Medical Preambles

The following general principles should be practiced while operating within parish of Jackson. These principles serve as a reference to be used in conjunction with each disease-specific protocol to the basics of prehospital medicine, utilizing the skills of assessment and treatment appropriate for their level of training. Medical Control should be considered a resource for consultation when mandated and as needed.

- As scene safety and scene conditions allow, a *primary* survey, routine medical care, and initial treatment should be completed **prior to moving the patient to the ambulance.** The performance of the *secondary* survey should not delay transport in critical patients.

- High-visibility, retro-reflective apparel should be worn when deemed appropriate (e.g. operations at night, in darkness, in large crowds, on or near roadways)

- Appropriate personal protective equipment (PPE) should be always worn by EMS providers during patient care.

I. UNIVERSAL CARE

- All patients should have vital signs assessed upon patient contact or as soon as reasonably possible. JPASD recognizes vital signs as:
    - blood pressure (+ capillary refill in children)
    - heart rate
    - respiratory rate
    - SpO_2
    - GCS or AVPU (**Al**ert, **V**erbal, **P**ainful, **U**nresponsive)
    - pain scale
    - temperature (where indicated)

- At least two full sets of vital signs should be documented for every patient. Ideally, one set should be taken shortly before arrival at the receiving facility. Critical patients should have pertinent vital signs monitored more frequently.
- Abnormal vital signs should be addressed and reassessed.
- Response to therapy provided should be documented, including pain scale reassessment if appropriate.
- Upon administration of any medication, patients should ideally have IV access, cardiac monitoring, and pulse oximetry measurement with O_2 as indicated.
- Following administration of medications via IV/IO access, providers should flush the line with saline fluid bolus. Give 20ml of NS following medication given during cardiac arrest; give a 10ml NS flush following IV/IO medication administered at all other times.
- When medication, including a fluid bolus, are not required, or anticipated saline locks may be used at the paramedic's/AEMT's discretion.

Patient Assessment

PQRST History

- **O** Onset of symptoms
- **P** Provocation (location of symptom; any exacerbating or alleviating factors)
- **Q** Quality of pain (sharp, dull, stabbing, pressure, etc)
- **R** Radiation of pain (is it localized in one area or does it spread)
- **S** Severity of symptoms (pain scale)
- **T** Time of onset of symptoms and circumstances around onset

SAMPLE History

- **S** Signs and symptoms including pain
- **A** Allergies
- **M** Medications prescribed and medications taken prior to arrival
- **P** Past medical history
- **L** Last oral intake/Last known well
- **E** Events leading to injury or illness {Mechanism of Injury, (MOI)}

Signs and Symptoms should support the provider impressions, treatment guidelines and overall care given.

- A symptom is something the patient experiences and tells the provider; it is subjective.
- A sign is something the provider sees; it is objective.

Symptoms should not be confused with provider impressions. The provider impressions are the EMS working field diagnosis of the patient's actual medical condition. Provider impressions should be supported by symptoms but not be the symptoms except on rare occasions where they may be the same (e.g. weakness when no etiology for the weakness can be determined by the EMS provider).

In accessing pain severity, the provider should first attempt to obtain a reported value between 1-10 directly from the patient. If the patient is unable to provide a value for any reason, Wong-Baker Faces Pain Rating Scale can be utilized.

Wong-Baker FACES Pain Rating Scale[2]

Providers should be sensitive to, and respectful of, how different cultures perceive and express pain.

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[2] Hockenberry MJ, Wilson D, Winkelstein ML. *Wong's Essentials of Pediatric Nursing*, (7th ed), St. Louis, 2005, p. 1259. Used with permission. Copyright, Mosby.

Documentation & Patient Care Reports

Documentation should occur for all EMS events where a patient was encountered, and one or more clinical guidelines were used to determine patient treatment and/or disposition. The use of a narrative is essential to a complete patient care record and provides an efficient means to share patient information for continuity of care between prehospital and hospital staff.

A copy of the pre-hospital patient care report – paper or electronic – MUST be made available to the receiving emergency department.

Know your audience. Like every call, every report is unique. The disposition of the patient can help you convey why and how you provided care. Remembering the **BIG Five**[3] can help.

"BIG Five" of Patient Transports:

1) Write for Doctors, Nurses, and Allied Professionals
2) Organize as if the patient will become unconscious and unable to provide any information to staff after hand off.
3) Assume that the person reading your report knows nothing about anything that happened before the patient arrived in the ED.
4) Make sure the reader knows WHEN you did what you did.
5) Presume nothing and leave nothing [relevant] to the imagination.

"BIG Five" of Death in the Field:

1) Write for medical examiners, homicide detectives, and criminal justice attorneys.
2) Organize as if you expect to see the report projected onto a giant screen in a courtroom.
3) Assume that the person reading your report knows nothing about anything that happened while you were on the scene.
4) Make sure the reader knows WHY you didn't treat or transport.
5) Presume nothing and leave nothing [relevant] to the imagination.

"BIG Five" of patients not transported:

1) Write for the Attorney who may sue you over this call.
2) Organize as if you expect to see the report projected onto a giant screen in a courtroom — because it will be.
3) Assume that the person reading your report knows nothing about anything that happened while you were on the scene.
4) Make the reader understand WHY you didn't treat or transport.
5) Presume nothing and leave nothing [relevant] to the imagination.

If it is not documented, it did not happen. Every pertinent finding, every negative finding, every action taken, exists only if documented properly.

[3] https://www.ems1.com/ems-products/consulting-management-and-legal-services/articles/1056598-How-to-avoid-documentation- disasters/

[4] www.ada.gov/regs2010/service_animal_qa.html

Medical Care During Pandemics

During periods of pandemic (e.g. SARS-COV-2, COVID-19) the following protocols should be followed as endorsed by the Centers for Disease Control and Prevention[1]

- **EMS personnel working in areas with moderate to substantial community transmission** are more likely to encounter asymptomatic or pre-symptomatic patients with SARS-CoV-2 infection. If SARS-CoV-2 infection is not suspected in a patient (based on symptom and exposure history), EMS personnel should follow Standard Precautions (and Transmission-Based Precautions if required based on the suspected diagnosis). They should also:
    - Wear eye protection in addition to their facemask to ensure the eyes, nose, and mouth are all protected from splashes and sprays of infectious material from others.
    - Wear an N95 or equivalent or higher-level respirator, instead of a facemask, for aerosol generating procedures.
- **For EMS personnel working in areas with minimal to no community transmission,** the universal eye protection and respirator recommendations described for areas with moderate to substantial community transmission are optional. However, EMS personnel should continue to adhere to Standard and Transmission-Based Precautions, including use of eye protection and/or an N95 or equivalent or higher-level respirator based on anticipated exposures and suspected or confirmed diagnoses.
- Universal use of a facemask for source control is recommended for EMS personnel. EMS personnel should always wear a facemask while they are in service, including in breakrooms or other spaces where they might encounter co-workers.
    - When available, facemasks are preferred over cloth face coverings for EMS personnel as facemasks offer both source control and protection for the wearer against exposure to splashes and sprays of infectious material from others.
    - Cloth face coverings should NOT be worn instead of a respirator or facemask if more than source control is needed.
- To reduce the number of times EMS personnel must touch their face and potential risk for self-contamination, EMS personnel should consider continuing to wear the same respirator or facemask (extended use) throughout their entire work shift, instead of intermittently switching back to their cloth face covering.
- Respirators with an exhalation valve are not recommended for source control, as they allow unfiltered exhaled breath to escape.
- EMS personnel should remove their respirator or facemask, perform hand hygiene, and put on their cloth face covering when leaving at the end of their shift.

[1] https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-for-ems.html

Aerosol-Generating Procedures

EMS personnel should exercise caution if an aerosol-generating procedure (AGP) is necessary. When possible, EMS personnel should consult with **Medical Control** before performing aerosol-generating procedures for specific guidance.

- An N95 or equivalent or higher-level respirator such as disposable filtering facepiece respirators, PAPR, or elastomeric respirator instead of a facemask, should be used in addition to the other PPE by all personnel present while performing aerosol-generating procedures.
- Bag valve masks (BVMs), and other ventilatory equipment, should be equipped with HEPA filtration to filter expired air.
- If possible, the rear doors of the transport vehicle should be opened, and the HVAC system should be activated during AGPs. This should be done away from pedestrian traffic.
- If possible, discontinue AGPs prior to entering the destination facility or communicate with receiving personnel that AGPs are being implemented.
- If possible, providers present for the procedure should be limited to a minimum, to avoid unnecessary exposure to additional personnel.

- Providers should limit others riding in the ambulance while the patient is transported to the healthcare facility to only those essential for the patient's physical or emotional well-being or care (e.g. care partner, parent, etc).

- Patients and family members should wear their own cloth face covering (if tolerated) prior to the arrival of EMS personnel and throughout duration of the encounter, including during transport. If they do not have a face covering, they should be offered a facemask or cloth face covering, as supplies allow.

  - Facemasks and cloth face coverings should not be placed on young children under age 2, anyone who has trouble breathing, or anyone who is unconscious, incapacitated or otherwise unable to remove the mask without assistance.
  - If a nasal cannula is used, a facemask should (ideally) be worn over the cannula.

II. FUNCTIONAL NEEDS OF PATIENTS

The way in which care is provided may need to be modified to accommodate the specific needs of patients with functional limitations or communication barriers. Medical care should not intentionally be diminished and/or underperformed during the triage, treatment, and transport of these patients without sound clinical rationale.

Communication Barriers

Providers should utilize tools to overcome language barriers when caring for patients with fluency in a different language than their own. Having telephone and/or video accessible service with live language interpreters is ideal. Other tools include electronic applications such as Google Translate and written communication. Providers should utilize and be mindful of the patient's use of non-verbal communication (e.g. eye blinking, nodding).

Providers should make every effort to obtain primary information about a patient's complaint and symptoms directly from the patients. However, providers may utilize family members of the patient to obtain secondary information or pertinent data. Transport of a family member who is fluent in the patient's language can also have a calming influence on some patients and is encouraged. However, provider should be weary of intentional false/edited translation by on scene translators, especially in situations where abuse or neglect of patient is

suspected. Notation of non-verbal communication from patients is invaluable in these situations.

American Sign Language is a language and serves as the primary language of many persons within the United States who are deaf or hard of hearing. If providers are unfamiliar with ASL, written communication should be utilized.

Physical Barriers

Providers should look for a patient's adjunct assist devices and identify their physical needs by speaking with the patient, family, or bystanders. Providers should also look for medical alert bracelets or medical documents. Assistance adjuncts include but are not limited to:

(a) Extremity protheses
(b) Hearing aids
(c) Magnifiers
(d) Tracheostomy speaking valves.
(e) Wheelchair or scooters

Providers should document the patient's functional need and the avenue exercised to support the patient, if applicable, how that need was managed. Providers should make every effort to transport any adjunct devices that facilities the activities of daily living for the patient.

Bariatric patients should be asked if they need assistance with ambulation in the same manner as other people with medical conditions limiting their mobility.

Service Animals

Service animals are not classified as pets. Service animals are not required to wear a vest or a leash. EMS providers may ask the patient (1) if their service animal is required because of a disability and (2) what work or task the animal has been trained to perform. It is illegal to ask for special identification or documentation from the service animal's partner. Animals that solely provide emotional support, comfort, or companionship do not qualify as service animals.

By law service animals should always be permitted to accompany the patient with the following exception:
A public entity may ask an individual with a disability to remove a service animal from the premise if (a) the animal is not housebroken or (b) the animal is out of control and the animal's handler does not take effective action to control it.

Service animals must be allowed anywhere in a hospital that the public and patients may go. If a patient is unable to care for their service animal while in the hospital, the patient can arrange for a family member or friend to come to the hospital to provide these services or to keep the dog during the hospitalization.

It is preferable that a service animal and its handler are not separated. If space in the ambulance is crowded and the animal's presence would interfere with the ability to treat the patients, providers should make other arrangements to have the service animal transported to the hospital.[4] If the patient is incapacitated and cannot personally care for the service animal, a decision to transport the animal can be made at the provider's discretion. EMS providers are not responsible for the care of the service animal.

III. **ABUSE AND MALTREATMENT**

EMTs and paramedics are mandated reporters of abuse. Abuse and maltreatment can happen to patients of all ages. Human trafficking is also considered a form of abuse. Any provider who has cause to believe that an individual's physical or mental health or welfare is endangered because of abuse or neglect should report it. Reporting serves as a request for investigation, not accusation. Mandated reporters are given immunity from legal liability for reports made in good faith.

Patients may be unwilling or unable to disclose abuse or maltreatment, so the responsibility falls on EMS personnel to assess the situation, document appropriately, and take appropriate action to secure a safe place for the patient. EMS providers should not take it upon themselves to investigate, interview, or intervene – these actions should be left for the appropriate law enforcement personnel.

Remember these patients have been recently traumatized with control over their life and/or bodies lost to the perpetrator. Though scene safety and treating potential life threats still takes priority, when interacting with this patient, it is important to reinforce that they are safe with you. Reinforcing that they have control over their bodies again by taking extra care to clearly explain all procedures and assessments you would like to perform and obtaining expressed verbal consent before performing them will empower the patient and set them up for success for the care and potential investigation that will follow transfer of patient care.

SANE Services for Sexual Abuse

In cases involving sexual assault patients have the right to have a Forensic Medical Exam (FME) performed by trained Sexual Assault Nurse Examiner (SANE Nurse). Per LSA R.S. 40:1216.1, no hospital or healthcare provider (including EMS) shall directly bill a victim of a sexually oriented criminal offense for any healthcare services rendered in conducting a forensic medical examination as provided for in R.S. 15:622.

The FME can still be performed if the assailant is unknown. FME can be performed regardless of the amount time that has passed since the assault, but evidence will only be collected up to 96 hours after assault for patients 12+ and 72 hours after for patients 11 and younger. A patient does not have to report the assault to law enforcement to receive services and may refuse any part of the exam. Patients 18+ have the option to report to law enforcement anonymously. The patient has 1 year from the day the evidence is collected to report before the evidence is discarded. The FME includes:

(1) Patient advocate who is only there to guide patient through the process and establish a long-term case worker for legal, financial, social assistance, mental health services.

(2) Forensic evidence collection including photography of injuries and specimen collection.

(3) HIV/STI testing and preventative medication

(4) Clothing and toiletries if needed.

(5) Referrals for follow up care.

(6) Development of a safety plan including emergency housing if it is needed.

If you respond to a call for sexual assault that has recently occurred AND the patient has expressed interest in receiving an FME the provider should recommend avoiding the following activities for the preservation of evidence. The patient should be made aware of these recommendations, with the choice to follow them ultimately being their choice:

(1) Bathing/showering

(2) Using the restroom

(3) Changing clothes

(4) Combing hair

(5) Brushing teeth

(6) Cleaning the area

Any soiled linen or clothing involved in the assault should be transported with patient in a brown paper bag. This includes any clothing removed by EMS. Debris found on linen can be utilized as evidence. For this reason, care should be taken to avoid unnecessary handling or movement of linen before placing it in a bag.

Human Trafficking:

Human trafficking is also considered a form of abuse. Human trafficking is the forcing or cohesion of an individual to provide services/labor against their will. Human Sex Trafficking is when those forced services/labor include sexual acts. Trafficking is often perpetrated by someone the victim knows and trusts such as family members, friends, and romantic partners. Keep in mind U.S. Trafficking Victims Protection Act of 2000 (TVPA) states that "any commercial sex act if the person is under 18 years of age, regardless of whether any form of coercion is involved, is defined as human trafficking". Look for warning signs such as:

(1) Show signs of mental/physical abuse.

(2) Appear to be coached on what to say regarding events leading to medical complaints.

(3) Show signs of being denied food, water, medical care by specified caretaker.

(4) Appears to have unstable living conditions where they have limited control over personal decision making, and/or lack personal possessions.

(5) Juvenile engaged in sex work.

(6) Patients are vague about their relationship with who they live with.

(7) Patient has timid, fearful, or submissive interactions with person they live with or is present with them on provider arrival.

(8) Patient has a controlling parent, guardian, romantic partner, or "sponsor" who will not allow patient

to be assessed alone or without input from them.

(9) Patient is from out of town with no specific explanation of how or why they came to the region.

Not all victims will disclose their situation due to fear, or lack of trust with the provider. It is not the provider's job to investigate. If you suspect a patient may be trafficked, transportation to SANE capable facility if possible and disclose concerns to receiving facility on arrival.

Each EMS agency should maintain a policy for how to report abuse or maltreatment. However, the following general principles apply when managing scenes and/or caring for a patient where abuse or neglect is suspected:

(10) Consider scene safety, as always. Survey the scene for factors that could adversely affect the patient's welfare. Providers should not confront suspected perpetrators as this may create an unsafe situation for EMS and for the patient. Providers should consider seeking assistance from law enforcement officers early.

(11) Address life-threatening issues and transport the patient even if no medical indication is present. EMS providers should not force child transport. If the suspected perpetrator is present and interferes with transportation of the patient or is influencing the patient's acceptance of medical care, law enforcement should be involved as soon as possible, and Medical Control should be consulted as needed for guidance.

(12) Thoroughly document the child's history and physical exam findings. Providers should document objective findings and use quotes to reference patient or family statements. Providers should not make accusations or opinions in their patient care reports.

(13) If SANE services are indicated/requested for suspected/reported sexual assault, ensure your hospital destination has those services available. LERN can be contacted for guidance.

(14) Upon arrival at the ED, notify the receiving nurse or physician of the suspected maltreatment. Most hospitals have a protocol in place that will anonymize patient names to prevent perpetrators from locating patients. Collection of names from patients of anyone they fear may try to locate them can be added to triage as a fail-safe.

(15) This notification and handoff does not relieve a provider of their responsibility to report. Any mandated reporter who knowingly and willingly fails to report may be fined, imprisoned, or both.

The Department of Child and Family Services investigates child abuse and neglect and provides services for children and their families. Call **1-855-4LA-KIDS** (**1-855-452-5437)** 277/365 to report concerns for child abuse or neglect. All hotlines have trained operators to receive reports, however if an operator is not available, a voicemail system is available. By law, all reports made orally by mandated reporters must be followed by a written report to DCFS within five days. This can be done online at https://mr.dcfs.la.gov/c/MR_PortalApp.app

Adult Protective Services is responsible for investigating reports and arranging for services to protect vulnerable adults age 18-59 and emancipated minors who are at risk of abuse, neglect exploitation or extortion. Reports of adult abuse may be made to **1-800-898-4910**.

Elderly Protective Services protects people who are 60 or older from physical or emotional abuse as well as neglect by caregivers. The law also protects seniors from self-neglects and from other people misusing or stealing their money. Reports of elder abuse may be made to **1-833-577-6532** or **225-342-0144.**

CHILD ABUSE RECOGNITION AND REPORTING

Definition: Child abuse is the physical and mental injury, sexual abuse, negligent treatment, or maltreatment of a child under the age of 18 by a person who is responsible for the child's welfare. The first step in helping abused or neglected children is learning to recognize the signs of child abuse and neglect. The presence of a single sign does not prove child abuse is occurring in a family; however, when these signs appear repeatedly or in combination you should take a closer look at the situation and consider the possibility of child abuse.

Purpose:
Assessment of child abuse case based upon the following principles:

Protect the life of the child from harm, as well as the EMS team from liability.

Suspect that the child may be a victim of abuse, especially if the illness/injury is not consistent with the reported history.

Respect the privacy of the child and family.

Collect as much evidence as possible, especially information.

Procedure:
With all children, assess for and document psychological characteristics of abuse, including excessive passivity, compliant or fearful behavior, excessive aggression, violent tendencies, excessive crying, fussy behavior, hyperactivity, or other behavior disorders.

With all children, assess for and document physical signs of abuse, including especially and injuries that are inconsistent with the reported mechanism of injury. The back, buttocks, genitals, and face are common sites for abusive injuries.

With all children, assess for and document signs and symptoms of neglect, including inappropriate level clothing for weather, inadequate hygiene, absence of attentive caregiver(s), or physical signs of malnutrition.

With all children, assess for and document signs of sexual abuse, including torn, stained or bloody under clothing, unexplained injuries, pregnancy, or sexually transmitted diseases.

Reporting:
Immediately report any suspicious findings to the receiving hospital (if transported) and/or Medical Control. EMS should not accuse or challenge the suspected abuser. This is a legal requirement to report, not an accusation.

If you suspect a child is being neglected and/or abused, you must report your suspicions to the Department of Children and Family Services Child Protective Hotline at 1-855-452-5437 (24 hours a day).

Complete a Department of Children and Family Services/Child Welfare Written Report Form for Mandated Reporters of Child Abuse/Neglect within 5 days of making the initial oral report. Forms can be downloaded from www.dcfs.la.gov

IV. ADDITIONAL MEDICAL PEARLS

Reactive Airway and Pulmonary Edema

Prehospital differentiation between severe Reactive Airway Disease (RAD) and Pulmonary Edema can be difficult. Particularly when only auscultation is used to differentiate between cardiac wheeze and pulmonary wheeze in patients with decreased lung sounds. In patients presenting with respiratory distress, auscultation of lung sounds alone is not sufficient for a field diagnosis of RAD over cardiac pulmonary edema. Blood pressure, pitting edema, skin condition and ETCO2 waveform should be considered, equal weight to lung sounds in these cases. If a patient is hypertensive with systolic over 180 mmHg, clammy or diaphoretic, has noted pitting edema, and/or their ETCO2 waveform is not shark fin, the provider should be highly suspicious of a cardiac nature of presentation and follow the pulmonary edema protocol over RAD protocol. Early CPAP should be utilized in either case, particularly with a patient who has been intubated in the past.

Patients may become intolerant of the CPAP due to anxiety. Often this anxiety stems from a combination of hypoxia and the unfamiliarity of the patient with the CPAP. An explanation of the CPAP device and supplemental O2 should be provided while setting up equipment to help prepare the patient. If anxiety persists every effort should be made by the provider to verbally calm the patient followed by utilization of a benzodiazepine if needed.

Providers should also be checking for decreased or absent lung sliding indicative of developing or present pneumothorax.

In cases of severe respiratory distress caused by bronchospasm in RAD in patients >60 years old with a cardiac history the risks and benefits of 1:1000 IM Epinephrine should be weighed. However, the management of a patient's airway remains the main priority in these cases. Similarly, use of magnesium sulfate in patients with a history of renal failure should be done with caution and constant reassessment and monitoring. If there is any uncertainty that the risk of either of these medications may not outweigh the benefits, contact Medical Control for guidance.

Difficult Airway Management[5,6]

A difficult airway is one in which the EMS provider identifies potential attributes of the patient that would make it difficult to utilize a bag-valve mask (BVM), insert a supraglottic airway (SGA), perform laryngoscopy, and/or perform a surgical airway. Providers should prepare for alternative airway management and minimize risks of further patient decompensation when difficult airway is identified.

Numerous algorithms exist to support providers in difficult airway management. MOANS (Mask seal, Obesity/obstruction, Age 55, No teeth, Stiff lungs) and LEMON (Look externally, Evaluate the 3-3-2 rule, Mallampati, Obstruction, Neck mobility) are both commonly referenced.

Quick assessment in the prehospital setting limits the utility of several mnemonics; however, the 4 D Concept is easy to remember:

The Four Ds of Difficult Laryngoscopy (footnote):

Dentition – prominent upper incisors, receding chin
Distortion – edema, blood, vomit, tumor, infection.
Disproportion – large tongue, small mouth, bull neck, short chin to larynx distance
Dysmobility – TMJ, cervical spine collar

All intubations should be considered potential difficult airways. Providers should routinely have alternative airway management tools prepared prior to attempting endotracheal intubation. All members of the team should be aware of the contingency plan(s). Tools/techniques for difficult airways management in the prehospital setting include:

- Two-person bag mask ventilation
- Oropharyngeal and nasopharyngeal airways
- Alternative laryngoscope blade
- Video laryngoscopy
- Awake nasotracheal intubation
- ETT introducer (e.g. gum elastic bougie)
- Supraglottic airway device (e.g. iGel)

Insertion of a Supraglottic Airway Device is a skill EMTs and Advanced EMTs can perform. All EMTs must be trained and prove competency on the insertion of supraglottic airway devices.

Preoxygenation & Apneic Oxygenation[7]

Preoxygenation should be attempted prior to initiating management of the difficult airway to delay the onset of desaturation while apneic. Supplemental oxygen may be delivered via nasal cannula, facemask, CPAP, or BVM (with PEEP valve). Preoxygenation via nasal cannula best serves as an adjunct in addition to using a facemask or BVM; the provider must ensure that the cannula does not interfere with maintaining an effective seal while using the other device.

It is sometimes difficult to achieve effective preoxygenation in the prehospital setting due to factors such as patient agitation or lack of manpower to maintain an effective mask seal; however, providers should make every effort to provide at least 30 seconds of preoxygenation. Use of sedatives (ex. benzodiazepine) to assist the uncooperative patient in whom intubation is anticipated can facilitate preoxygenation.

The ideal length of time for preoxygenation is 3-4 minutes; however, allowing the patient to take eight maximal breaths over 60 seconds allows for more rapid preoxygenation when necessary. If inadequate respiratory drive is present, providers can assist patient breaths via BVM. Providers should remember that there is an inherent lag time with pulse oximetry (SpO_2). In critically ill patients this may be > 90 seconds. If there is no improvement in SpO_2 after 3-4 minutes, it is reasonable to proceed with intubation; there is no proven benefit to extending the preoxygenation period beyond 4 minutes. _____

[5] Walls RM. The emergency airway algorithms. In: Walls RM, Murphy MF, editors. Manual of Emergency Airway Management. 4th. Philadelphia: Lippincott Williams and Wilkins; 2012.

[6] https://litfl.com/difficult-airway-algorithms/

[7] https://litfl.com/preoxygenation/

Apneic oxygenation is generally considered an adjunct to be used during rapid sequence intubation (i.e. with a paralytic). Giving supplemental oxygen at 15 lpm via nasal cannula during ETT insertion helps to maintain an adequate SpO_2 while the tube is secured and connected to an oxygen source. Apneic oxygenation is likely to mostly benefit patients with difficult airways, but it should be considered for all intubations. Apneic oxygenation does not diminish the need for effective preoxygenation.

Sepsis

Sepsis is a life-threatening organ dysfunction caused by a dysregulated host response to infection and should be treated as a "life threatening condition that arises when the body's response to an infection injures its own tissues and organs. Early recognition and aggressive treatment is vital for these patients. Certain co-morbidities are at higher risk for development of sepsis including but not limited to:

- Immunocompromised
- Developmental Delay
- Cancer patients
- Permanent/Semi-permanent Catheters (PICC lines, Foley catheters, etc.)
- Sickle Cell Patients
- Bedridden/immobilized
- Recent surgery
- IV drug users

If patient has an obvious or suspected infection **PLUS two or more** of the following signs and symptoms a Sepsis Alert should be called to the receiving ED:

- Respiratory Rate > 20/minute
- Heart Rate > 100/minute
- Altered Mental Status from baseline
- Temp > 100.4 F or < 96.0 F

Lactated Ringers and O2 as needed is the indicated with any sepsis patient. However, if patient systolic blood pressure is <90 mmHg or MAP is <65 patient should be considered in Septic Shock.

Septic shock is caused by peripheral anterior lat vasodilation, which results in low systemic vascular resistance, high cardiac output, severe hypotension, and inadequate tissue perfusion. As such it should be treated with aggressive fluid resuscitation using a pressure bag and vasopressors.

Fluid overload/pulmonary edema should always be considered, especially in patients with a history of CHF, renal failure, and dialysis. To avoid this complication, administer 500mL of fluid and reassess with focus on lung sounds and any signs of respiratory distress.

The vasopressor of choice for septic shock is norepinephrine (Levophed) to be given as a drip. Administration of 1:100,000 Epinephrine (Push Dose epinephrine) while drip is prepared is recommended.

Stroke

Stroke symptoms may vary and include but are not limited to:

- Severe, unexplained headache
- Dizziness or vertigo
- Visual loss
- Communication deficit
- Facial or limb numbness or weakness
- Lack of coordination or disruption of gait

Treatment with mechanical thrombectomy is considered standard of care for patients with proximal large vessel occlusion (LVO). Early diagnosis and transport to an endovascular treatment facility is vital for better neurologic outcomes. The Cincinnati Prehospital Stroke Scale[8] (CPSS) is a quick tool that can be used for stroke recognition upon EMS arrival. If any of the following three signs is abnormal, the probability of a stroke is 72%.

Facial Droop – have patients show their teeth or smile.

- *Normal*: both sides of face move equally
- *Abnormal*: one side of the face does not move at all

Arm Drift – have patients close their eyes and hold both arms out straight for 10 sec

- *Normal*: both arms move equally, or both do not move at all
- *Abnormal*: one arm does not move, or one arm drifts down compared with the other

Speech – have patients say "you can't teach an old dog new tricks"

- *Normal*: patient uses correct words with no slurring
- *Abnormal*: patient slurs words, uses the wrong words, or is unable to speak

Time[9] – time last seen normal (LSN) within 24 hours. If the patient is unable to provide a history, LSN is the time last seen in a normal state as reported by a bystander. Patients with "wake up strokes" should be presumed to have a time of LSN < 24hours.

[8] Kothari, R.; Hall, K.; Brott, T.; Broderick, J. (1997-10-01). "Early stroke recognition: developing an out-of-hospital NIH Stroke Scale". Academic Emergency Medicine. **4** (10): 986–990

The CPSS is quick but fails to measure cortical signs such as aphasia and neglect commonly seen with large vessel occlusions, thus it must be followed by utilization of the Vision, Aphasia, Neglect (VAN) scale whenever a stroke is suspected.

A patient is considered VAN positive when they display upper arm weakness plus one or more of the following:

Visual Field Disturbance – new onset blindness, double vision, field cut

Aphasia – inability to speak, paraphasia errors (use of wrong word such as identifying a pen as a watch), inability to understand or follow commands (do not count slurring of words)

Neglect – forced gaze, inability to track to one side, ignoring one side, inability to identify their own arm, inability to field both sides at the same time.

The above screening tools combined – FAST-VAN – provide a high level of predictably for identifying LVO occlusions that may benefit from mechanical thrombectomy. The JPASD Stroke Protocol outlines how an EMS provider should choose a hospital destination based on the patient's presenting symptoms and the transport time to each facility. Traffic delays should be considered when factoring in the time of transport.

Hospital notification is a priority treatment when new onset focal neurological symptoms are present.

**Consider contacting LERN for every stroke activation even when destination has already been chosen/requested by the patient/family.

Stroke Center Levels/Designations[10]

The Joint Commission, American Heart Association, and American Stroke Association developed program requirements for hospital certification as a stroke center. Louisiana Emergency Response Network (LERN) follows these requirements and recognizes the following categorization of stroke facilities:

- Stroke Bypass Hospital (**Bypass**, formerly known as LERN Level 4): These facilities lack the capability to provide the standard of care for acute stroke. Transfer protocols are in place for transfer to higher levels of care with a written and agreed upon relationship with more acute hospitals.

- Acute Stroke Ready Hospital (**ASRH**, formerly known as LERN Level 3): Facilities in this category have the following capabilities:
    - A CT scan is able to be performed within 25 minutes of patient arrival.
    - Vascular neurology is not available.
    - Neurosurgery is not available.
    - Treatment capability includes IV thrombolytic and medical management of stroke.

- Interventional therapy is not available.
- A dedicated stroke unit is not usually available.

- Primary Stroke Center (**PSC**, formerly known as LERN Level 2): Facilities in this category have the following capabilities:
  - A CT scan can be performed within 25 minutes of a patient's arrival.
  - Access to vascular neurology expertise is available within 15 minutes.
  - A neurosurgeon is available within 2 hours.
  - Treatment capability includes IV thrombolytics and medical management of stroke.
  - Interventional therapy is not routinely available.
  - A dedicated stroke unit is available.

ASRH and PSC stroke facilities provide acute stroke care in urban and rural areas where transportation and access are limited. Timely transfer to a higher-level facility is often indicated; however, their designation recognizes models of care that have shown utility, including "drip-and-ship" and telemedicine.

- Primary Stroke Center with Endovascular Capability (**PSC-E**): Facilities in this category are similar to Primary Stroke Centers as outlined above but are also able to perform mechanical thrombectomy.

- Thrombectomy Stroke Center (**TSC**): Hospitals in this category are like PSC-E; however, the facility has more services for stroke patients and the clinicians involved have higher training and certification reporting requirements than PSC-E centers.
  - A CT scan can be performed within 25 minutes of patient arrival.
  - Access to vascular neurology expertise is available within 15 minutes.
  - A neurosurgeon is available within 2 hours.
  - Treatment capabilities include intravenous thrombolytic and endovascular therapies, like intra-arterial thrombolytic and mechanical thrombectomy.

- Comprehensive Stroke Center (**CSC**, formerly known as LERN Level 1): Facilities in this category can manage all forms and severities of stroke, both ischemic and hemorrhagic, and can provide 24/7 access to specialty care. CSC facilities have the following capabilities:
  - CT scan can be performed within 25 minutes of patient arrival.
  - Access to vascular neurology expertise is available within 15 minutes.
  - A neurosurgeon is available within 30 minutes.
  - IV thrombolytic, endovascular therapies (e.x. intra-arterial thrombolytic, thrombectomy, coiling) and surgical therapies (e.x. aneurysm clipping, carotid endarterectomy, hematoma removal/drainage) can be performed.

[9] The original CPSS, generated in 1997, did not include **T**ime. LSN up to 24 hours is currently considered standard of care.
[10] http://lern.la.gov/wp-content/uploads/Stroke-Level-Requirements.pdf

Providers within Parish of Jackson should contact LERN and aim to transport patients with a suspected large vessel occlusion (i.e. VAN positive) to a CSC, TSC, or PSC-E. If the total transport time (from scene to the nearest CSC/TSC/PSC-E) is expected to be greater than 15 minutes, then providers should transport to a PSC or ASRH to ensure rapid assessment and treatment. Traffic delays should be considered when determining the expected time of transport.

Hyperactive Delirium with Severe Agitation (formerly Excited Delirium)

Hyperactive Delirium with Severe Agitation is a common, yet poorly understood condition. It has no universally accepted definition except that persons present with "delirium associated with agitation." Mentally, the patient is unable to focus his/her attention on any one thing and is often distracted by his surroundings. The subjects' inability to process rational thought often renders normal de-escalation procedures ineffective.

Common causes of Hyperactive Delirium with Severe Agitation (formerly Excited Delirium)

- drug overdose (ex. cocaine, methamphetamine, PCP) *
- drug withdrawal
- brain tumor
- dementia
- infection
- hypoxia or hypercarbia
- low or high blood sugar
- psychiatric patient off meds
- mental illness or acute psychosis*
- hyperthyroidism/" thyroid storm"
- head trauma

* most common

Hyperactive Delirium with Severe Agitation (formerly Excited Delirium) is presumed to be due a combination of:

(1) an individual's underlying physical or mental illness,

(2) excess catecholamine – either endogenous (ex. thyroid storm) or exogenous (ex. Cocaine, PCP, Methamphetamine, recreational Ketamine use),
and
(3) overstimulation of dopamine receptors. Heart rate, respiration, and temperature control are also affected by dopamine levels with elevation resulting in tachycardia, tachypnea, and hyperthermia.

Common signs of Hyperactive Delirium with Severe Agitation (formerly Excited Delirium)

- bizarre & aggressive behavior
- dilated pupils
- fear and panic
- hyperthermia
- incoherent speech
- inconsistent breathing patterns
- insensitive to pain
- nakedness
- paranoia
- profuse sweating (may be absent with severe hyperthermia)
- shivering
- superhuman strength
- violence directed at objects

Hyperthermia is a key risk factor of imminent death in patients with Hyperactive Delirium with Severe Agitation (formerly Excited Delirium). Another alarming symptom to the onset of death is "instant tranquility" - this is when the suspect had been very violent or vocal then suddenly becomes quiet and docile while in the car or sitting at the scene.

Treatment of Hyperactive Delirium with Severe Agitation (formerly Excited Delirium) involves four pillars. Care in the prehospital setting (as outlined in the JPASD Protocols) focuses on control of agitation.

Benzodiazepines should also be utilized when a patient found in hyperactive delirium presents with signs of hyperthermia.

Adrenal Crisis[11,12]

Adrenal crisis is a life-threatening emergency due to an acute deficiency in hormones produced by the adrenal gland – mineralocorticoids and glucocorticoids. This condition is most commonly seen in patients on steroids who have an acute illness or physiological stress, or have their steroids withdrawn. Addison's disease is the most common cause of adrenal insufficiency. Persons with a history of chronic lung disease, autoimmune disease, or organ transplant frequently fall into the cohort of patients with chronic steroid use.

Symptoms of adrenal crisis vary and are non-specific – patients may present with weakness, confusion, fever, nausea, vomiting, abdominal pain, hypoglycemia, or shock. A history of surgery, infection, burn, trauma, fluid loss, cardiovascular event (ex. MI), or failure to take medications should all be questioned.

Hypotension or shock out of proportion to the severity of the illness is the key feature of adrenal crisis. Treatment for adrenal crisis is steroid replacement. Administration of Methylprednisolone 125mg. Adrenal crisis can be fatal if not diagnosed and treated aggressively. Providers should consider this diagnosis early and contact Medical Control for consultation.

Sickle Cell Pain Crisis

Many patients with a sickle cell pain crisis will not exhibit vital sign abnormalities. Patients may also not show behavior considered consistent with pain (e.g. walking, engaging in conversation, or having a calm appearance) while their pain levels remain high. The patient's pain should still be taken seriously with pain managed accordingly with available analgesics.

[11] www.litfl.com/weak-and-vomiting-an-endocrine-emergency/
[12] www.coreem.net/core/adrenal-crisis/

In addition to pain crises, patients with Sickle Cell Disease (SCD) are at risk for several life-threatening

complications.

Often the presentation of these complications is atypical. Potentially serious condition other than pain crises may include:

(a) Acute chest syndrome
    i. Hypoxia
    ii. Chest pain
    iii. Fever
(b) Stroke
    i. Focal neurologic deficit
(c) Shock
    i. Septic
    ii. Cardiogenic
    iii. Hypovolemic
(d) Meningitis
    i. Headache
    ii. Altered mental status
    iii. Fever
(e) Septic arthritis
    i. Severe pain in a single joint
    ii. Fever
(f) Splenic sequestration crisis (usually young pediatric patients)
    i. Abdominal pain, LUQ
    ii. Splenic enlargement (palpate with care)
    iii. Hypotension, tachycardia

Reserve oxygen for patients who are hypoxic. Supplemental oxygen is thought to suppress bone marrow and increase transfusion requirements. Only give supplemental oxygen to sickle cell patients whose SpO_2 is < 92%. Reserve fluid boluses for sickle cell patients that are overly hypovolemic; overhydration may have detrimental effects, including atelectasis or increased sickling. These individuals will usually provide a story of fluid losses (e.g. vomiting or diarrhea) and/or shows signs of sepsis. If fluid is required, saline boluses should be 10 ml/kg up to 1L.

Back Pain

Acute, nontraumatic back pain is a common patient complaint. While musculoskeletal etiologies generally are not emergent, providers should consider and assess life threatening signs and symptoms, including shock.

(a) Spinal cord compression (e.g. from spinal epidural abscess, malignancy, spinal epidural hematoma for patients on anticoagulants)
    i. Urinary and/or bowel incontinence
    ii.Inability to walk due to weakness
    iii. New neurologic deficits in extremities
    iv. Loss of sensation in saddle distribution
(b) Aortic dissection or ruptured abdominal aortic aneurysm (AAA)
    i. Unequal femoral or distal lower extremity pulses

ii. "Pulsatile" abdominal mass
iii. Associated abdominal pain and/or chest pain
iv. Known history of abdominal aortic aneurysm or dissection

(c) Pyelonephritis (Kidney Infection)
i. Fever
ii. Nausea, vomiting
iii. Urinary frequency/urgency
iv. Dysuria
v. Hematuria
vi. Abdominal pain
vii. Costovertebral angle tenderness to percussion

Providers should assess and document neurologic findings (ex. motor and/or sensory loss in arms/legs) in patients with back pain. Providers should additionally assess and document changes in perfusion or pulses. Consider transport to an appropriate specialty center if an aortic emergency is suspected – Medical Control can assist in decision making.

Pain Management

Pain is subjective with a wide range of presentations and tolerances for opioid medication. Patient pain level should always be assessed, when possible, based on reported pain scale of 1-10. For patients reporting moderate to severe pain (6-10) pain management is indicated. Different etiologies of pain respond better to certain medications. When considering which pain medication to administer keep in mind each medications strengths and weakness.

- **Ketorolac (Toradol) - (NSAID)**
    - **Best for:** moderate to severe pain caused by inflammation such as:
        - Moderate pain from trauma associated with swelling
        - Sickle Cell
        - bone cancer patients
    - **What it does well:**
        - does not affect mental status, respiratory drive, mobility of intestines
        - It is an ideal alternative for patients in remission from opioid abuse, patients with hypersensitivity to or reservations about opioid medications, patients presenting with constipation
    - **Considerations:**
        - Toradol should not be used in patient with renal concerns
        - Counterintuitively, use for ACS pain is not recommended as Toradol may cause an increased risk of cardiovascular thrombotic events, myocardial infarction, and stroke

o **Tylenol (Acetaminophen, Ofirmev)-NSAID**

Best for: moderate to severe pain caused by inflammation such as:

- Mild to Moderate pain
- Moderate to severe pain from trauma (when used in conjunction with an opioid)
- Bone cancer patients

What it does well:

- does not affect mental status, respiratory drive, mobility of intestines
- It is an ideal alternative for patients in remission from opioid abuse, patients with hypersensitivity to or reservations about opioid medications, patients presenting with constipation

o Consideration

- Use caution in pregnant patients and alcoholic patients
- Do not use in patients with severe hepatic impairment or active live disease

o **Fentanyl (Opioid)**
Best for: almost any etiology of pain and very effective in treating more severe pain.

o **Consideration**
- Can cause constipation, and should not be used for patients currently experiencing constipation
- Can cause Altered Mental Status
- Can cause CNS depression
- Every patient will have different tolerance levels. As such, Fentanyl should always be titrated beginning with the lowest dose.

V. MEDICATION INFUSIONS

Crystalloid Fluid Bolus

A fluid bolus (fluid challenge) is given at a rate of "wide open," typically through the largest IV catheter possible (14 – 18 gauge). Patients should be reassessed after each 250 – 500ml of fluid, particularly their lung sounds. This is especially the case when treating persons with cardiovascular disease and the elderly. When a fluid bolus is not going to be needed or anticipated, saline locks may be used.

Dextrose

The traditional treatment for hyperglycemia has been 50ml of D50W (aka "an amp of D50"); however, drug shortages, profound hyperglycemia, and the risk of tissue injury from extravasation have caused D50 to fall out of favor. Providers may administer dextrose via the following concentrations:

D50 (50% Dextrose): 25g in a 50ml prefilled syringe

D25 (25% Dextrose): 2.5g in a 10 ml prefilled syringe (usually reserved for pediatrics)

D10 (10% Dextrose): 10g in 100ml or 25g in 250ml bag

D50 is more viscous than other intravenous fluids and often requires two hands to administer. Providers may need to apply light pressure to the D10 bag if a very small catheter is used (22-24G)[13]. All concentrations have similar times for patient return to normal mentation.

Magnesium Sulfate ($MgSO_4$)

Recommended doses and rates vary based on the indication. Add 2-4 gm of $MgSO_4$ to 100 ml of NS or D5W and infuse as follows:

Asthma: 2g in 100ml given over 10 minutes = 150 gtts/min using a 15 gtt/ml macro drip set

Torsade de pointes: 2g in 100ml over 10 minutes = 150 gtts/min using a 15 gtt/ml macro drip set

Eclampsia: 4g in 100ml over 10 minutes = 150 gtts/min using a 15 gtt/ml macro drip set

Vasopressors – see Cardiac Preambles

VI. CAPNOGRAPHY[15,16]

Capnography includes the noninvasive measurement of CO_2 partial pressure during respiration (primarily exhalation). This can be displayed as a color (colorimetric or qualitative), number (quantitative), and as a function of time with waveform. More specifically, the quantitative monitor provides a numeric value which is the end-tidal carbon dioxide ($EtCO_2$) plateau in phase 3.

A normal waveform displays several phases, and interpretation of this waveform can provide valuable information. Just like the various stages of an electrocardiogram represent different phases of the cardiac cycle, different phases of a capnogram correspond to different phases of the respiratory cycle. Knowing how to analyze and interpret each phase will contribute to the utility of capnography.

Capnography is most used in the prehospital setting to verify endotracheal tube placement and to monitor the effectiveness of CPR during cardiac arrest. It can also be a valuable tool to assess the clinical picture with other patient complaints.

ETT placement

Capnography used with visualization of the ETT passing through the vocal cords is the standard of care for confirming ETT placement during intubation. Capnography can also be easily applied to alternative airways like supraglottic devices. No matter which device is in use, capnography can provide immediate indication of the loss of proper position or function. Providers should continue to use $ETCO_2$ monitoring to reassess ETT location prior to and after patient movement.

Flattened waveforms are commonly seen with esophageal intubation, ETT obstruction, technical malfunction of the monitor or tubing, complete airway obstruction distal to the ETT, and prolonged cardiac arrest.

Cardiac Arrest

$EtCO_2$ monitors may give a low reading during the first few minutes of cardiac arrest. Though the body still makes CO2 during arrest, it will not reach the alveoli without circulating blood. As CPR increases circulation the EtCO2 should increase in a patient with a viable downtime. EtCO2 often gives the first indicator of ROSC as evidenced by an abrupt & sustained rise in the $EtCO_2$ level – a specific level is not required, but rather the sudden increase (usually at least 10 mmHg).

The EtCO2 level may help guide decision-making in assessing whether continued resuscitation in cardiac arrest is futile. Values < 10 mmHg after 20 minutes of active resuscitation have consistently demonstrated minimal chance of survival; however, EtCO2 should not be used as the only factor in the determine to cease resuscitation.

[13] www.aliem.com/d50-vs-d10-severe-hypoglycemia-emergency-department/

Respiratory Distress

Capnography can provide dynamic monitoring in patients with acute respiratory distress. Patients with acute obstructive disease processes of the lung (e.g. asthma, COPD, bronchitis) have bronchospasm that is produced a unique waveform shape – a "shark-fin appearance" – because of regional airway obstruction. Patients with respiratory distress from CHF typically do not have bronchoconstriction, so the waveform on their capnogram will not necessarily have the shark fin appearance unless the patient has a pulmonary comorbidity.

By analyzing the CO_2 waveform over time, medics can monitor the severity of asthma or COPD and the effectiveness of therapy provided. $ETCO_2$ values in asthma attacks will change depending on severity of the disease.

Early in an acute asthma attack, hyperventilation may occur, lowering $ETCO_2$ levels with a slightly abnormal waveform. As the attack progresses, the $ETCO_2$ may read in the normal range with a more prominent. looking shark fin waveform on the monitor. Finally, as the attack becomes severe, the $ETCO_2$ rises, and the wave becomes indistinguishable in its shark fin form. Once treatment is decided upon and bronchoconstriction decreases, the $ETCO_2$ number may increase initially as gas exchange improves. Recognize that the waveform will appear to be normalizing.

The return of a normal waveform indicates resolution of the bronchoconstriction. The same concepts will apply with a COPD patient; however, the initial numbers may be high due to retaining CO_2 in their disease process.

Other Capnography Indications

Waveform capnography is a direct measure of the changes in elimination of CO_2 from the lung and indirectly indicates changes in the production of CO_2 at the cellular level.

Monitoring $ETCO_2$ can provide an early warning sign of acidosis and/or shock and should be utilized on patients with suspected sepsis. A patient with low cardiac output from a shock state does not deliver as much CO_2 per minute back to the lungs to be exhaled, which will result in a decreased $ETCO_2$ regardless of any change in breathing rate.

Capnography should be used on all trauma and cardiac patients and any patient at risk for shock.

Capnography can also help paramedics optimize ventilation of intubated patients with head injury.

Hyperventilation of patients with increased intracranial pressure decreases intracranial blood flow, thereby increasing the risk of cerebral ischemia. Avoiding hyperventilation is associated with decreased mortality.

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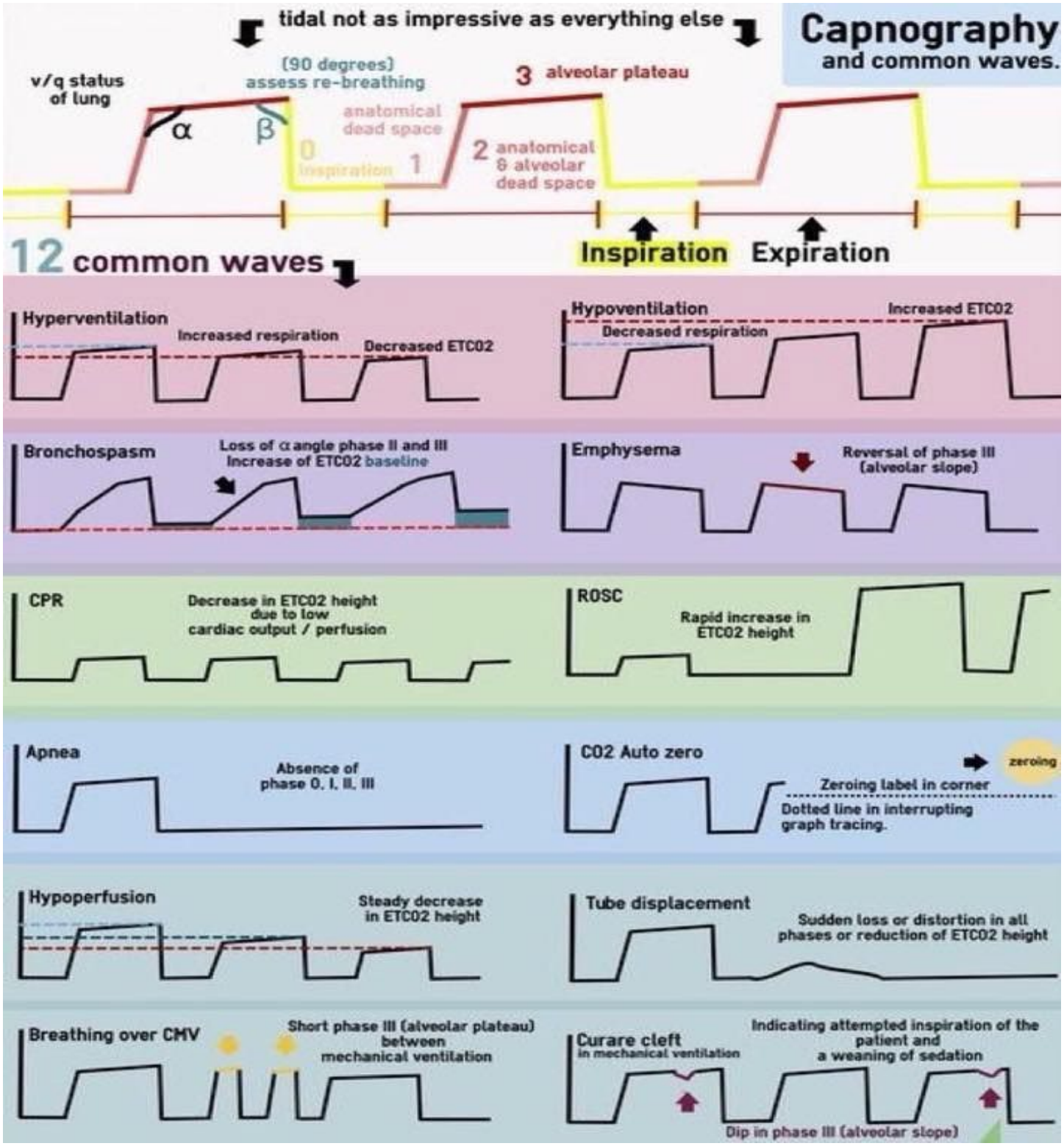
[15] http://www.emdocs.net/capnography-useful-ed-part/

[16] https://www.emsworld.com/article/10287447/capnography-clinical-tool


tidal not as impressive as everything else
Capnography
and common waves.
v/q status of lung
(90 degrees) assess re-breathing
α
β
anatomical dead space
0 inspiration
1
2 anatomical & alveolar dead space
3 alveolar plateau
Inspiration
Expiration
12 common waves
Hyperventilation
Increased respiration
Decreased ETCO2
Hypoventilation
Decreased respiration
Increased ETCO2
Bronchospasm
Loss of α angle phase II and III
Increase of ETCO2 baseline
Emphysema
Reversal of phase III (alveolar slope)
CPR
Decrease in ETCO2 height due to low cardiac output / perfusion
ROSC
Rapid increase in ETCO2 height
Apnea
Absence of phase 0, I, II, III
C02 Auto zero
zeroing
Zeroing label in corner
Dotted line in interrupting graph tracing.
Hypoperfusion
Steady decrease in ETCO2 height
Tube displacement
Sudden loss or distortion in all phases or reduction of ETCO2 height
Breathing over CMV
Short phase III (alveolar plateau) between mechanical ventilation
Curare cleft
in mechanical ventilation
Indicating attempted inspiration of the patient and a weaning of sedation
Dip in phase III (alveolar slope)