPARATUS AND EQUIPMENT:

1. After transporting the patient, leave the rear doors of the transport vehicle open to allow for sufficient air exchange to remove potentially infectious particles. The time to complete the transfer of patient to the receiving facility and complete all documentation should provide sufficient air exchange.

2. When cleaning the vehicle, EMS clinicians should wear a disposable gown and gloves. A face shield or facemask and goggles should also be worn if splashes or sprays during cleaning are anticipated.
3. Ensure that environmental cleaning and disinfection procedures are followed consistently and correctly, to include the provision of adequate ventilation when chemicals are in use. Doors should remain open when cleaning the vehicle.

    a. Carefully bag any linens used in red biohazardous waste bags.
    b. All exposed surfaces must be decontaminated, including the interior of any cabinets or compartments opened and any equipment that was present in the patient compartment area.

c. Use an appropriate cleaning solution:

- An Environmental Protection Agency (EPA) registered hospital disinfectant with the label claim for disinfection of non-enveloped organisms (e.g. norovirus, rotavirus, adenovirus, poliovirus). If a commercial disinfectant is used, follow the direction set forth by the manufacturer.
- A freshly mixed 1:10 bleach solution, made by using 5-6% (household) bleach that is less than one year old mixed with cold water in a spray bottle. This solution will remain effective as a disinfectant for twenty-four (24) hours, then discard.

d. Clean up any visible body fluids.
e. Spray all surfaces with an appropriate cleaning solution, allow to sit for at least five (5) minutes and to completely dry.
f. Wipe remaining solution as necessary.
g. Wipe all surfaces with hospital disinfectant cloths. This provides a further level of decontamination.
h. Double bag any red biohazardous waste bags generated.
i. If sharps were generated, seal sharps container and process as biohazardous medical waste.

4. Clean and disinfect reusable patient-care equipment before use on another patient, according to manufacturer's instructions.

G. REPORTING PROCEDURES

1. Personnel that have a suspected moderate to high risk exposure, should complete an Incident Report and First Report of Injury paperwork.

2. In the patient care report submitted to the Elite reporting system, the provider should complete the COVID-19 Panel and the Crew Exposures/Injury tab found on the Narrative panel. The following fields should be completed:

a. Crew Member
b. PPE Used
c. Type of Exposure – Other = "COVID-19"

3. In order to maximize the protection of our first responders, a new signature option was created in Elite which no longer requires the signature of a patient if cross-contamination is a concern. EMS clinicians may now select "Not Signed – Patient Contamination Concern" in the Elite drop down of the patient signature section.

H. EXPOSURES

1. Patients who test positive for COVID-19 will be tracked through the State-designated Health information exchange, the Chesapeake Regional Information System for Our Patients, Inc. (CRISP).

2. CRISP shall notify the Infection Control Officer of the EMS Operational Program who in turn will process appropriate notifications to all affected providers.

3. Personnel who are deemed to have a confirmed low risk exposure will be instructed to self-monitor and report the onset of fever, cough, or other respiratory symptomology.

4. Personnel who are deemed to have a confirmed moderate to high risk exposure should be instructed to stay at home and self-isolate for fourteen (14) days. During quarantine, personnel will be expected to measure their temperature daily and report this information along with any signs or symptoms to their designated healthcare provider.

5. Personnel who complete the fourteen (14) days of self-isolation without fever or respiratory illness for at least seventy-two (72) hours, should be cleared to return to full duty.
6. Personnel who develop fever or respiratory illness during quarantine must contact their primary care physician for further guidance and/or treatment.

7. Personnel under quarantine who experience the aforementioned symptoms must be cleared by a physician prior to return to full duty.

I. FIRST RESPONDER PERSONAL PREPARATION:

1. Personnel should familiarize themselves with some of the many reputable resources regarding COVID-19 and infectious diseases, especially the CDC website at https://www.cdc.gov/coronavirus/2019-ncov/index.html. As with all things that can be dangerous to us while on-duty, learn about COVID-19 and infectious disease, and how the risks they present can be minimized.

2. Ensure your issued infection control PPE is in ready condition.

3. Ensure your assigned unit has adequate supplies of PPE and decontamination supplies.

4. Ensure the contents of your issued PPE bag are in ready condition. It is a good idea to have a simple change of clothes stowed in it. This is useful practice for a host of possibilities that might occur during a duty shift.

5. Ensure the information contained in your personal communications devices is frequently backed up. If you choose to carry your phone (or other belongings) on your person while on-duty, anticipate the potential need to have them be quarantined or for them to be possibly damaged during decontamination.

6. Plan for the possibility that you might be called upon to care for an COVID-19 PUI. Familiarize yourself with equipment available to you to manage this situation.

J. BEST PRACTICES:

1. Wellness checks should be performed at the beginning and middle of each shift. A wellness check should consist of the following basic monitoring areas:

    a. Presence of cough, sore throat or trouble breathing,
    b. Temperature,
    c. Blood Pressure,
    d. Pulse,
    e. Pulsoximetry.

Anomalies should be reported to your supervisor. Personnel should be excluded from work if they have exhibited the following:

a. Temperature > 100.4 F or,
b. Any of the following symptoms: cough, sore throat, trouble breathing.

Personnel should be without a fever or other aforementioned symptoms for at least seventy-two (72) hours before they are cleared to return to duty.

2. Limit the number of non-essential visitors to the station.

3. The station should be cleaned at least daily (more if needed) to ensure that communal hygiene standards are maintained at the highest level.

4. Personal hygiene standards should be maintained at the highest level in an effort to combat the spread of communicable diseases.

5. Bring a change of clothes with you when you report for duty. Change into your personal clothes and bag your uniform at the end of your shift.

6. Be kind and always do the right thing. Remember that every patient you encounter is just as worried or concerned about their well-being and the well-being of their families as you are. The public is counting on you to comfort them, give them guidance and treat them as if they were part of your family. Please don't disappoint them.

5. APPROVAL

Approved: _____ Date:_____

Michelle Lilly, Director

Approved: _____ Date:_____

Dr. Kevin Seaman, Jurisdictional Medical Director

Approved:_____ Date:_____

Andrew Spalding, Volunteer Chief; CCAEMS

Maryland Institute for Emergency Medical Services Systems
Infection Control and PPE Guidance

Signs & Symptoms of COVID-19: Any patient with respiratory symptoms (cough, congestion, body aches, shortness of breath, or sore throat) with or without fever, **regardless of travel history**

Arrival to Patient	☐ Perform an initial assessment at a minimum of 6 feet from the patient ☐ Limit the number of EMS clinicians and equipment within 6 feet of the patient ☐ Place a simple facemask **(NOT N-95)** on the patient ☐ EMS clinicians should put on (don) personal protective equipment including: gown, gloves, eye protection, and a simple facemask ☐ **IF THE PATIENT IS IN CARDIAC ARREST, N-95 respirators, not facemasks, should be donned by each EMS clinician treating the patient**
Treatment	☐ **CPAP and nebulized medications should be withheld except for patients experiencing severe distress** ☐ If respiratory procedures performed, use an N-95 respirator instead of a simple facemask ☐ Cover the respiratory device (NRB, nasal cannula, etc.) with a simple facemask ☐ Minimize intranasal administration of medications ☐ Minimize endotracheal intubation and instead utilize supraglottic airways (e.g. LMA or King LT) whenever possible
Transport	☐ Limit the number of EMS clinicians in the patient compartment ☐ Family members and other contacts of patients with possible COVID-19 should **not** ride in the transport vehicle, if possible. If riding in the transport vehicle, they should wear a facemask ☐ Activate the patient compartment's exhaust fan, and ensure the ventilation system of the ambulance is on non-recirculating mode
Arrival at ED	☐ Upon arrival, instruct the family members or other contacts of the patients with possible COVID-19 to remain outside the hospital and await further instruction from the hospital staff. **Do not allow them to accompany the EMS team through the ED entrance** ☐ **Turn off nebulizers and CPAP before entering the hospital** if patient condition allows (patient not in severe respiratory distress) ☐ Move the patient to the hospital bed, transfer the patient, then while still in PPE, promptly return the stretcher to the ambulance without touching anything else along the way
Returning to Service	☐ Leave all doors of the ambulance open to allow for air exchanges prior to gross decontamination ☐ Decontaminate ambulance according to established policies and procedures. Don PPE if PPE was removed after patient transfer to the ED ☐ Remove (doff) PPE and perform hand hygiene

EMS Clinician N-95 Critical Shortage Usage Tool

Are respiratory procedures being performed <u>OR</u> is the patient in cardiac arrest?	Facemask or Respirator Determination
YES	N-95*
NO	Simple facemask

***IF N-95 RESPIRATORS ARE COMPLETELY UNAVAILABLE, SIMPLE FACEMASKS MAY BE USED AS AN ALTERNATIVE**

Revised March 25, 2020

COVID-19

Airway and Respiratory Considerations for the Maryland EMS Clinician

Consider this guidance for managing a PUI's airway or treating their respiratory illness

EMS clinicians should exercise caution if an aerosol-generating procedure (e.g., bag valve mask (BVM) ventilation, oropharyngeal suctioning, endotracheal intubation, nebulizer treatment, continuous positive airway pressure (CPAP), bi-phasic positive airway pressure (biPAP), or resuscitation involving emergency intubation or cardiopulmonary resuscitation (CPR)) is necessary. BVMs, and other ventilatory equipment, should be equipped with HEPA filtration, if available, to filter expired air.

Aerosol-generating procedures should be avoided unless the patient presents in severe respiratory distress

Why are aerosol-generating procedures (AGPs) a concern? AGPs generate tiny particles that are small enough to remain in the air for an extended amount of time, travel long distances, and may be inhaled

What are signs that a patient is experiencing severe respiratory distress? Inability to speak between breaths, increased number of breaths per minute, diaphoresis, accessory muscle use, cyanosis, and respiratory arrest

What is the appropriate personal protective equipment for the EMS clinician who is performing an aerosol-generating procedure, or treating a patient in cardiac arrest? Gown, gloves, eye protection, and an N-95 respirator

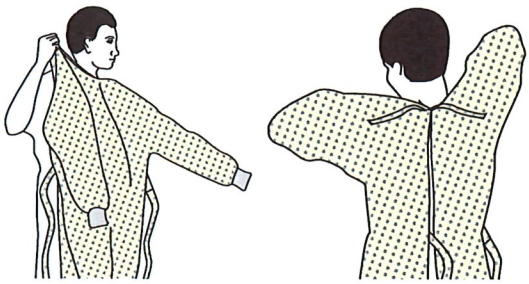
- Supplemental **oxygen** should be administered to any PUI with an **SpO2 less than 94%**
- If oxygen is administered, the **patient's SpO2** should be maintained **no higher than 96%**
- A **simple/surgical facemask should be placed over any patient** who is being administered oxygen or being treated with a nebulized medication
- Intranasal administration of medications should be minimized if an intramuscular/intravenous route of administration is available
- **Nebulized medications should be stopped upon arrival to the emergency department**
- If the need for advanced airway management arises, the EMS clinician should utilize a supraglottic airway whenever possible
- If endotracheal intubation is required, the EMS clinician most experienced with airway management should perform the procedure to minimize the number of attempts and risk of disease transmission
- Video laryngoscopy should be utilized whenever available

SEQUENCE FOR PUTTING ON PERSONAL PROTECTIVE EQUIPMENT (PPE)

The type of PPE used will vary based on the level of precautions required, such as standard and contact, droplet or airborne infection isolation precautions. The procedure for putting on and removing PPE should be tailored to the specific type of PPE.

1. GOWN

- Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
- Fasten in back of neck and waist



2. MASK OR RESPIRATOR

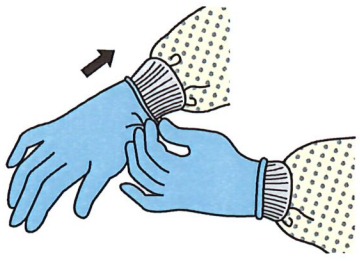
- Secure ties or elastic bands at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator

3. GOGGLES OR FACE SHIELD

- Place over face and eyes and adjust to fit

4. GLOVES

- Extend to cover wrist of isolation gown



USE SAFE WORK PRACTICES TO PROTECT YOURSELF AND LIMIT THE SPREAD OF CONTAMINATION

- Keep hands away from face
- Limit surfaces touched
- Change gloves when torn or heavily contaminated
- Perform hand hygiene

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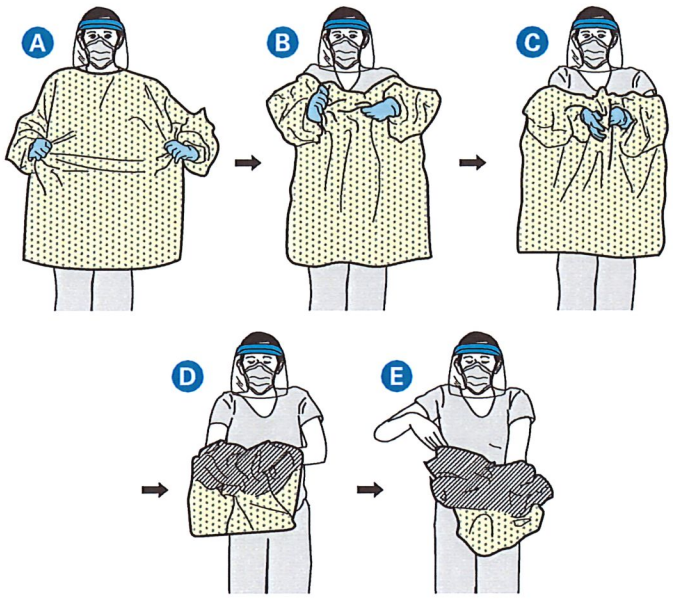
HOW TO SAFELY REMOVE PERSONAL PROTECTIVE EQUIPMENT (PPE) EXAMPLE 2

Here is another way to safely remove PPE without contaminating your clothing, skin, or mucous membranes with potentially infectious materials. **Remove all PPE before exiting the patient room** except a respirator, if worn. Remove the respirator **after** leaving the patient room and closing the door. Remove PPE in the following sequence:

1. GOWN AND GLOVES

- Gown front and sleeves and the outside of gloves are contaminated!
- If your hands get contaminated during gown or glove removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Grasp the gown in the front and pull away from your body so that the ties break, touching outside of gown only with gloved hands
- While removing the gown, fold or roll the gown inside-out into a bundle
- As you are removing the gown, peel off your gloves at the same time, only touching the inside of the gloves and gown with your bare hands. Place the gown and gloves into a waste container



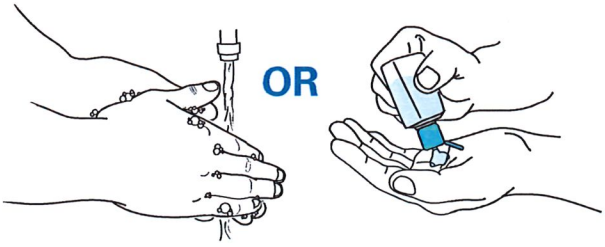
2. GOGGLES OR FACE SHIELD

- Outside of goggles or face shield are contaminated!
- If your hands get contaminated during goggle or face shield removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Remove goggles or face shield from the back by lifting head band and without touching the front of the goggles or face shield
- If the item is reusable, place in designated receptacle for reprocessing. Otherwise, discard in a waste container

3. MASK OR RESPIRATOR

- Front of mask/respirator is contaminated — DO NOT TOUCH!
- If your hands get contaminated during mask/respirator removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Grasp bottom ties or elastics of the mask/respirator, then the ones at the top, and remove without touching the front
- Discard in a waste container

4. WASH HANDS OR USE AN ALCOHOL-BASED HAND SANITIZER IMMEDIATELY AFTER REMOVING ALL PPE



PERFORM HAND HYGIENE BETWEEN STEPS IF HANDS BECOME CONTAMINATED AND IMMEDIATELY AFTER REMOVING ALL PPE

CS250672-F

Facial Hairstyles and Filtering Facepiece Respirators

Intended for workers who wear tight-fitting respirators

CLEAN SHAVEN ✓

STUBBLE ✗

LONG STUBBLE ✗

FULL BEARD ✗

FRENCH FORK ✗

DUCKTAIL ✗

VERDI ✗

GARIBALDI ✗

BANDHOLZ ✗

SOUL PATCH ✓

GOATEE ✓

CHIN CURTAIN ✗

EXTENDED GOATEE ✗

CIRCLE BEARD ✗

ANCHOR ✓

(Careful! Chin hair may easily cross the seal)

BALBO ✓

VAN DYKE ✗

IMPERIAL ✗

(Careful! Chin hair may easily cross the seal)

SIDE WHISKERS ✓

MUTTON CHOPS ✗

HULIHEE ✗

HORSESHOE ✓

(Careful not to cross the seal)

ZAPPA ✓

WALRUS ✓

PAINTER'S BRUSH ✓

CHEVRON ✓

HANDLEBAR ✓

PENCIL ✓ ✓

TOOTHBRUSH ✓

LAMPSHADE ✓

ZORRO ✓

VILLAIN ✓

(Careful not to cross the seal)

FU MANCHU ✗

ENGLISH ✗

DALI ✗

*If your respirator has an exhalation valve, some of these styles may interfere with the valve working properly if the facial hair comes in contact with it.

†This graphic may not include all types of facial hairstyles. For any style, hair should not cross under the respirator sealing surface.

Source: OSHA Respiratory Protection Standard
https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&p_id=12716

Further Reading: NIOSH Respirator Trusted-Source Webpage
https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/respsource3fittest.html

Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

2017

Proper PPE ensemble for a suspected PUI patient, for patients and clinicians.

Centers for Disease Control and Prevention

The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research NIOSH

PANDEMIC PLANNING

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Recommended Guidance for Extended Use and Limited Reuse of N95 Filtering Facepiece Respirators in Healthcare Settings

Background

This document recommends practices for extended use and limited reuse of NIOSH-certified N95 filtering facepiece respirators (commonly called "N95 respirators"). The recommendations are intended for use by professionals who manage respiratory protection programs in healthcare institutions to protect health care workers from job-related risks of exposure to infectious respiratory illnesses.

Supplies of N95 respirators can become depleted during an influenza pandemic (1-3) or wide-spreadoutbreaks of other infectious respiratory illnesses.(4) Existing CDC guidelines recommend a combination of approaches to conserve supplies while safeguarding health care workers in such circumstances. These existing guidelines recommend that health care institutions:

- Minimize the number of individuals who need to use respiratory protection through the preferential use of engineering and administrative controls;
- Use alternatives to N95 respirators (e.g., other classes of filtering facepiece respirators, elastomeric half-mask and full facepiece air purifying respirators, powered air purifying respirators) where feasible;
- Implement practices allowing extended use and/or limited reuse of N95 respirators, when acceptable; and
- Prioritize the use of N95 respirators for those personnel at the highest risk of contracting or experiencing complications of infection.

This document focuses on one of the above strategies, the extended use and limited reuse of N95 respirators only; please consult the CDC or NIOSH website for guidance related to implementing the other recommended approaches for conserving supplies of N95 respirators.

There are also non-emergency situations (e.g., close contact with patients with tuberculosis) where N95 respirator reuse has been recommended in healthcare settings and is commonly practiced.(5-9) This document serves to supplement previous guidance on this topic.

Definitions

Extended use refers to the practice of wearing the same N95 respirator for repeated close contact encounters with several patients, without removing the respirator between patient encounters. Extended use may be implemented when multiple patients are infected with the same respiratory pathogen and patients are placed together in dedicated waiting rooms or hospital wards. Extended use has been recommended as an option for conserving respirators during previous respiratory pathogen outbreaks and pandemics.(10, 11)

Reuse[1] refers to the practice of using the same N95 respirator for multiple encounters with patients but removing it ('doffing') after each encounter. The respirator is stored in between encounters to be put on again ('donned') prior to the next encounter with a patient. For pathogens in which contact transmission (e.g., fomites) is not a concern, non-emergency reuse has been practiced for decades.(7) For example, for tuberculosis prevention, CDC recommends that a respirator classified as disposable can be reused by the same worker as long as it remains functional[2] and is used in accordance with local infection control procedures.(9) Even when N95 respirator reuse is practiced or recommended, restrictions are in place which limit the number of times the same FFR is reused.Thus, N95 respirator reuse is often referred to as "limited reuse". Limited reuse has been recommended and widely used as an option for conserving respirators during previous respiratory pathogen outbreaks and pandemics.(2, 3, 10-12)

Implementation

The decision to implement policies that permit extended use or limited reuse of N95 respirators should be made by the professionals who manage the institution's respiratory protection program, in in consultation with their occupational health and infection control departments with input from the state/local public health departments. The decision to implement these practices should be made on a case by case basis taking into account respiratory pathogen characteristics (e.g., routes of transmission, prevalence of disease in the region, infection attack rate, and severity of illness) and local conditions (e.g., number of disposable N95 respirators available, current respirator usage rate, success of other respirator conservation strategies, etc.). Some healthcare facilities may wish to implement extended use and/or limited reuse before respirator shortages are observed, so that adequate supplies are available during times of peak demand. For non-emergency (routine) situations, current CDC recommendations (6, 9) specific to that pathogen should also be consulted.

The following sections outline specific steps to guide implementation of these recommendations, minimize the challenges caused by extended use and reuse, and to limit risks that could result from these practices.

Respirator Extended Use Recommendations

Extended use is favored over reuse because it is expected to involve less touching of the respirator and therefore less risk of contact transmission. Please see the section on Risks of Extended Use and Reuse of Respirators for more information about contact transmission and other risks involved in these practices.

A key consideration for safe extended use is that the respirator must maintain its fit and function. Workers in other industries routinely use N95 respirators for several hours uninterrupted. Experience in these settings indicates that respirators can function within their design specifications for 8 hours of continuous or intermittent use. Some research studies (14, 15) have recruited healthcare workers as test subjects and many of those subjects have successfully worn an N95 respirator at work for several hours before they needed to remove them. Thus, the maximum length of continuous use in non-dusty healthcare workplaces is typically dictated by hygienic concerns (e.g., the respirator was discarded because it became contaminated) or practical considerations (e.g., need to use the restroom, meal breaks, etc.), rather than a pre-determined number of hours.

If extended use of N95 respirators is permitted, respiratory protection program administrators should ensure adherence to administrative and engineering controls to limit potential N95 respirator surface contamination (e.g., use of barriers to prevent droplet spray contamination) and consider additional training and reminders (e.g., posters) for staff to reinforce the need to minimize unnecessary contact with the respirator surface, strict adherence to hand hygiene practices, and proper Personal Protective Equipment (PPE) donning and doffing technique.(16) Healthcare facilities should develop clearly written procedures to advise staff to take the following steps to reduce contact transmission after donning:

- Discard N95 respirators following use during aerosol generating procedures.
- Discard N95 respirators contaminated with blood, respiratory or nasal secretions, or other bodily fluids from patients.
- Discard N95 respirators following close contact with, or exit from, the care area of any patient co-infected with an infectious disease requiring contact precautions.
- Consider use of a cleanable face shield (preferred[3]) over an N95 respirator and/or other steps (e.g., masking patients, use of engineering controls) to reduce surface contamination.
- Perform hand hygiene with soap and water or an alcohol-based hand sanitizer before and after touching or adjusting the respirator (if necessary for comfort or to maintain fit).

Extended use alone is unlikely to degrade respiratory protection. However, healthcare facilities should develop clearly written procedures to advise staff to:

- Discard any respirator that is obviously damaged or becomes hard to breathe through.

Respirator Reuse Recommendations

There is no way of determining the maximum possible number of safe reuses for an N95 respirator as a generic number to be applied in all cases. Safe N95 reuse is affected by a number of variables that impact respirator function and contamination over time.(18, 19) However, manufacturers of N95 respirators may have specific guidance regarding reuse of their product.The recommendations below are designed to provide practical advice so that N95 respirators are discarded before they become a significant risk for contact transmission or their functionality is reduced.

If reuse of N95 respirators is permitted, respiratory protection program administrators should ensure adherence to administrative and engineering controls to limit potential N95 respirator surface contamination (e.g., use of barriers to prevent droplet spray contamination) and consider additional training and/or reminders (e.g., posters) for staff to reinforce the need to minimize unnecessary contact with the respirator surface, strict adherence to hand hygiene practices, and proper PPE donning and doffing technique, including physical inspection and performing a user seal check.(16) Healthcare facilities should develop clearly written procedures to advise staff to take the following steps to reduce contact transmission:

- Discard N95 respirators following use during aerosol generating procedures.
- Discard N95 respirators contaminated with blood, respiratory or nasal secretions, or other bodily fluids from patients.
- Discard N95 respirators following close contact with any patient co-infected with an infectious disease requiring contact precautions.
- Consider use of a cleanable face shield (preferred[3]) over an N95 respirator and/or other steps (e.g., masking patients, use of engineering controls), when feasible to reduce surface contamination of the respirator.
- Hang used respirators in a designated storage area or keep them in a clean, breathable container such as a paper bag between uses. To minimize potential cross-contamination, store respirators so that they do not touch each other and the person using the respirator is clearly identified. Storage containers should be disposed of or cleaned regularly.
- Clean hands with soap and water or an alcohol-based hand sanitizer before and after touching or adjusting the respirator (if necessary for comfort or to maintain fit).
- Avoid touching the inside of the respirator. If inadvertent contact is made with the inside of the respirator, discard the respirator and perform hand hygiene as described above.
- Use a pair of clean (non-sterile) gloves when donning a used N95 respirator and performing a user seal check. Discard gloves after the N95 respirator is donned and any adjustments are made to ensure the respirator is sitting comfortably on your face with a good seal.

To reduce the chances of decreased protection caused by a loss of respirator functionality, respiratory protection program managers should consult with the respirator manufacturer regarding the maximum number of donnings or uses they recommend for the N95 respirator model(s) used in that facility. If no manufacturer guidance is available, preliminary data(19, 20) suggests limiting the number of reuses to no more than five uses per device to ensure an adequate safety margin. Management should consider additional training and/or reminders for users to reinforce the need for proper respirator donning techniques including inspection of the device for physical damage (e.g., Are the straps stretched out so much that they no longer provide enough tension for the respirator to seal to the face?, Is the nosepiece or other fit enhancements broken?, etc.). Healthcare facilities should provide staff clearly written procedures to:

- Follow the manufacturer’s user instructions, including conducting a user seal check.
- Follow the employer’s maximum number of donnings (or up to five if the manufacturer does not provide a recommendation) and recommended inspection procedures.
- Discard any respirator that is obviously damaged or becomes hard to breathe through.
- Pack or store respirators between uses so that they do not become damaged or deformed.

Secondary exposures can occur from respirator reuse if respirators are shared among users and at least one of the users is infectious (symptomatic or asymptomatic). Thus, N95 respirators must only be used by a single wearer. To prevent inadvertent sharing of respirators, healthcare facilities should develop clearly written procedures to inform users to:

- Label containers used for storing respirators or label the respirator itself (e.g., on the straps(11)) between uses with the user's name to reduce accidental usage of another person's respirator.

Risks of Extended Use and Reuse of Respirators

Although extended use and reuse of respirators have the potential benefit of conserving limited supplies of disposable N95 respirators, concerns about these practices have been raised. Some devices have not been FDA-cleared for reuse(21). Some manufacturers' product user instructions recommend discard after each use (i.e., "for single use only"), while others allow reuse if permitted by infection control policy of the facility.(19) The most significant risk is of contact transmission from touching the surface of the contaminated respirator. One study found that nurses averaged 25 touches per shift to their face, eyes, or N95 respirator during extended use.(15)Contact transmission occurs through direct contact with others as well as through indirect contact by touching and contaminating surfaces that are then touched by other people.

Respiratory pathogens on the respirator surface can potentially be transferred by touch to the wearer's hands and thus risk causing infection through subsequent touching of the mucous membranes of the face (i.e., self-inoculation). While studies have shown that some respiratory pathogens (22-24) remain infectious on respirator surfaces for extended periods of time, in microbial transfer (25-27) and reaerosolization studies (28-32) more than ~99.8% have remained trapped on the respirator after handling or following simulated cough or sneeze.

Respirators might also become contaminated with other pathogens acquired from patients who are co-infected with common healthcare pathogens that have prolonged environmental survival (e.g., methicillin-resistant Staphylococcus aureas, vancomycin-resistant enterococci, Clostridium difficile, norovirus, etc.). These organisms could then contaminate the hands of the wearer, and in turn be transmitted via self-inoculation or to others via direct or indirect contact transmission.

The risks of contact transmission when implementing extended use and reuse can be affected by the types of medical procedures being performed and the use of effective engineering and administrative controls, which affect how much a respirator becomes contaminated by droplet sprays or deposition of aerosolized particles. For example, aerosol generating medical procedures such as bronchoscopies, sputum induction, or endotracheal intubation, are likely to cause higher levels of respirator surface contamination, while source control of patients (e.g. asking patients to wear facemasks), use of a face shield over the disposable N95 respirator, or use of engineering controls such as local exhaust ventilation are likely to reduce the levels of respirator surface contamination.(18)

While contact transmission caused by touching a contaminated respirator has been identified as the primary hazard of extended use and reuse of respirators, other concerns have been assessed, such as a reduction in the respirator's ability to protect the wearer caused by rough handling or excessive reuse.(19, 20) Extended use can cause additional discomfort to wearers from wearing the respirator longer than usual.(14, 15) However, this practice should be tolerable and should not be a health risk to medically cleared respirator users.(19)

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[1] The term "reuse" is used in a variety of settings in healthcare. For example, FDA defines 3 kinds of reuse: (1) between patients with adequate reprocessing (e.g., as with an endoscope), (2) reuse by the same person with adequate reprocessing/decontamination (e.g., as with contact lenses), and (3) repeated use by the same person over a period of time with or without reprocessing.(12, 13)

[2] Functional means that the N95 respirator has maintained its physical integrity and when used properly provides protection (exposure reduction) consistent with the assigned protection factor for this class of respirator.

[3] Use of a cleanable face shield is strongly preferred to a surgical mask to reduce N95 respirator contamination. Concerns have been raised that supplies of surgical masks may also be in limited supply during a public health emergency and that the use of a surgical mask could affect the function of the N95 respirator.(17)

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Centers for Disease Control and Prevention

Coronavirus Disease 2019 (COVID-19)

Decontamination and Reuse of Filtering Facepiece Respirators

Disposable filtering facepiece respirators (FFRs) are not approved for routine decontamination and reuse as standard of care. However, FFR decontamination and reuse may need to be considered as a crisis capacity strategy to ensure continued availability. Based on the limited research available, ultraviolet germicidal irradiation, vaporous hydrogen peroxide, and moist heat showed the most promise as potential methods to decontaminate FFRs. This document summarizes research about decontamination of FFRs before reuse.

Introduction

Reusing disposable filtering facepiece respirators (FFRs) has been suggested as a contingency capacity strategy to conserve available supplies for healthcare environments during a pandemic. Strategies for FFR extended use and reuse (without decontamination of the respirator) are currently available from CDC's National Institute for Occupational Safety and Health (NIOSH).

The surfaces of an FFR may become contaminated while filtering the inhalation air of the wearer during exposures to pathogen-laden aerosols. The pathogens on the filter materials of the FFR may be transferred to the wearer upon contact with the FFR during activities such as adjusting the FFR, improper doffing of the FFR, or when performing a user-seal check when redoffing a previously worn FFR. A study evaluating the persistence of SARS-CoV-2 (the virus that causes COVID-19) on plastic, stainless steel, and carboard surfaces showed that the virus is able to survive for up to 72-hours [1]. One strategy to mitigate the contact transfer of pathogens from the FFR to the wearer during reuse is to issue five respirators to each healthcare worker who may care for patients with suspected or confirmed COVID-19. The healthcare worker will wear one respirator each day and store it in a breathable paper bag at the end of each shift. The order of FFR use should be repeated with a minimum of five days between each FFR use. This will result in each worker requiring a minimum of five FFRs, providing that they put on, take off, care for them, and store them properly each day. Healthcare workers should treat the FFRs as though they are still contaminated and follow the precautions outlined in our reuse recommendations. If supplies are even more constrained and five respirators are not available for each worker who needs them, FFR decontamination may be necessary.

Decontamination and subsequent reuse of FFRs should only be practiced as a crisis capacity strategy. At present, FFRs are considered one time use and there are no manufacturer authorized methods for FFR decontamination prior to reuse. On March 28, 2020, FDA issued an Emergency Use Authorization (EUA) permitting the Battelle Decontamination System at Battelle Memorial Institute to be authorized for use in decontaminating "compatible N95 respirators." The FDA website should be checked to determine if other EUAs have been issued since the posting of this crisis capacity strategy guidance. Only respirator manufacturers can reliably provide guidance on how to decontaminate their specific models of FFRs. In absence of manufacturer's recommendations, third parties may also provide guidance or procedures on how to decontaminate respirators without impacting respirator performance. Decontamination might cause poorer fit, filtration efficiency, and breathability of disposable FFRs as a result of changes to the filtering material, straps, nose bridge material, or strap attachments of the FFR. **CDC and NIOSH do not recommend that FFRs be decontaminated and then reused as standard care. This practice would be inconsistent with their approved use, but we understand in times of crisis, this option may need to be considered when FFR shortages exist.**

An effective FFR decontamination method should reduce the pathogen burden, maintain the function of the FFR, and present no residual chemical hazard. The filter media in NIOSH-approved respirators varies by manufacturer. The ability of the respirator filter media to withstand cleaning and disinfection are not NIOSH performance requirements. The NIOSH's National Personal Protective Technology Laboratory (NPPTL) and other researchers have investigated the impact of various decontamination methods on filtration efficiency, facepiece fit of FFRs, and the ability to reduce viable virus or bacteria on the FFRs. This research is summarized below.

Crisis Standards of Care Decontamination Recommendations

Because ultraviolet germicidal irradiation (UVGI), vaporous hydrogen peroxide (VHP), and moist heat showed the most promise as potential methods to decontaminate FFRs, researchers, decontamination companies, healthcare systems, or individual hospitals should focus current efforts on these technologies. Specifically, the effectiveness of using these methods should be explored further with specific FFR models based on the manufacturers' support to better understand the impact on the respirator performance, including filtration and fit. The respirator manufacturer should be consulted about the impact of the method on their respirators prior to considering the use of any method.

When information from the manufacturer or a third-party is available showing that respirators can be successfully decontaminated without impacting respirator performance, then FFRs decontaminated following those recommendations can be worn for any patient care activities.

In the absence of guidance or when information is available that a respirator cannot be decontaminated without negatively impacting the performance, respirators may still be decontaminated. However, given the uncertainties on the impact of decontamination on respirator performance, these FFRs should not be worn by HCPs when performing or present for an aerosol-generating procedure.

No current data exists supporting the effectiveness of these decontamination methods specifically against SARS-CoV-2 on an FFR. Other pathogens may also be present on FFRs and there is only limited data available for other pathogens. Further work is needed to assure SARS-CoV-2 and other pathogens are inactivated. Therefore, even after decontamination, these FFRs should be handled carefully.

HCPs should take the following precautionary measures prior to using a decontaminated FFR:

- Clean hands with soap and water or an alcohol-based hand sanitizer before and after touching or adjusting the FFR.
- Avoid touching the inside of the FFR.
- Use a pair of clean (non-sterile) gloves when donning and performing a user seal check.
- Visually inspect the FFR to determine if its integrity has been compromised.
- Check that components such as the straps, nose bridge, and nose foam material did not degrade, which can affect the quality of the fit, and seal.
- If the integrity of any part of the FFR is compromised, or if a successful user seal check cannot be performed, discard the FFR and try another FFR.
- Users should perform a user seal check immediately after they don each FFR and should not use an FFR on which they cannot perform a successful user seal check.

Table 1 provides a summary of the crisis standards of care decontamination recommendations.

Table 1. Summary of crisis standards of care decontamination recommendations

Method	Manufacturer or third-party guidance or procedures available	Recommendation for use after decontamination	Additional use considerations
Ultraviolet germicidal irradiation (UVGI)	Yes	Can be worn for any patient care activities	• Clean hands with soap and water or an alcohol-based hand sanitizer before and after touching or adjusting the FFR. • Avoid touching the inside of the FFR. • Use a pair of clean (non-sterile) gloves when donning and performing a user seal check. • Visually inspect the FFR to determine if its integrity has been compromised.
Vaporous hydrogen peroxide (VHP)			

Method	Manufacturer or third-party guidance or procedures available	Recommendation for use after decontamination	Additional use considerations
Moist heat			• Check that components such as the straps, nose bridge, and nose foam material did not degrade, which can affect the quality of the fit, and seal. • If the integrity of any part of the FFR is compromised, or if a successful user seal check cannot be performed, discard the FFR and try another FFR. • Users should perform a user seal check immediately after they don each FFR and should not use an FFR on which they cannot perform a successful user seal check.
Ultraviolet germicidal irradiation (UVGI)	No	Can be worn for patient care activities except when performing or present for an aerosol generating procedure	
Vaporous hydrogen peroxide (VHP)			

Table 2 provides a summary of the decontamination methods evaluated in the referenced literature and the reported effect of each method on FFR performance.

Table 2. Summary of the decontamination method and effect on FFR performance

Method	Treatment level	FFR filtration performance	FFR fit performance	Other observations	References

Table 3 provides a summary of the decontamination methods used, the treatment levels assessed, the microbes tested, and the antimicrobial efficacy as reported in the literature.

Table 3. Summary of decontamination method antimicrobial efficacy

Method	Treatment level	Microbe tested	Antimicrobial efficacy	References

Vaporous hydrogen peroxide, ultraviolet germicidal irradiation, and moist heat are the most promising decontamination methods. If FFR decontamination is considered, these methods do not appear to break down filtration or compromise the FFR; however, many of these methods can only be used for limited times.

Vaporous hydrogen peroxide

Investigations into VHP decontamination of FFRs provides evidence of minimal effect to filtration and fit while demonstrating 99.9999% efficiency in killing bacterial spores. VHP did not reduce the filtration performance of the ten N95 FFR models tested while showing a 6-log reduction in *Geobacillus stearothermophilus* spores [2-4]. In a report prepared by Battelle Memorial Institute, the 3M 1860 FFR was shown to maintain filtration performance for 50 treatment cycles of VHP, also referred to as HPV by some decontamination system manufacturers, using the Clarus® R HPV generator form Bioquell (utilizing 30% H_2O_2). Additionally, FFR fit was shown to be unaffected for up to 20 VHP treatments cycles using NPPTL's Static Advanced Headform [4, 5]. Strap degradation occurred after 20 treatment cycles. Kenney et al., co-contaminated 3M 1870 FFRs with three bacteriophages, T1, T7, and Phi 6, and decontaminated the FFRs using VHP generated from the Bioquell's BQ-50 system. The VHP treatment was shown inactivate >99.999% of all phages which was below the limit of detection [6]. Viscusi et al. found that 9 FFR models (three particulate N95, three surgical N95 FFRs and three P100) exposed to one cycle of VHP treatment using the STERRAD 100S H_2O_2 Gas Plasma Sterilizer (Advanced Sterilization Products, Irvine, CA) had filter aerosol penetration and filter airflow resistance levels similar to untreated models; however, Bergman et al. found that three cycles of VHP treatment using the STERRAD 100S H_2O_2 Gas Plasma Sterilizer negatively affected filtration performance [2, 3]. Bergman et al. measured acceptable filtration performance for six FFR models (three particulate and three surgical FFRs) that received three cycles of VHP treatment using the Clarus® R HPV generator (utilizing 30% H_2O_2) [3]. VHP is a promising method with a potential for high capacity throughput, but certain VHP systems, such as the Clarus® R HPV generator, may be more compatible with FFR decontamination.

Ultraviolet germicidal irradiation

UVGI is a promising method but the disinfection efficacy is dependent on dose. Not all UV lamps provide the same intensity thus treatment times would have to be adjusted accordingly. Moreover, UVGI is unlikely to kill all the viruses and bacteria on an FFR due to shadow effects produced by the multiple layers of the FFR's construction. Acceptable filtration performance was recorded for eleven FFR models exposed to various UV doses ranging from roughly 0.5–950 J/cm^2 and UVGI was shown to have minimal effect on fit [2, 3, 7, 8, 9, 10]. Heimbuch et al. tested filtration and fit of 15 FFRs and found no adverse effects to FFR performance [11]. Lindsley et al. reported a reduction of the durability of materials of the FFRs for doses ranging from 120–950 J/cm^2; however, an approximate inactivation of 99.9% of bacteriophage MS2, a non-enveloped virus, and H1N1 influenza A/PR/8/34 were achieved with much lower doses of approximately 1 J/cm^2 [12–14]. Heimbuch et al. tested the performance of 1 J/cm^2 of UVGI against Influenza A (H1N1), Avian influenza A virus (H5N1), Influenza A (H7N9) A/Anhui/1/2013, Influenza A (H7N9) A/Shanghai/1/2013, MERS-CoV, and SARS-CoV and reported virus inactivation from 99.9% to greater than 99.999% [11]. UVGI is harmful. Proper precautions are required to avoid UVGI exposure to skin or the eyes.

Moist heat

Moist heat, consisting of 60°C and 80% RH caused minimal degradation in the filtration and fit performance of the tested FFRs [3, 9, 10]. Heimbuch et al. disinfected FFRs contaminated with H1N1 using moist heat, of 65°C and 85% RH, and achieved a minimal of 99.99% reduction in virus [14]. One limitation of the moist heat method is the uncertainty of the disinfection efficacy for various pathogens.

Steam treatment and liquid hydrogen peroxide are promising methods with some limitations

Steam treatment

Steam treatment may be a suitable approach for decontaminating FFRs. The limited number of studies for steam report minimal effect on FFR filtration and fit performance and a minimum 99.9% reduction in H1N1 and bacteriophage MS2 [14, 15]. Fisher et al. used microwave steam bags, designed for disinfecting infant feeding equipment, to decontaminate six FFR models and achieved 99.9% inactivation of MS2 bacteriophage. Filtration performance of all tested FFRs scored above NIOSH certification requirements. Three FFRs were further evaluated for three cycles of steam exposure and demonstrated no change in filtration performance [15]. Bergman et al. also demonstrated acceptable filtration performance after three cycles of exposure to microwave generated steam [3]. Microwave generated steam had little effect on FFR fit after exposure to up to three cycles of steam [9, 10]. Using microwaves to produce steam to decontaminate FFRs is not without limitations. Not all microwaves are constructed the same and some are more powerful than others. The effect of higher power microwaves on FFRs is unknown. Furthermore, the metal nosebands of FFRs may cause arcing, sparks inside the microwave oven, during exposure to microwaves.

Liquid hydrogen peroxide

Liquid hydrogen peroxide showed no effect of FFR filtration performance [3, 7]. Bergman et al. evaluated six FFRs for filtration performance after a 30-minute submersion in 6% hydrogen peroxide. All six FFR models tested demonstrated no changes in filter performance after three cycles of decontamination. FFR fit and disinfection efficacy were not assessed for this method.
Table 4 provides a summary of the decontamination methods evaluated for each FFR model.

Table 4. Decontamination methods evaluated for each FFR model

FFR Model	Type	VHP	UVGI	EtO	Steam	Moist heat	Hydrogen peroxide

Autoclaving and the use of disinfectant wipes are not recommended as crisis strategies as they may alter FFR performance.

Autoclave, dry heat, isopropyl alcohol, soap, dry microwave irradiation and bleach

Decontamination using an autoclave, 160°C dry heat, 70% isopropyl alcohol, microwave irradiation and soap and water caused significant filter degradation to both FFRs and particle penetration levels did not meet the levels that NIOSH would allow for approval. Decontamination with bleach caused slight degradation in filtration performance and created an odor that would not be suitable for use [2, 7].

Disinfectant wipes

Heimbuch et al. evaluated biological decontamination efficacy and filtration penetration following aerosol exposure of mucin or viable *Staphylococcus aureus* [18]. Following aerosol exposure, respirators were cleaned with three types of wipes: hypochlorite, benzalkonium chloride (BAC), or nonantimicrobial. Particle penetration following cleaning yielded mean values <5%. The highest penetrations were observed in FFRs cleaned with BAC wipes. The BAC wipe caused one sample of FFRs to exceed 5% penetration. Filter penetration following various decontamination methods was shown in this study to vary based on the decontamination method and the model of FFR.

Ethylene oxide as a promising method with serious limitation

Ethylene oxide is not recommended as a crisis strategy as it may be harmful to the wearer.

Ethylene oxide (EtO) was shown to not harm filtration performance for the nine tested FFR models [2, 3, 7]. All tests were conducted for one hour at 55˚C with EtO gas concentrations ranging from 725 to 833 g/L. Six models that were exposed to three cycles of 736 mg/L EtO all passed the filtration performance assessment [3]. Data is not available for the effect that EtO treatment may have on FFR fit. However, EtO treatment does not cause visible physical changes to the appearance of FFRs [2, 3]. A serious concern about using EtO for decontamination of large numbers of FFRs is throughput, since relatively long aeration cycles are needed to ensure removal of highly toxic EtO gas [2]. Any use of ethylene oxide (EtO) should be accompanied by studies to ensure no off-gassing into the breathing zone of the wearer as EtO is carcinogenic and teratogenic. Chronic inhalation of EtO has been linked to neurologic dysfunction and may cause other harmful effects to the wearer [16]. EtO should be used in accordance with Occupational Safety and Health Administration standard 29 CFR 1910.1047 [17].

Other methods for consideration which have not been tested

Hospitals may have other decontamination capabilities on-hand that may be feasible. For example, photodynamic inactivation of pathogens using methylene blue plus visible light exposure is used to treat blood products and there is interest in using the method to decontaminate PPE. There is currently no data to evaluate the effect of this method on FFR filtration and fit [19].

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Other resources

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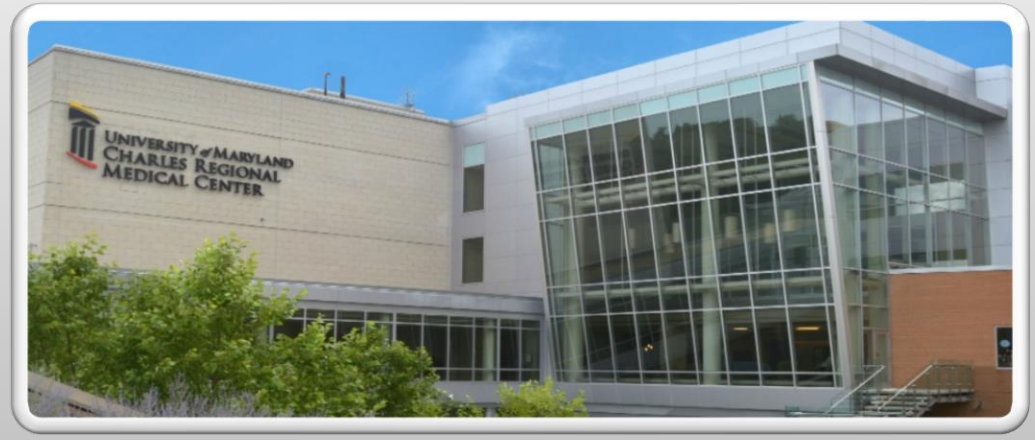
Page last reviewed: April 1, 2020

DECONTAMINATION PROCEDURES FOR AMBULANCES AT CHARLES REGIONAL MEDICAL CENTER.

SPECIAL ORDER 2020-01_VERSION 3.1

FOR YOUR PROTECTION AND THE PROTECTION OF THE COMMUNITY:

- THE COUNTY HAS CONTRACTED THE SERVICES OF A CERTIFIED CLEANING COMPANY TO SANITIZE THE PATIENT COMPARTMENT OF EACH AMBULANCE.
- CONTRACTORS WILL BE USING EPA CERTIFIED DISINFECTANTS.
- THIS SERVICE IS ONLY AVAILABLE AT CHARLES REGIONAL MEDICAL CENTER.



PROCEDURES

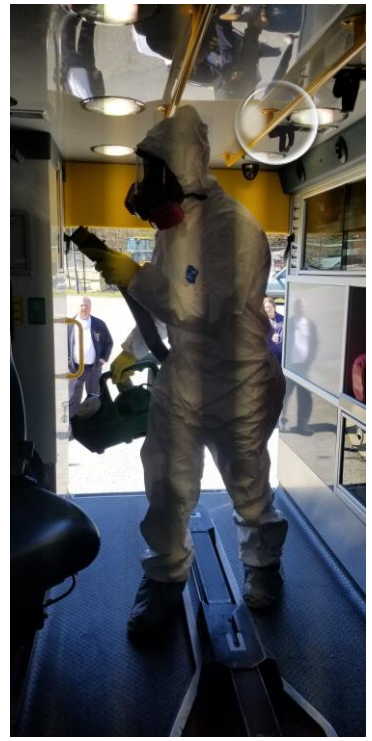
- AFTER TRANSPORTING THE PATIENT, LEAVE THE REAR DOORS OF THE TRANSPORT VEHICLE OPEN TO ALLOW FOR SUFFICIENT AIR EXCHANGE TO REMOVE POTENTIALLY INFECTIOUS PARTICLES.
- THE TIME TO COMPLETE THE PATIENT TRANSFER PROCESS TO THE RECEIVING FACILITY AND COMPLETE ALL DOCUMENTATION SHOULD PROVIDE SUFFICIENT AIR EXCHANGE.
- THE OPEN REAR DOORS WILL ALSO SIGNAL THE CONTRACTOR THAT THEY HAVE AN AMBULANCE THAT REQUIRES DISINFECTING.

PROCEDURES – CONT'D

- WITH THE AMBULANCE TURNED OFF AND WEARING THE PROPER LEVEL OF PPE:
  - PICK UP AND BAG ALL GROSS CONTAMINATION (TO INCLUDE BODILY FLUIDS), TRASH AND MEDICAL WASTE.
  - REMOVE ALL ITEMS FROM THE PATIENT COMPARTMENT YOU DO NOT WANT SANITIZED.
  - CLOSE ALL CABINETS AND MEDICAL BAGS THAT YOU DO NOT WANT SANITIZED.
  - MAKE SURE THE DRIVER'S COMPARTMENT IS ISOLATED FROM THE PATIENT COMPARTMENT.

PROCEDURES – CONT'D

- THE CONTRACTORS WILL SANITIZE THE REAR PATIENT COMPARTMENT USING A FOGGING PROCESS OF EPA CERTIFIED DISINFECTANTS.

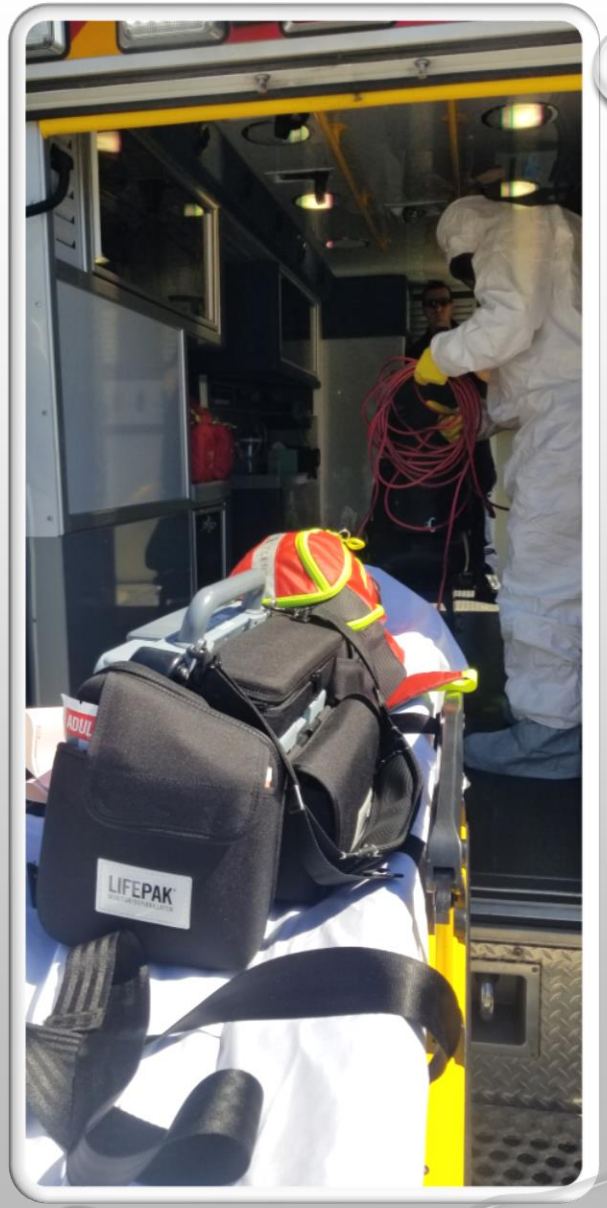


PROCEDURES – CONT'D

- THE SANITIZATION PROCESS SHOULD TAKE NO LONGER THEN 20 MINUTES TO COMPLETE FOLLOWED BY A MANUAL WIPE DOWN OF THE PATIENT COMPARTMENT.

PROCEDURES – CONT'D

- THE EMS CREW IS RESPONSIBLE FOR THE PROPER DECONTAMINATION OF THE STRETCHER, PORTABLE RADIO, ASSOCIATED PROFESSIONAL EQUIPMENT AND FRONT DRIVER'S CAB.



FAQ'S:

- WHEN WILL THIS START? THIS IS SOLELY DEPENDENT UPON YOU, THE CAREER AND VOLUNTEER EMS CLINICIANS. WE NEED TO MAKE SURE EVERYONE IS TRAINED AND ON-BOARD. PLEASE MAKE SURE YOU COMPLETE THIS TRAINING AND SPREAD THE WORD TO YOUR PEERS. WE ARE READY TO PULL THE TRIGGER NOW.
- HOW LONG WILL THIS LAST? THIS PROCESS WILL ONLY BE IN EFFECT WHILE THE COVID-19 PANDEMIC THREATENS THE HEALTH AND SAFETY OF OUR EMS CLINICIANS.
- WHO IS THIS FOR? THIS SERVICE IS AVAILABLE TO BOTH CAREER AND VOLUNTEER EMS CLINICIANS AS WELL AS OUR LOCAL JURISDICTIONAL RESPONSE PARTNERS.
- WHY? BECAUSE THE COUNTY WANTS TO PROTECT THE HEALTH AND WELL BEING OF OUR FRONTLINE FIRST RESPONDERS. WE WANT TO MAKE SURE YOUR FAMILIES ARE PROTECTED; THE COMMUNITY IS PROTECTED AND DO OUR PART TO PREVENT THE SPREAD OF THE COVID-19 VIRUS.
- WILL THE DISINFECTING CLEANER DAMAGE THE AMBULANCE? NO. THE SANITIZATION PROCESS MAY LEAVE A LOW SHEEN FILM ON HIGHLY POLISHED SURFACES.
    - THIS SHEEN IS EASILY REMOVED WITH A DAMP CLOTH.
- IS THE DISINFECTING CLEANER HARMFUL DANGEROUS? NO, YOU SHOULD HAVE NO DIRECT CONTACT WITH THE PRODUCT AFTER THE SANITIZATION PROCESS.
    - ALL PRODUCTS USED ARE EPA CERTIFIED

Intelligence Briefing 4-5-2020
COVID Charles County

Updated Infection Numbers: As of 1059 hrs.

Total worldwide: 1,225,360 +186,194,041 since the 4-4-20 brief.

Worldwide increase of confirmed cases by 24-hour period over the last 9 days

3-27/28	3-28/29	3-29/30	3-30/31	3-30/4-1	4-1/4-2	4-2/3	4-3/4	4-4/5
+59,541	126,150	56,378	68,578	76,079	79,559	73,920	100,041	186,194

Total fatalities worldwide: 66,560 +5,686 since the 4-4-20 brief

Total confirmed cases in the US: 66,560 +33,913 since the 4-4-20 brief

US increase of confirmed cases by 24-hours period over the last 9 days

3-27/28	3-28/29	3-29/30	3-30/31	3-31/4-1	4-1/4-2	4-2/3	4-3/4	4-4/5
18,853	19,898	18,769	41,111	24,215	27,174	28,383	32,922	33,913

Analysis note: While number continue to rise, positive tests being recorded today were sampled up to 10 days ago. In essence, the data we are recording today could be as much as 10 days old. This must be kept in mind as we determine the scope and magnitude of the today's situation.

Total fatalities in US: 8,503 +1340 since 4-4-2020 (Largest single day increase to date)

Maryland Numbers: As of 1000 hrs. via https://coronavirus.maryland.gov/

Total confirmed cases in State in of MD: 3,609 +484 since the 4-4-20 brief
Total tested in the State of MD: 24,728 +2,243 over 4-4-20
Percent of those test that test positive: 14.5%
Total Fatalities in State of MD: 67 +11 change since the 4-4-20 brief
Total Hospitalizations: 936 Increase of 115 from 4-4-2020

First Responder Numbers in Charles County:

12 Self-isolation: responder is sick or test positive. No change report to the Intel Unit
39 Quarantine: the responder has been exposed and they can't come to work. No change reported ot the Intel Unit

Weather:
Monday 67-51 Sun, Tuesday 73-55 storms, Wed 78-51 sun

Analysis note: Warm weather will likely mean more people outside, increasing the probability of gatherings. Rainy weather will drive people into their residences. The potential for increased calls for police service exists.

Local:

Several chain grocery stores were checked this am. Milk, eggs, produce, and meats were well stocked. Paper products and sanitizer are still at a premium. Lines and people waiting to enter stores is common place.

Social media reporting a worker at the Waldorf Giant has test positive.

Several banks were checked on. They DO NOT report any unusual demand for cash
DSS and Lifestyles shared information on the services they are providing during the closure (See attached)

Maryland Update:

State-wide moment of prayer on 4-5-2020 at noon
5 patients at Bowie Rehab Center test positive
PG County announces they have secured a hotel to quarantine county workers
Ocean City mayor reminds citizen the beaches and boardwalk are closed
Virus reported in 60 nursing homes in the state

Region:

Over 3,365 cases in the NCR as of 1000 4-4-2020
7,568 cases in Maryland, DC, and Virginia as of 1100 on 4-4-2020
32 DCFD members positive
DC fish market and wharf after numerous pictures are posted on social media of the crowds
Models indicate the DC area could become the next "hotspot"

National:

New York report deaths have dropped for the first time.
Walmart, Lowes, and Costco join Target in announcing they will be limiting the number of shoppers in their stores.
Analysist note: This will cause lines out of the stores, increase anxiety, and increase panic buying. The potential for unrest continues to increase.
CDC recommends the use of non-surgical masks for all citizens
shows symptoms. This research underscores that the best way to stop the spread of COVID-19 is through vigilant social distancing, including staying at home except for essential trips.

Local critical infrastructure:

No outages or disruptions are reported or are appear to be likely as of today.

Predications/ Analysis:

- As the confirmed case numbers continue to rapidly ascend the likelihood of jurisdictions issuing "travel bans" increases. Law enforcement should begin researching the constitutionality of these potential edicts and have plans in place for implantation and begin to develop a public communication strategy. Standardizing local "travel authorization documentation" should be explored by the lead jurisdiction having authority.
- Due to diverted attention, the international and domestic terrorism threat is rapidly increasing. Responders should be reminded to remain vigilant and of the DHS guidelines for spotting suspicion activities and terrorism indicators.
- As we enter into the reported peak of this situation communication, along with sharing of individual branch capability and capacity is more important now than ever. "We don't know what we are going to need to know until we need to know it."
- First responder organizations should begin surveying members for pre-existing conditions and other complicating medical conditions. Responders found to have pre-existing conditions should be placed in limited citizen contact roles.
- A review of the 179 countries that report COVID-19 cases, only two (South Korea and China) have somewhat "flattened the curve" of NEW infections. Both showed flattening roughly 30 to 45 days after the initial spikes. The initial spike in the US began around 3-18-2020.
- Reduced stability in the supply chain along with increased fear and anxiety can be expected with today's "stay at home order."
- After 3 weeks of social distancing and schools being closed non-english speaking communities within Charles County are likely feeling further isolated due to a lack of language specific communications. Direct and increased messaging to Spanish speakers is likely necessary.
- As mass transit continues to shrink in availability, plans should be made to ensure those who rely on it for essential supplies and trips have delivery resources.
- LE and EMS screening protocols should include questions about recent travel to NY, NJ, CT, and FL.
- Immediate attention is needed to direct companies and organization on the proper processes and appropriate contact to use (Donation Manager at the EOC) to donate PPE and cleaning materials to essential personnel
- The next 7 days will likely see a stabilization of a majority of the grocery supply chain. However, the potential for disruption moving forward continues to remain high.
- FOIA and PIA request from media and citizens groups will likely begin to increase the longer this event lasts. "New normal" processes need to be established as soon as possible.
- Lack of child care options will likely add to family stress. Additional resources, activity and options are needed.

- JIC staff should substantially amplify community resource communications
- As we enter the 2nd week of social distancing stress, anxiety, and fear will likely increase. Continuous reminders of patience and focusing on kindness will become increasingly important.
- Many stores restock overnight. Seniors and the vulnerable populations should be strongly encouraged to shop during the early morning hours when supplies are likely to be at their highest.
- As testing increased the confirmed cases in MD will increase. This will likely cause additional life restrictions.
- Supply chain issues will continue and likely increase as further life interruptions and travel restrictions are ordered. The possibility of violence increases as stress increases, especially at grocery stores.
- Commanders of responders and essential staff should have robust plans for potential quarantines and updated continuity of operations including plans for diminished manpower. Further, responder organizations should begin reviewing existing integration plans with the National Guard.
- Obtaining medical supplies and PPE will continue to be an issue for the foreseeable future. All services should use the command ordering process so orders can be tracked.
- The community of Charles County is showing increased signs of pulling together and assisting one another. The JIC should continue to encourage civility and increase positive press of good news stories occurring throughout our community.

Respectfully submitted by Jason Stoddard

Charles County Public Schools Briefing 4-5-2020
COVID Charles County

48-hour Priorities:

- Establishing instructional continuity
- Expanding and maintaining food service
- Maintaining tech support for digital learning
- Maintaining open communication with all stakeholders

Meals:

NO MEAL SERVICES SATURDAY OR SUNDAY.

Reminder that on 4/3/20 CCPS served 8901 meals to 2967 children at the 11 meal distribution sites. This total is up +2343 from 4/2/20. This overwhelming increase was due to parents picking up work packets for students to complete at home. We anticipate another day like this on Monday, 4/6/20, and have put measures in place to help relieve the traffic flow.

Closure:

School closure through at least 4-24-20.

Instruction:

Students are working online and with paper packet work for home instruction. This will continue for the foreseeable future.

Community Wifi:

Mt. Hope mobile WiFi is still down and is hope to be resolved early this week.

Misc:

We were notified that a former Southern Maryland Sabers hockey coach and current Chesapeake Lightening High School coach named Shannon Jackson committed suicide yesterday. The Chesapeake team is made up of Charles County and St. Mary's County high school students, and took the place of the former La Plata club. The team is comprised of a large number of La Plata HS students that played for him. CCPS staff is reaching out to those families in this time of crisis.

Respectfully submitted by Jason Stoddard and Michael Meiser

Charles County
Volunteer Firemen's Association, Inc.

Post Office Box #21, La Plata, Maryland 20646

April 5th, 2020

Re: Volunteer Fire/EMS Brief

Items Being Worked On:

- Reduction of Force Policy – *Information gathering occurring.*
- Station Health Screening Policy – *Draft Version under review.*

Stations/Apparatus:

- No Fire or EMS Stations with any contamination issues.
- No Apparatus with any contamination issues.
- No Service Deliverability Issues with Apparatus O.O.S.

Personnel (10 Members / 4 Stations):

- ~~Station 1 - 1 Member --- Due to possible work exposure. Effective March 30th~~ **COVID Test Negative.**
- Station 2 - 3 Members --- Due to Domestic Travel to New York. Effective March 25th (Quarantined.)
- ~~Station 7 - 2 Members --- In County EMS Call. 14 days ends April 4th. No Issues reported so far. (Quarantined.)~~ **14 Days Completed. No issues and personnel have returned.**
- Station 8 - 1 Member ---- Due to Family Member with Positive Test. Effective April 1st (Quarantined.)
- Station 11 - 4 Members --- 1-DC FF, 2- Due to Family Members being Quarantined, 1-DES/Hospital Employee, 1-Hospitalized at John Hopkins expected to be released today---Released from JH. COVID Negative Now.
- Station 12 - 2 Members --- In County EMS Call. Effective March 30th (Quarantined.)

Incidents/Call Volume:

- No Major Incidents to Report related to COVID-19
- Yesterday's EMS Call Volume was average, and Fire Call Volume was average.
  54 Ems Related Incidents ----- 13 Fire Related Incidents

Other Information:

- Personnel have been briefed on Ambulance Decon Procedure
- MWAA has restricted Employees from participating in Secondary Employment

Respectfully Submitted,

Mark A. Kaufmann, Jr
County Fire Chief
Charles County Maryland

Physical Address: 109 La Grange Avenue, La Plata, Maryland 20646
Administrative Services Office: 301-934-3581

Charles County
Volunteer Firemen's Association, Inc.

Post Office Box #21, La Plata, Maryland 20646

Physical Address: 109 La Grange Avenue, La Plata, Maryland 20646
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