



***NWC EMSS Continuing  
Education  
April 2015***

# ***COPD / Asthma VS Heart Failure***

## **Objectives:**

1. Propose and defend a comprehensive assessment plan for the patient with a CC/S&S of respiratory distress in accordance w/ assessment standards in the 2014 NWC EMSS SOP's
2. Identify essential components of the SAMPLE history for the patient experiencing CC/S&S of respiratory distress
3. Explain pathophysiology of asthma, focusing on immune system response
4. Summarize the three major clinical manifestations of asthma
5. Distinguish the exam findings that qualify an asthma attack as mild-mod from those that signal a severe attack
6. Identify warning signs of a potentially fatal asthma attack
7. Sequence and support rationale for EMS interventions for a patient experiencing an asthma attack
8. Describe the characteristics of a chronic respiratory disease
9. Contrast pathophysiology of emphysema and chronic bronchitis
10. Outline assessment findings for a patient with a chronic respiratory disease
11. Sequence and support rationale for EMS interventions for a patient experiencing exacerbation of COPD
12. Categorize actions, dose, indications, side effects, and contraindications for NTG, albuterol, ipratropium, epinephrine, and magnesium
13. Distinguish exam findings exhibited by the patient experiencing heart failure
14. Sequence and support rationale for EMS interventions for the patient experiencing heart failure, cardiogenic shock
15. Summarize the physiologic action and indications for, and defend the benefit of, CPAP for patients with heart failure
16. Group assessment findings in to those distinguishing each of COPD, asthma, and heart failure from each other
17. Discuss correct preparation and implementation of the CPAP device
18. Interpret capnography waveform morphology and numeric data to select interventions for the pt w/ resp distress
19. Defend use of capnography monitoring for all patients with resp distress as a CC/presenting sign/symptom

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Please note: Full resources for this module may be found on [www.nwcemss.org](http://www.nwcemss.org), under Continuing Education, April 2015. Information in this document adapted from the following sources. They include:

- NWC EMS System Paramedic Education Program: COPD
- NWC EMS System Paramedic Education Program: Asthma
- NWC EMS System Paramedic Education Program: HF

### Class Credit Activity

2 hours of didactic credit may be earned as an option for a missed class. Refer to the ePCR's in the class handout, 2014 NWC EMSS SOP's, and to the following information presented in live CE classes, to answer the questions following this content. Submit the original answers document to your HEMSC/nurse coordinator/educator by May 30, 2015. It is suggested that you make a copy for your records.

### Notes from COPD/Asthma vs Heart Failure CE Classes

**Assessment:** All respiratory problems can be categorized as impacting at least one of oxygenation, ventilation, diffusion, and or perfusion. Assessment of the patient w/ resp distress should include:

- LOC: Indicator of perfusion (brain must have constant supply of oxygen). Mental status S&S of hypoxia: anxiety/restlessness, confusion/disorientation
- Breath sounds: priority assessment for pt w/ resp distress!!!
  - Note amount/quality of air movement
  - Wheezes: audible w/o stethoscope? May not be reliable indicator of asthma severity!
  - Silent chest (and NO WHEEZES) = NO AIR MOVEMENT. OMINOUS SIGN!
  - Onset of wheezes after interventions, when there were none before, is GOOD! (there is now air movement!)
  - Lung sounds occur on a continuum. Diminished/decreased breath sounds are **not** the same as clear breath sounds. The pt may or may not have abnormal sounds (crackles, wheezes), and still be diminished. A decrease in the "volume" of breath sounds indicates reduction in the amount of air moving in and out of the lungs. Thus, inhaled bronchodilators will likely not be effective.

Clear →	Crackles, Wheezes →	Diminished/Decreased →	Absent
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- Position: sitting up, leaning forward/tripod position, inability to lie down - all findings of significant resp distress.
- WOB:
  - Degree of distress: have them rate 0-10; provide your *objective* description of degree of distress also.
  - Chest wall movement: symmetry; shallow vs deep
  - Gen rate (fast, slow); ETCO2 monitor is great for this – accurate and objective!
  - Beware fatigue!!! Implies impending resp failure!!!
- Accessory muscles, retractions
- Speech: ability to speak full sentences (4-5 words) vs word clusters (1-2 words) or less. 1-2 or less = severe SOB.
- Color - skin, lips, mucous membranes

- SpO<sub>2</sub>:
  - Consider factors affecting readings - ↑ RR will ↑ SpO<sub>2</sub> – may mask hypoxia
  - ≤ 91% predictor of poor outcomes
  - Room air SpO<sub>2</sub> if possible – provides indication of response to subsequent interventions
  - Know normal acceptable ranges (Gen Asmt SOP): ≥ 94%; COPD norm/target ≥ 92%
- Capnography: created as byproduct of cellular metabolism/respiration. Determined by 3 processes:
  - Metabolism: cellular “waste”
  - Perfusion: adequate blood flow to transport CO<sub>2</sub> from the cells to alveoli
  - Ventilation: removal of CO<sub>2</sub> @ alveoli via breathing

Interpretation of the significance of ETCO<sub>2</sub> readings requires consideration of all 3! Must look at all 3 processes – not just breathing – to determine significance and relevance of ETCO<sub>2</sub> readings. For example, if numbers are low, we must assess the pt’s breathing (airway, gen rate, WOB, lung sounds, chest movement, SpO<sub>2</sub>, etc) as well as their perfusion (skin, pulses, ECG, BP, etc) and consider the possibility of any conditions that might decrease their metabolism (hypothermia) and contribute to low readings.

  - Sharkfin waveform is created by anything that creates obstruction to air leaving the lungs. Thus, it is not strictly a reflection of bronchoconstriction. For example, the pt w/ AMS may have obstructed ventilations/sharkfin waveform simply due to airway position. The pt w/ foreign body aspiration might well present w/ sharkfin waveform as well. Note that in the challenging pt w/ both HF and either COPD or asthma, if the pt has *BOTH* occurring, HF can be present in the presence of sharkfin wave form!
  - Capnography can help you do or determine the following:
    - Help confirm/discriminate between dx of COPD, asthma, HF
    - Severity of COPD/asthma
    - Effect of interventions: as the pt gets better, low numbers rise closer to norm, and or high numbers fall closer to norm
    - Accurate, real time resp rate: how often do you COUNT for 30-60 sec? How often have you just “eye-balled” the pt and thought they looked pretty normal? We’re not as good as we think.....
    - Appropriateness of assisted ventilation rate, depth
    - **TRENDING** ETCO<sub>2</sub> values: Quantitative (numeric) ETCO<sub>2</sub> reading should be obtained w/ VS and SpO<sub>2</sub>, prior to interventions, when possible. A **series** of numbers tells much more than just one reading! Values should be noted w/ each reassessment & VS, & following each intervention.

**SAMPLE AND PMH:** Information obtained from these can provide you w/ many important clues to what’s going on w/ your pt and how you might best treat him or her! Consider in particular:

- Allergies: if +, consider asthma (think hyper-responsiveness & inflammation!)
- Meds: request a list or actually see them! How often have you been told “no medical problems” only to find meds or a med list telling you otherwise? Know your meds! If you know what they are used for, you have a clue to what might be causing the pt’s S&S. (There are many new meds on the market! Consider investing in a med guide or an app for your phone.) Are they taking them as directed? Any recent changes? Time of last dose?
- What have they taken for *this* episode, & did it help? If multiple nebs prior to calling EMS yielded no relief, do not anticipate that they will respond differently to yours. Consider more aggressive interventions.
- PMH: While not absolute, PMH may reveal risk factors for COPD, asthma, or HF. Smoking is a risk factor for **both** COPD & heart failure. Allergies frequently serve as asthma triggers. HTN, diabetes, cardiac hx, drug abuse, valve

problems all put patients at risk for HF. Psycho/social/economic hx may be associated w/ non-compliance and limited access to care.

**History of present illness:** Ask about the following:

- What's normal? What's different today?
- Onset: time, duration, rapidity: especially for asthmatics – rapid onset may herald a potentially severe attack.
- Trigger or event: what were you doing before this started? Is there something you think caused the event?
- Recurrence: how long since your last episode? Frequent/close episodes may indicate poor control and or risk for exacerbation.
- Prior episodes: Any hx of intubation, hospital admission, stays in ICU related to the resp condition?
- Severity: have the pt rate it, as with chest pain, 0-10/10. Compare ratings before and after interventions.
- Cough: if present, is it productive? COPD is usually thick whitish; consider infectious process if mucus is yellow, green, etc; pts w/ HF often produce frothy sputum that may be pink-tinged.
- Impact on activity and speech: difficulty walking < 100 ft, speech less than 1 word or only syllables, both indicate severe distress.
- What have you done/taken/used for this event? Has it helped?
- Associated symptoms

**The high risk asthma patient:** Following are findings that place a patient at risk for a particularly severe or fatal asthma attack. Be prepared to act aggressively and quickly.

ETCO <sub>2</sub> ≥ 40	ED visit w/in last 24-48 hrs
AMS	Multiple hosp admissions w/in a year
Speaks < 3 syllables	Previous near – fatal attack
Markedly diminished or absent lung sounds	Asthma – related ETI, seizure, resp failure
Central cyanosis	Chronic steroid use or recent w/drawl
Exhaustion or fatigue	Psychiatric or psychosocial problems
VS: HR > 120 or < 60, RR > 40	Age > 55
Cannot lie flat	

**Heart Failure:** Results from heart's inability to pump sufficient blood to meet the body's metabolic needs. Risk factors for HF include MI, diabetes, HTN, smoking (yes!) and valve problems. The body compensates by ↑ heart rate and vasoconstricting. While these may be helpful for a short time, these mechanisms are actually harmful as they

- ↑ demand for myocardial O<sub>2</sub>

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- Decrease ventricular filling time ( ↓ cardiac output)
- Shorten time for coronary artery filling (→ inability to meet ↑ myocardial O2 demand)
- ↑ LV workload against constricted arteries

As a result of these mechanisms, commonly noted assessment findings will include ↑ **HR**, ↑ **BP**, ↓ **SpO2**, and S&S and hypoperfusion. Because HF often shares S&S w/ asthma and COPD, it is essential to do a thorough exam that includes assessments that point to HF as a likely etiology. Along w/ PMH that poses risk for HF, some findings common to HF that are not likely to be associated w/ COPD and asthma include:

- Crackles
- JVD
- Pedal edema

Note that wheezes frequently occur in HF, though not for the same physiological reason as w/ COPD and asthma. Because of the high pressure in the pulmonary vasculature in the lung tissue, fluid is forced out of the vessels in to the interstitial spaces of the lung tissue (not the airways). The tissue edema surrounding the smaller airways actually compresses and narrows them. Thus, wheezing can be heard as air makes its way through these narrowed passages (as it does in the narrowed airways of the constricted airways of pts w/ asthma or COPD). If wheezes are present in the pt w/ HF, it is likely that the softer sounds of crackles will be obscured and not detected by the examiner.

**Refer to PCR for 85/M for the following questions.**

1. Look at this pt's PMH, meds and assessment findings. Which condition is the pt most likely at risk for?

\_\_\_\_\_

2. Support your answer to #1 with 3 pieces of information from PMH, meds, and any assessments made on this pt.

(1) \_\_\_\_\_

(2) \_\_\_\_\_

(3) \_\_\_\_\_

3. List 3 interventions indicated for this pt according to SOP.

(1) \_\_\_\_\_

(2) \_\_\_\_\_

(3) \_\_\_\_\_

**Refer to PCR for 24/F for the following questions.**

4. According to the Asthma SOP, list 8 assessment findings that would indicate to the paramedic that the pt is in severe distress and should be treated according to the guidelines under "Severe distress".

(1) \_\_\_\_\_

(2) \_\_\_\_\_

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(3) \_\_\_\_\_

(6) \_\_\_\_\_

(4) \_\_\_\_\_

(7) \_\_\_\_\_

(5) \_\_\_\_\_

(8) \_\_\_\_\_

5. Circle 4 assessment findings **above** that place this pt at the severe level of distress.

6. List the Hx/assessment finding that indicate this pt may be at risk for a fatal asthma attack.

\_\_\_\_\_

7. List the first two interventions that were indicated for this pt.

(1) \_\_\_\_\_

(2) \_\_\_\_\_

**Refer to PCR for 43/F for the following questions.**

8. List 3 assessment findings for this pt that indicate she is in “severe” distress according to SOP.

(1) \_\_\_\_\_

(2) \_\_\_\_\_

(3) \_\_\_\_\_

9. Explain how the change in breath sounds assessed at 12:37 and 12:47 demonstrate improvement.

\_\_\_\_\_

10. List 2 findings that indicate that this pt is at risk for a potentially severe /fatal asthma attack.

(1) \_\_\_\_\_

(2) \_\_\_\_\_

11. List 3 reassessments documented in the PCR that demonstrate patient improvement following treatment.

(1) \_\_\_\_\_

(2) \_\_\_\_\_

(3) \_\_\_\_\_

**Refer to PCR for 81/M for the following questions.**

12. Determine what condition (HF, COPD, or asthma) this pt is at risk for.

\_\_\_\_\_

13. List 3 assessment and SAMPLE hx findings that support your answer to question 11.

(1) \_\_\_\_\_

(2) \_\_\_\_\_

(3) \_\_\_\_\_

14. List three interventions indicated for this pt.

(1) \_\_\_\_\_

(2) \_\_\_\_\_

(3) \_\_\_\_\_



**Refer to the PCR for the 93/F for the following questions.**

15. List 3 assessment findings that indicate severe respiratory distress.

(1) \_\_\_\_\_

(2) \_\_\_\_\_

(3) \_\_\_\_\_

16. This pt was treated according to the Heart Failure SOP. List 3 assessments or PMH/SAMPLE hx findings that support this primary impression.

(1) \_\_\_\_\_

(2) \_\_\_\_\_

(3) \_\_\_\_\_

17. Should NTG have been withheld from this patient? Support your answer according to HF SOP.

\_\_\_\_\_

18. List 3 assessment findings for this patient indicative of a positive response to interventions.

(1) \_\_\_\_\_

(2) \_\_\_\_\_

(3) \_\_\_\_\_

19. What is causing this pt's BP to be elevated initially?

\_\_\_\_\_

20. If, due to severe anxiety, the patient was unable to tolerate CPAP in spite of EMS' coaching and reassurance, what option is available to EMS to assist the pt to relax and possibly tolerate the CPAP?

\_\_\_\_\_

**Refer to PCR for 29/M for the following questions.**

21. According to the narrative, why would albuterol/ipratropium neb via BVM likely have been ineffective?

\_\_\_\_\_

22. According to the SOP Drug Appendix, how does Epi given IM help relieve resp distress in pts w/ asthma?

\_\_\_\_\_

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23. Why was CPAP not indicated for this pt?

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24. Consult the possible indications for DAI according to the DAI SOP. According to the narrative, which intervention was attempted and failed, prompting EMS to attempt an advanced airway?

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**Refer to PCR for 88/F for the following questions.**

25. What condition is this pt likely experiencing? Circle one. COPD      Asthma      HF

26. List 2 assessments (VS, Hx, meds, exam findings etc) that support your answer to # 24.

(1) \_\_\_\_\_

(2) \_\_\_\_\_

27. List 3 interventions that should have been provided to this pt that were not.

(1) \_\_\_\_\_

(2) \_\_\_\_\_

(3) \_\_\_\_\_

**Refer to PCR for 82/F for the following questions.**

28. Read the “**Airway/Oxygen**” guidelines in the IMC portion of the Asthma/COPD SOP. What observation in the report narrative alerts EMS to the possibility that this pt might possibly be a candidate for advanced airway or ventilatory assistance?

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29. This pt has hx of COPD/emphysema, HTN, and HF. All assessments documented are found in both HF and COPD, except the capnography waveform (sharkfin). Which condition do you think is occurring? (Circle one)

COPD

Heart Failure

30. Per SOP, what assessment findings indicate that the COPD pt is a candidate for Albuterol/Ipratropium neb?

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31. At 00:30, which intervention should have been provided to this pt?

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32. Per SOP, what assessment findings indicate that the COPD pt is a candidate for CPAP? List all that apply.

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33. List 2 findings in this pt's PCR that indicate she is a candidate for the intervention in #31.

(1) \_\_\_\_\_

(2) \_\_\_\_\_

34. Which would you expect this pt's capnography readings to be if ETCO<sub>2</sub> readings had been assessed? (Circle one)

Elevated

Normal

Low

**Refer to PCR for 38/F for the following questions.**

35. Take note of this pt's PMH and meds. What might EMS anticipate w/ regards to the pt's disease management?

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36. List 2 assessment findings that indicate this pt's asthma severity level as "severe".

(1) \_\_\_\_\_

(2) \_\_\_\_\_

37. Medication administration started at 0341. Per SOP, what should have been the FIRST med administered?

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38. What other initial intervention was indicated but not provided?

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39. What does this pt's capnography reading of "55" @ 0348, followed by a "44" @ 0410 indicate to EMS?

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40. List 4 other assessment findings that indicate improvement w/ interventions.

(1) \_\_\_\_\_

(2) \_\_\_\_\_

(3) \_\_\_\_\_

(4) \_\_\_\_\_