July 2, 2020

Dear colleagues,

I am Dan Gerard and I currently serve as the Vice President of the International Association of Emergency Medical Services Chief's (IAEMSC), as well as an EMS coordinator for a city in northern California.

Emergency medical services, the systems they comprise and the communities they serve are frequently the canary in the coal mine and the tip of the spear, many times simultaneously. The true import of COVID 19 and the devastating impact it has had on the international EMS and healthcare community will not be understood until sometime from now. The simple fact is is that we will be dealing with COVID 19 patients and the sequela from being infected and recovering for the next several years. This curriculum/lesson plan was developed to facilitate the ability to begin building a body of knowledge relevant to COVID 19 and emergency medical services. In the future pandemics will require a rapid development of educational content, plans for response, and crisis standards of care. It is my hope this outline, and improvements and additions to its content, will serve as a model for future generations who will deal with the next pandemic. This is not a product of the IAEMSC or any other EMS organization, but it is a free-use document.

As a free-use document it means this curriculum, and its subsequent versions, are available for everyone to use, for example in initial education for EMT and paramedic programs, in continuing education programs, as an outline for webinars/online presentations, development of treatment plans/protocols, and operational response procedures as needed. This curriculum does not need to be presented in its entirety but may be used in continuing education programs for specific topic/subject matter content (for example cytokine storm for EMS providers or PPE for the emergency medical responder). Use what you need from this outline. If you require less detail for emergency medical responder versus a critical care paramedic for instance, please scale the content as appropriate to the audience who will receive it.

What it is not intended for is the development of educational programs where people will be charged a fee to attend a specific course relevant to COVID 19 where this curriculum is used as the foundation of the entire presentation, or the information herein contained in the curriculum is used in a revenue generating program (for example a COVID-Life Support course or something similar). The intent is not to generate revenue during a global pandemic but instead to develop the requisite body of knowledge required for EMS providers; promote the free-flow of information between providers in all sectors of the healthcare continuum; to facilitate the ability of EMS providers to protect their staff; improve operations; and advance patient care. During this time of unprecedented catastrophe it would be immoral and unethical for me to sell this curriculum. Like-wise as agencies large and small around the world struggle to provide care and respond to this pandemic it would be equally immoral and unethical for someone to develop a program and attempt to sell it to agencies struggling during this crisis.

The references for this curriculum were used to devise the outline. At this point in time they are not meant to be the compendium of knowledge relevant to COVID 19 and emergency medical services. Additional readings and texts should be used to supplement this outline. As the curriculum is further developed over a period of time additional references will be included and eventually those references for this plan will be included as a separate document. The body of knowledge is consistently changing so a literature review is imperative before any presentation. This curriculum will be updated as possible. In addition I am working on developing case studies from across the United States that I hope to be able to offer in short order. Please refer to the version/revision date. Use of this lesson plan/curriculum should include acknowledgment of the author, Daniel R. Gerard, MS, RN, NRP.

I want to say thank you to the following individuals for taking the time to review this curriculum and for taking my emails and phone calls. Their dedication and hard work to a grateful nation does not go unnoticed.

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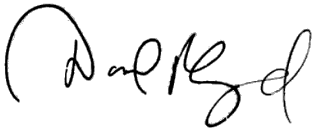
Deputy Chief / Paramedic (ret.) FDNY EMS

Finally to my brothers and sisters in emergency medical services. Please do not hesitate to reach out if you have questions about this curriculum. We have been faced with many challenges in our short history, but nothing comparable to this. I don't know when this will end but it will end. I know we are afraid. The future is uncertain. We are faced with overwhelming frustration, a sense of dread, whether it is related to work, or family, REMEMBER whatever it is: STOP. BREATH. BREATH AGAIN DEEPLY. REPEAT. That is your primary obligation. Be kind to one another. We will endure.



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EMS
Curriculum/Lesson Plan COVID 19

DATE(S):	CURRENT VERSION DATE: 7/1/2020	PREVIOUS VERSION DATES:
7/1/2020		

COURSE: COVID 19 Curriculum	TOPIC: COVID 19

AUTHOR: Daniel R. Gerard, MS, RN, NRP

SUBJECT AND LEARNING OBJECTIVES:

When presented with different scenarios the participants should successfully be able to:

- Identify patients who may are exhibiting signs and symptoms for COVID 19
- Understand pathophysiology of disease
- Describe modes of transmission of COVID 19
- Describe the social determinants of health that influence community spread
- Implement appropriate treatment strategies for EMS patients who had COVID
- Demonstrate correct use of PPE to reduce exposure to COVID 19 and other pathogens
- Identify patients who are in extremis from COVID 19
- Describe and demonstrate proning for EMS patients with COVID 19
- Identify and describe crisis standards of care

REFERENCES:

COVID-19 pathophysiology: A review. *Clinical immunology (Orlando, Fla.)*, Yuki, K., Fujiogi, M., & Koutsogiannaki, S. (2020). *215*, 108427. Advance online publication. https://doi.org/10.1016/j.clim.2020.108427

A Novel Coronavirus Overview for EMS, D. Gerard, https://www.emsworld.com/article/1223817/novel-coronavirus-overview-ems

PAHO COVID-19 Recommendations: Prehospital Emergency Medical Services (EMS) https://www.paho.org/en/documents/covid-19-recommendations-prehospital-emergency-medical-services-ems

WHO Clinical Management of the COVID 19 https://www.who.int/publications-detail/clinical-management-of-covid-19

NIH, Care of Critically Ill Patients with COVID-19, https://www.covid19treatmentguidelines.nih.gov/critical-care/

Surviving Sepsis Campaign: guidelines on the management of critically ill adults with Coronavirus Disease 2019 https://link.springer.com/article/10.1007/s00134-020-06022-5

COVID-19: The Clinical Presentation for EMS, D. Gerard. https://www.emsworld.com/article/1224466/covid-19-symptoms-presentation-EMS

Society of Critical Care Medicine Recommendations on the Treatment and Management of the COVID 19 Patient https://journals.lww.com/ccmjournal/Documents/Combined%20COVID-19%20Infographics.pdf

Recovery Trial University of Oxford https://www.recoverytrial.net/files/recovery_dexamethasone_statement_160620_v2final.pdf

Reducing transmission of SARS-CoV-2 https://science.sciencemag.org/content/early/2020/06/02/science.abc6197.1

Spotting the Clotting: Hypercoagulopathy in COVID-19 M. Estreicher, MD; T. Hranjec; P. Pepe https://www.emsworld.com/article/1224381/spotting-clotting-hypercoagulopathy-covid-19

Respiratory virus shedding in exhaled breath and efficacy of face masks, Leung, et al Nature Medicine, https://www.nature.com/articles/s41591-020-0843-2.pdf

Masks and Coronavirus Disease 2019 (COVID-19) , DeSai, Aranoff , JAMA https://jamanetwork.com/journals/jama/fullarticle/2764955?guestAccessKey=6c273154-918c-4839-9911-df4d7b49a62a&utm_source=silverchair&utm_campaign=jama_network&utm_content=weekly_highlights&utm_medium=email

Face Masks Against COVID-19: An Evidence Review, Howard; Huang, Fridmen, et al. (NOTE – Submitted for peer-review, as of yet not peer-reviewed) https://www.preprints.org/manuscript/202004.0203/v2

Aerosol Filtration Efficiency of Common Fabrics Used in Respiratory Cloth Masks. ACS Nano. Konda A, Prakash A, Moss GA, Schmoldt M, Grant GD, Guha S. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7185834/

Universal use of face masks for success against COVID-19: evidence and implications for prevention policies Susanna Esposito, Nicola Principi, Chi Chi Leung, and Giovanni Battista Migliori https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7191114/

A rapid systematic review of the efficacy of face masks and respirators against coronaviruses and other respiratory transmissible viruses for the community, healthcare workers and sick patients C. Raina MacIntyrea and Abrar Ahmad Chughta https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7191274/

University of New Mexico Project ECHO Clinical Grand Rounds https://echo.unm.edu/covid-19/sessions/hhs-aspr-clinical-rounds

COVID-19 in Racial and Ethnic Minority Groups https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/racial-ethnic-minorities.html

ASPR-Tracie Novel Coronavirus Resources https://asprtracie.hhs.gov/covid-19

Association of American Medical Colleges Coronavirus Clinical Resources Repository https://www.aamc.org/

National Emerging Special Pathogens Training and Education Center https://repository.netecweb.org/

Federal Healthcare Resilience Task Force EMS/Prehospital Team 1 April 16, 2020 Document Developed by the Healthcare Resilience Task Force Emergency Medical Services (EMS) Prehospital Team COVID-19: Considerations, Strategies, and Resources for Emergency Medical Services Crisis Standards of Care https://www.usfa.fema.gov/downloads/pdf/covid19/ems14_ems_crisis_standards_of_care.pdf

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EMS
Curriculum/Lesson Plan COVID 19

LESSON OUTLINE

1. **Overview**
    a. Wuhan District, Peoples Republic of China
        i. Started in wild animal food markets in the Wuhan district
        ii. First Reported in the media in December of 2019, may have occurred earlier
        iii. SARS like pneumonia of unknown cause
    b. Spillover from animal to animal to animal to human transmission
        i. Human to human
2. **Epidemiology (Update for every presentation)**
    a. Numbers under reported in China
        i. Rapidly spread worldwide – Italy
    b. First US Case January 21, 2020
        i. First US Death February 6
        ii. As of June 3, 2020 current death toll US 108,000 (4 months)
        iii. Total US Cases 1.87 million
        iv. NYS/NYC – cases 373,000 deaths 24,023
        v. NJ – cases 162,000 deaths 11,770
        vi. California – cases 117,000 deaths 4,286
            1. Los Angeles – cases 81,795 deaths 2,042
            2. Alameda County – cases 3,515 deaths 97
        vii. EMS
            1. 42 EMT's and paramedics dead in the US
            2. 23 dead in NJ alone
3. **Presentation of COVID 19**
    a. Pathophysiology of COVID 19
        i. Virology
            1. Invasion of host cells
            2. Disease progression
                a. Body systems
            3. Virus transmission
                a. Droplets
        ii. Range from mild symptoms to severe illness.
        iii. May appear 2-14 days after exposure to the virus.
            1. Cough
            2. Shortness of breath or difficulty breathing
            3. Fever
            4. Chills
            5. Muscle pain
            6. Sore throat
            7. New loss of taste or smell
            8. Other less common symptoms have been reported, (e.g. GI symptoms like N/V/D)
        iv. Infectious 2 – 7 days before symptoms appear
            1. Spread through person to person contact
                a. Primarily large/small droplets
                b. Coughing/Sneezing
                c. Speaking/talking
            2. Unsure if COVID 19 is airborne akin to measles/still to be determined
            3. May also spread via contact with surfaces, different thoughts on this
        v. 40% of patients spread COVID 19 without signs or symptoms
            1. Asymptomatic
            2. Pre-symptomatic – 2 – 5 day period before they show signs & symptoms
        vi. No vaccine to prevent COVID-19
            1. In hospital Treatment
        vii. The best way to prevent COVID is avoid being exposed
            1. Always assume COVID 19 is everywhere`
        viii. Patient distribution
            1. 80% of the patients have mild symptoms or may be asymptomatic.
                a. Absence of fever does not exclude viral infection from COVID 19
            2. Patients with more moderate signs and symptoms of COVID 19 account for approximately 14%
                a. They will present with pneumonia or signs of sepsis
            3. 5% of the COVID 19 patients are critical – ICU admits – may require ETI
                a. Present with severe ARDS (AKA CARDS)
                b. Septic shock
                c. Multi-organ system failure
                d. Patients with prolonged ICU/ETI/Ventilator support – 14 – 60 days

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4. Critical factors
    a. Genetics
        i. Genetics - Race
            1. Race has no influence on protection from COVID
            2. Race is not a factor in susceptibility to acquiring COVID
        ii. Genetics – still being studied to determine linkage
            1. Common variants
            2. Moderately rare variants
            3. Gene-environment interactions
            4. Some areas under study
                a. ABO blood group locus and a cluster of genes on human chromosome 3 are more common among COVID-19 patients with respiratory failure than in the general population
                b. Male vs Female – male XX chromosome may account for higher rates of infection/death for male versus female (2 to 1)
                c. Further study of susceptibility may be in human leukocyte antigens (HLAs)
                d. Clonal Hematopoiesis
    b. Prevalence
        1. Social determinants of health - higher prevalence of COVID 19 in areas of low socio-economic status
        2. Disproportionally higher rates of infection and death in Native American, African American, and Latino Communities
        3. Reasons
            a. Crowded living conditions
                i. Unable to maintain social distancing
            b. Inability to acquire masks/PPE
            c. Essential workers
                i. Inability to access healthcare
                ii. Reside in medical deserts
                iii. Medically indigent
                iv. Inadequate Workplace Protections
                v. Inadequate PPE – Masks
                vi. Unable to Social distance
                vii. Without proper paid sick leave workers are forced to work when they are sick in order to get paid

4. **Prevention of COVID 19**
    a. Key points regarding exposure
        i. Viral load
        ii. Time
        iii. Distance
    b. Wash your hands often
        i. Wash your hands often with soap and water for at least 20 seconds especially after you have been in a public place, or after blowing your nose, coughing, or sneezing.
        ii. If soap and water are not readily available, use a hand sanitizer that contains at least 60% alcohol. Cover all surfaces of your hands and rub them together until they feel dry.
        iii. Avoid touching your eyes, nose, and mouth with unwashed hands.
    c. MASKS
        i. Cover your mouth and nose with a cloth face cover when around others
        ii. Must wear an N95 for all patient encounters
        iii. Must wear a cloth face cover when you have to go out in public on non-EMS assignments
            1. The cloth face cover is meant to protect other people in case you are infected. It will also provide a measure of protection from others
        iv. Even when wearing mask continue to keep at least 6 ft social distance
        v. Cover coughs and sneezes, even with a mask on (use crook of arm or shoulder)
        vi. Immediately clean hands with soap and water or hand sanitizer with 60% alcohol after sneezing/coughing or after removal of mask.

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vii. Social distancing
1. Avoid close contact with people in general
2. Put distance between yourself & other people outside of your home.
3. Avoid close contact with people who are sick, even inside your home. If possible, maintain 6 feet between the person who is sick and other household members.
4. Stay at least 6 feet (about 2 arms' length) from other people.
5. Do not gather in groups.

d. Stay out of crowded places and avoid mass gatherings
e. Do masks and Social Distancing work?
i. Yes
1. N95 mask
a. Industrial N95
b. Medical/Surgical N95
2. Cloth masks
a. Efficiency/efficacy
3. Protection
a. Virus
b. Droplets
4. De Kai, et al, 80% of the US population wore masks COVID goes away
5. NYC vs Hong Kong
a. NYC 199,000 COVID positive cases, 22,000 dead
b. Hong Kong, same population density as NYC, 1,066 COVID positive cases, 4 deaths.
6. Taiwan, 441 COVID positive cases, 7 deaths
7. New Zealand, 1500 cases COVID cases, 21 deaths
a. New Zealand has not had a COVID case since April
b. Open for business as usual
8. Australia 7,227 COVID cases, only 102 deaths
f. Clean AND disinfect frequently touched surfaces daily.
i. Tables/Doorknobs/Light switches/Countertops/Handles/Desks/Phones/Keyboards/Toilets/faucets/sinks/Radios/Interior cab of apparatus and patient compartment/All patient care equipment
1. If surfaces are dirty, clean them
g. Assume COVID 19 is everywhere in every patient (asymptomatic/pre-symptomatic)

5. **EMS Operations for COVID Response**
a. Call Screening at Dispatch with pre-arrival information
i. Determine chief complaint/signs/symptoms
ii. Anyone sick with COVID or COVID symptoms
iii. Recent travel to an area of COVID outbreak (not as important since COVID is worldwide)
iv. Determine if patient can meet EMS at the door
b. On Scene
i. If patient meets you at the door
1. Meet patient in PPE
2. Apply mask to patient
ii. Don PPE prior to entry into house (mask, eye protection, gloves, gown)
1. Assess patient from 6 – 10 feet away
2. Place surgical mask on patient
3. Additional members don PPE to perform care/minimal number necessary to assist
iii. No pre-arrival information
1. One member dons PPE (mask, eye protection, gloves, gown)
a. Assess patient from 6 – 10 feet away
b. Place surgical mask on patient
c. Additional members don PPE to perform care/minimal number necessary to assist
d. Places surgical mask immediately on patient
iv. When there is adequate PPE and conversation strategies do not need to be employed regardless of call type/complaint every EMS provider dons N95 mask for every patient encounter
v. When there is adequate supply of surgical masks and conversation strategies do not need to be employed regardless of call type or patient complaint place a surgical mask immediately on every patient (asymptomatic and pre-symptomatic patients are our greatest danger)
vi. Limit aerosol generating procedures
1. Use supraglottic airways instead of ETI
2. Use breath activated nebulizers – better than small volume nebulizers
3. Use HEPA filters for BVMS/CPAP where applicable

6. **EMS Transport**
a. Transport patients with low SpO2 < 94, who are conscious and can maintain airway, in either a prone position or a modified prone position (left or right lateral recumbent position)
b. In ambulance open all windows and use air conditioner and exhaust vent – do not recirculate air in ambulance

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c. Isolate rear compartment from cab
d. Do not transport family with patient
e. Notify ED of suspected or confirmed COVID
f. On arrival at ED follow direction for triage – do they have screening or treatment of COVID 19 patients inside the facility or outside in tents
g. Is the emergency department separated into COVID and NON-COVID sections
h. Decon unit and equipment when call complete

7. **PPE**
   a. Donning PPE
      i. Put on PPE prior to patient contact
      ii. Sequence for donning PPE
         1. Mask
         2. Eye Protection
         3. Gown
         4. Gloves
      iii. Only Remove PPE once call is complete or crew has left patient area
   b. Doffing PPE - Be careful not to contaminate yourself taking it off
      1. Remove gloves - Wash hands for 20 seconds
      2. Remove gown - Wash hands for 20 seconds
      3. Remove eye protection - Wash hands for 20 seconds
      4. Remove mask - Wash hands for 20 seconds
8. **Hand Washing is Vital**
   a. Single most effective way to prevent the spread of disease
      i. Soap & water for at least 20 seconds or with the waterless alcohol based hand cleaner
   b. After ALL patient contact, even if you wore gloves AND WASH HANDS IMMEDIATELY AFTER REMOVAL OF GLOVES
9. **Equipment Decontamination**
   a. At the BEGINNING of your shift YOU should decontaminate/wipe down ALL patient care equipment
   b. After completing a response to an infectious patient or PUI:
10. **4 Step Process for Decon**
   a. Step 1: Remove all visible solid or liquid material
   b. Step 2: Decontaminate
   c. Step 3: Clean off excess/air dry.
   d. Step 4: Dispose of used cleaning materials
11. **Post-Exposure Follow-up**
   a. Self-Quarantine
      i. Protocol
         1. Pulse oximetry
         2. Temperature Screening
12. **Operational and Clinical Oversight**
   a. Emerging new infectious disease pathogen
      i. Consultation with an infectious disease specialist
         1. Review EMS clinical treatment protocols
         2. EMS & Emergency department consult/resource
         3. Oversight of PPE utilization (proper usage, identifying patients, etc.)
         4. Post exposure occupational treatment referral
13. **Clinical Course of COVID 19**
   a. The patient with more moderate to severe COVID 19 symptoms
      i. Pneumonia
         1. Instead of being localized to a single lung, it is more diffuse found in all of the lobes of the lungs.
   b. Leakage of fluid from the capillaries (alveolar and respiratory membranes), akin to ARDS, causes fluid to leak into the alveolar sacs, leading to shunting and VQ mismatch
   c. Steroids in COVID 19
      i. Timing of administration is important
      ii. Response to treatment may be related to classes of steroid
         1. Studies on which works best are ongoing
      iii. Optimal dosage for steroids still a moving target
      iv. Dexamethasone – reduced mortality in 2 subsets of COVID 19 patients
         1. Intubated patients
         2. Patients admitted to the hospital receiving supplemental oxygen
         3. No benefit demonstrated for patients who did not require ETI or oxygen
      v. Methylprednisone - Society of Critical Care Medicine (SCCM) – refer to current guidance:
         1. Recommended for use in certain COVID patients
            a. SCCM - COVID Patients Without ARDS not recommended
            b. SCCM - COVID Patients With ARDS recommended
         2. May increase the time frame patients shed virus
         3. Methylprednisone has demonstrated efficacy in ARDS patients who are intubated, it

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may play a role in COVID but it may be related to when it is initiated and dosing.
4. Studies on treatment of COVID patients are still on-going

vi. Currently no indications for use in the prehospital care environment, but this may change once we better understand optimal dose, timing, and best class of steroid
1. Other factors include transport time

d. Generally symptomatic patients who have been exposed to coronavirus will begin to develop symptoms in the 3- 5 day time range
i. Severe signs and symptoms will begin to progress at the 10 day mark

e. Patients with severe presentations do not appear tachypneic, but they are hypoxic
i. Thick secretions that are difficult to mobilize

f. May initially present as patients who have had mild symptoms and have stayed home, with increasing severity who have now decided to call for help.

g. What makes COVID unique
i. Clinical course may take hours to days to progress to extremis
ii. Anyone who has an SPO2 below 92-94% is getting ready to decompensate.
iii. Tachypnea is a premorbid sign and it may be too late for them
iv. Patient with mild symptoms may appear to have clear lung sounds
1. Pay attention you may hear fine rales in the bases
2. First sign of progression even though patient, awake, alert, oriented, but not tachypneic
v. Later on - Lung sounds a horrible mix of course rales and diffuse rhonchi.
vi. Pulse Ox readings in the 80's, 70,s, and 60's, the patient may have good mentation
vii. When we do see tachypnea it is a critical clinical sign. Early tachypnea is significant because it may be the first signs of complete failure, the need for intubation, or it may be the preceding sign of a patient going into cardiac arrest.
1. It is hypoxic decompensation, significant because of the growing dead space and shunting that has gone on.
viii. Patients who rapidly progress
1. Increased infiltrates in their lungs
2. Gas exchange is impossible/difficult for them to breath
3. Transition from a nasal cannula to a non-rebreather mask to increase FiO2
ix. Dangers of CPAP
1. Operational - Aersolized virus increases chances of infecting EMS
2. Clinical - Alveoli cannot tolerate the higher pressures and leakage of fluid is accelerated
a. Emory University demonstrated that prehospital CPAP/BiPAP patients have poor outcomes
b. Society of Critical Care Medicine clinical guideline recommendation - short trial of CPAP/BiPAP terminate quickly if the patient does not show signs of immediate improvement
x. Cytokine Storm
1. First what is a cytokine?
a. Cytokines are a large group of proteins, peptides or glycoproteins that are secreted by specific cells of immune system. They play a critical role in the immune response. Cytokines are a category of signaling molecules that mediate and regulate immunity, inflammation and hematopoiesis.
2. What is a cytokine storm?
a. Cytokines play an important role in normal immune responses having a large amount of them released in the body all at once can be harmful
b. It causes a severe immune reaction (hyper-inflammation) in which the body releases too many cytokines into the blood too quickly
c. Sometimes a cytokine storm may be so severe or life threatening it will lead to multiple organ failure
3. How do we recognize cytokine storm in the field for EMS
a. May appear as sepsis –
i. If you see it in a COVID patient or suspected COVID patient THINK cytokine storm
1. Hypoxia
2. Hypotension
3. Fever
xi. <u>COVID 19 Clotting and Coagulopathy</u>
1. <u>COVID 19 > Risk for Clotting/Embolic emergencies</u>
a. <u>Prevalence for development in the COVID patient</u>
i. <u>Pathophysiology</u>
1. <u>Markers</u>
2. <u>Presentation</u>
b. <u>Signs & Symptoms of CVA in the atypical patient (e.g. 28 year old without a history, normally healthy)</u>
c. <u>Confusion or altered mental status of unspecific etiology</u>

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d. Signs & Symptoms Pulmonary embolism
   i. *Shortness of breath that may occur suddenly*
   ii. *Sudden, sharp chest pain that may become worse with deep breathing or coughing*
   iii. *Rapid heart rate*
   iv. *Rapid breathing*
   v. *Sweating*
   vi. *Anxiety*
   vii. *Coughing up blood or pink, foamy mucus*
   viii. *Fainting*
e. Extremity complaints
   i. *Lose of pulses with or without associated pain*
   ii. *Discoloration, or loss of motor/sensory function*
f. Strange rashes, hematomas, petechiae, & purpura (bruiselike findings fingertips & toes)
g. Reddened conjunctiva
h. Erythematous skin blotches
i. Strawberry-colored tongue appearance in children

14. **Clinical Treatment of COVID 19**
    a. Managed symptomatically – Think VIP (Ventilation/Infusion/Pressors)
    b. Clinical bundle for EMS
       i. Maintain airway and oxygenation - increase SpO2
          1. High flow oxygen
          2. Nebulized medications
             a. Should be used cautiously due to risk of provider exposure/infection
                i. If used wear all PPE (N95 mask or >, gown, gloves, face shield and eye protection)
                ii. Use breath activated nebulizers to reduce amount of aerosol generated droplets
                iii. Open windows, use exhaust fan, turn on AC unit do not recirculate air in cab. Isolate drivers compartment
          3. Airway management/Ventilation
       ii. IV fluid bolus to maintain BP
          1. Monitor success
             a. Change in mental status
             b. Resolution of shortness of breath at rest
             c. Improvement in hypotension from baseline
          2. REMEMBER - Too much fluid too fast will exacerbate the leakage in the alveoli – remember that the alveolar and respiratory membranes are fragile and subject to failure
       iii. If fluids are not working - Push dose pressors or IV drip pressors as per protocol (nor-epi, epi, vasopressin. As per SCCM do not use dopamine)
       iv. Monitor/treat bleeding/clotting disorders – pulmonary emboli/CVA/etc.
       v. Pre-hospital prone patient to improve oxygenation
          1. Proning
             a. If patient will tolerate it place patient prone or on left lateral recumbent or right lateral recumbent
                i. Works by improving respiratory recruitment by taking advantage of the larger surface area of the posterior lungs. This improves V/Q matching, reduces atelectasis, resulting in improved pulmonary gas exchange
                ii. Perform in conscious patients who you do not have to provide airway support

15. **Crisis Standards of Care**
    a. Definitions
       i. Conventional – day to day routines, strategies, and resources (e.g., dispatch of supplementary units, mutual aid, adding additional units/shift, modifying schedule e.g. from 8 hours to 10/12/16 hour staff shift)
       ii. Contingency - uncommon strategies and resources that incur a small risk to patients such as staffing ambulances with less personnel or a lower level of response delayed or single agency response (sending an ambulance without a first responder unit for lower acuity calls)
       iii. Crisis - disaster strategies used when demand forces choices that pose a significant risk to patients but is the best that can be offered under the circumstances (e.g., recommending self-transport, refusing transport, modifying clinical care, e.g. not instituting CPAP/BiPAP or nebulized medication, using an SGA vs ETI, etc.
    b. Surge Capacity
    c. 9-1-1 Dispatch

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i. Referral to telehealth

d. EMS Response
   i. First Responder
   ii. BLS
   iii. ALS

e. Transport
   i. Destinations
      1. Overload/maximum surge
         a. Field hospitals
         b. Batched transport
         c. Transport to alternative destinations
         d. Transport by alternative means
         e. EMS provider initiated refusal of service/refusal of transport

f. Manpower
   i. Determine minimum staffing
   ii. Reconfigure Change staffing configuration – from 2 paramedics to one EMT and one paramedic or staff ambulance with one paramedic and use firefighter or police officer to drive EMS unit
   iii. Mutual Aid
      1. Local
      2. State
      3. Regional
      4. Federal
      5. Well-being
         a. Mental health
         b. Relief
         c. Nutrition
         d. Recreation
         e. Interventions/Follow-up

g. Supplies
   i. Supply chain
      1. Alternatives
         a. PPE
         b. Suppliers
   ii. Par levels
   iii. PPE
      1. Burn rate
      2. Mask
         a. Mask Plan
            i. Reuse
            ii. Extended Use
            iii. Decon
               1. Battelle/Similar systems
                  a. Gas
               2. Heat
                  a. Convection
                  b. Steam
                  c. UV
               3. Limitations/cautions
            iv. Substitutions
      3. Gowns
         a. Substitutions
      4. Gloves
         a. Substitutions
      5. Eye protection/face shield
         a. Substitutions

h. Clinical Care and Treatment Standards
   i. Modifications in clinical protocols
   ii. New procedures/protocols
   iii. EMS Operations

i. Medications
   i. Substitutes
      1. Change in clinical protocols

j. Algorithms
   i. Indications - a predictor of a possible event (e.g., a report of several cases of unusual respiratory illness) that requires gathering of additional information or analysis to decide if a “trigger point” has been reached to take action.
   ii. Triggers
      1. Scripted - typically designed into SOPs and are automatic if/then decisions. Useful for

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front line personnel so can take immediately to prevent delay.
2. Non-Scripted – may be challenging to implement. They require additional analysis and consideration involving management and supervisory staff. Implemented as part of the incident action planning cycle.
3. The EMS system should determine what strategies or options it may employ in a disaster and then decide on indicators that might be available and a trigger point for staff to take tactical action.

k. Agency Policy
   i. Application to resources
      1. Staff
      2. Ambulances
      3. Equipment and supplies
   ii. Policy and procedure options across the surge capacity spectrum from conventional to crisis care
      1. Determine limitations and options
         a. Then determine indicator and trigger thresholds

l. Medical Direction
   i. Subject Matter Expert
      1. Triage strategies
      2. Treat/Release
         a. Telehealth
      3. Refusal of transport
      4. Medical interventions
      5. Post exposure advice/direction
   ii. Liaison between other providers
      1. Physicians
      2. Hospitals
      3. LTC
      4. EMS regulatory agency
   iii. Integration/Inter-operability Regional/State
      1. Challenges
      2. Opportunities for innovation

16. **Summary**

ASSIGNMENT

INSTRUCTIONAL AIDS, MATERIALS, OR TOOLS NEEDED: Powerpoint enabled laptop, LCD projector

NOTES

The references for this curriculum were used to devise the outline. They are not meant to be the compendium of knowledge relevant to COVID 19 and emergency medical services. Additional readings and texts should be used to supplement this outline. The body of knowledge is consistently changing so a literature review is imperative before presentation. This curriculum will be updated as possible. Please look at the version/revision date.

Use of this lesson plan/curriculum must include acknowledgment of the author, Dan Gerard, MS, RN, NRP

Please contact the author directly for clarification.

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