ONTARIO BASE HOSPITAL GROUP

REFERENCE AND EDUCATIONAL NOTES

Companion Document for the Advanced Life Support Patient Care Standards

Version 5.1 - March 2023

Medicine is a discipline in which no two situations are the same. Every patient must be thoroughly assessed and decisions are to be made based on the caregiver's interpretation. The goal of the provincial Advanced Life Support Patient Care Standards (ALS PCS) is to provide guidance for certain clinical scenarios that fall within the scope of practice of Ontario Paramedics. That being said, no directive is all encompassing and cannot provide guidance for each and every situation encountered.

The Ontario Base Hospital Group (OBHG) has purposefully reformatted the ALS PCS in order to provide Paramedics with a succinct yet practical reference book that provides the ability to obtain information quickly. As such, many of the previously found detailed clinical notes and references have been omitted from the ALS PCS and have been placed into this companion document to provide intent and clarification regarding the application of the directives. Much of the information contained herein was generated as a result of the many "Frequently Asked Questions" received following the implementation of the ALS PCS in 2011.

This companion document should be used as a reference tool to further appreciate the applicability of the Medical Directives within the ALS PCS. In an attempt to standardize Paramedic education and certification provincially, this document further provides guidance for scenarios that historically have had differing treatments across Ontario Regional Base Hospital Programs. The provincial Medical Advisory Committee's (MAC) consensus and best practice approach to these unique scenarios are highlighted within this document.

PREAMBLE

The Medical Directives apply to Paramedics who provide patient care under the license and/or authority of the Regional Base Hospital (RBH) Program Medical Director. Delegation of controlled acts or Medical Directives in the ALS PCS to paramedics falls under the exclusive oversight of the MOH EHRAB Programs.

The Medical Directives are designed to guide a paramedic in the provision of timely and appropriate care to ill and/or injured patients in the prehospital setting, in accordance with the paramedic's training and authorized skill set. While great care has been taken in developing these Medical Directives, they cannot account for every clinical situation. Thus, they are not a substitute for sound clinical judgment.

In the section titled "Home Medical Technology and Novel Medications" the sentence that reads, "Alternatively consider contacting the responsible member of a regulated health profession" is not for the purposes of obtaining medical delegation.

This document will be updated regularly and the most current version will always be the electronic version available on the Ontario Base Hospital Group's website:
http://www.ontariobasehospitalgroup.ca

A patch may be made to a BHP for critically ill or injured patients that may benefit from additional/further treatment beyond what is specified in the medical directives, but is within the Paramedic's scope of practice.

Patch points or dosing end points within directives have been created to act as ‘safe margins’ or ‘check points’, where BHPs need to be involved in patient care.

Medication doses may be calculated based upon weight or other factors and result in a fraction that cannot be measured accurately. Depending on the delivery method used, medication doses may require rounding from the exact dose calculated. In these cases, the medication dose delivered will be rounded to the closest dose that can accurately be measured.

Medications listed in the following directives may be administered via 50 ml 0.9% Normal Saline (NS) or D5W Medication bag, if available, intravenously at the discretion of the paramedic as an alternative to bolus/slow IV push administration:

Medication	Medical Directive
dimenhyDRINATE (Gravol)	Nausea/Vomiting Medical Directive
diphenhydrAMINE (Benadryl)	Moderate to Severe Allergic Reaction Medical Directive
Amiodarone	Tachydysrhythmia Medical Directive
Morphine	Adult/Pediatric Analgesia Medical Directive
fentaNYL	Adult/Pediatric Analgesia Medical Directive
Calcium Gluconate	Hyperkalemia Medical Directive

1. All medications given via 50 ml 0.9% NS or D5W bag must be appropriately labeled with the following minimum information:
    a. Drug Name
    b. Drug Dosage
    c. Time initiated
    d. Attending Paramedic Name and initials

2. Only one medication may be administered per 50 ml 0.9% NS or D5W bag.

3. Volume of 50 ml 0.9% NS or D5W bag and medication is not to be counted towards total fluid volume administered to the patient.

4. Flush IV line with 10 ml of 0.9% NS or D5W once the medication infusion is complete to ensure all medication has been administered.

5. IV drug dosages remain the same, medication bag infusion allows for slow IV administration to be accomplished while providing ongoing patient care. Follow current directives for drug dosing. (i.e. Hyperkalemia Medical Directive – Administer 1.0g of Calcium Gluconate over 3 minutes. Inject your medication into the medication bag and titrate drip rate accordingly for a 3-minute delivery).

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PRIMARY CARE PARAMEDIC CORE MEDICAL DIRECTIVES

MEDICAL CARDIAC ARREST MEDICAL DIRECTIVE

- The initial rhythm interpretation/analysis and defibrillation should be performed as soon as possible. Following the initial rhythm interpretation/analysis, additional rhythm interpretations/analyses should occur at two (2) minute intervals with a focus on the delivery of high quality chest compressions.

- The energy settings used for defibrillation typically follow specific manufacturer guidelines and are supported by each respective Regional Base Hospital program.

- As a general rule, Paramedics do **NOT** count pre-arrival interventions into their patient care. Care delivered prior to arrival can be "considered" and documented. However, in the setting of cardiac arrest where a medical termination of resuscitation (TOR) might apply, the Paramedics should complete a full 20 minutes of resuscitation. Consider patching early if there are extenuating circumstances.
    - Compressions during the charge cycle should be considered to minimize the peri-shock pause.

- When en-route and using semi-automated rhythm analysis, the ambulance must be stopped to minimize artifact and the risk of an inaccurate rhythm interpretation/analysis.

- For a witnessed arrest in the back of the ambulance paramedics should use clinical judgment to decide whether to stay and perform resuscitation or proceed to hospital. Paramedic should perform three full analysis and then proceed/patch or to provide one analysis and go. The paramedic should provide at minimum one analysis. Factors that are part of the decision process include distance to closest hospital, probable cause of arrest, ability to provide adequate CPR/ventilation, shockable vs non-shockable etc.

Supraglottic Airways:

- The preferred sequence listed for the placement of advanced airways is deliberate and based on:
    1. The reduced importance placed on the airway as outlined in the 2015 AHA guidelines,
    2. The ease of supraglottic airway insertion vs. the complexity and risks of intubation,
    3. The emphasis placed on minimally interrupted compressions, and does not preclude the PCP from placing a supraglottic airway when more than a basic airway adjunct is required for a VSA patient, or in a prolonged resuscitation.

- Once the supraglottic airway is placed, compressions should be continuous and ventilations provided asynchronously at a rate of ten (10) breaths/minute (one [1] every six [6] seconds) for adults, and at a rate of twenty (20) breaths/minute (one [1] every three [3] seconds) for child and infants.

Mandatory Patch Point:

- For PCPs, the patch will follow 20 minutes of resuscitation if considering the medical TOR. The intention of this patch point is to receive advice as to whether transport, terminate resuscitation or to follow additional orders.

Re-Arrest:

- In the event a return of spontaneous circulation (ROSC) is achieved and the patient re-arrests en-route, Paramedics utilizing semi-automated defibrillators will adhere to the following sequence:
    1. Pull over,
    2. Initiate one (1) immediate rhythm interpretation/analysis,
    3. Treat rhythm appropriately AND,
    4. Continue with transportation to the receiving facility with no further stops.

Early Transport Considerations:

- The medical directive defines some specific clinical considerations for early transport after a minimum of one analysis (and defibrillation if indicated) once an egress plan is organized. To expand on the consideration of other known reversible cause of arrest not addressed could be:
    - Hypovolemia

- Hypoxia
- Hydrogen ion (acidosis)
- Hyper/Hypokalemia
- Toxins
- Tension Pneumothorax
- Thrombosis (pulmonary & coronary)
- Tamponade (cardiac)

Blood Glucometry:

- Glucometry in the vital signs absent (VSA) patient is of no clinical value and is not indicated.

Anaphylactic Cardiac Arrest:

- A single dose of IM EPINEPHrine 1:1,000 (1 mg/ml) is indicated if the Paramedic believes the cardiac arrest is directly related to the anaphylactic reaction. This patient is to be treated under the medical arrest medical directive and may be transported early as specified in the primary clinical considerations. An IM dose of EPINEPHrine for anaphylaxis should not delay defibrillation.

Asthmatic Cardiac Arrest:

- While there is provision for treatment with EPINEPHrine 1:1,000 (1 mg/ml) in the anaphylactic arrest, there is no similar recommendation in the asthmatic cardiac arrest. It may be difficult to deliver salbutamol effectively in an asthmatic cardiac arrests, so the focus is placed on effective ventilation and oxygenation.

Electrocution:

- The Paramedic must use judgment in this setting. A simple electrocution is a medical cardiac arrest that should respond well to defibrillation. In the event the electrocution is associated with significant trauma, it should be treated as a trauma cardiac arrest.

Pulse Checks:

- Following the initial pulse check, subsequent pulse checks are indicated when a rhythm interpretation/analysis reveals a non- shockable rhythm (PEA or Asystole), or there are signs of life present.

Commotio Cordis and Hangings:

- Are typically treated as medical cardiac arrests (unless life threatening trauma is noted).

TRAUMA CARDIAC ARREST MEDICAL DIRECTIVE

- An intravenous fluid bolus may be considered, without delaying transport to the ED, to assist with potential reversible causes.

NEWBORN RESUSCITATION MEDICAL DIRECTIVE

- Approximately 10% of newborns require some assistance to begin breathing following delivery; less than 1% require extensive resuscitation (Wyckoff, Aziz, Escobedo, Kapadia, Kattwinkel, Perlman, Simon, Weiner & Zaichin, 2015).

- If any of the following are **absent** or **abnormal**, begin with resuscitative assessment and interventions:
  - Term gestation,
  - Good muscle tone,
  - Breathing or crying.

- While drying, positioning and stimulating are intended for the newborn, this medical directive is applicable to all patients under <24hrs of age. In the patient that is not newly born, begin by assessing respirations and heart rate; then proceed.

- If ventilations are ineffective consider trying 'MR SOPA'
    - **M**ask adjustment to assure good seal
    - **R**eposition airway to "sniffing" position
    - **S**uction mouth and nose of secretions if necessary
    - **O**pen mouth using manual manoeuvres
    - **P**ressure increase to achieve adequate chest rise
    - **A**lternate **A**irway if available

- An oxygen saturation chart has been added as a guideline. These values are ideal targets and require application of the preductal SpO_2 using a probe to the right hand.

- Ensure cardiac monitoring is initiated (Wyckoff et al., 2015) to accurately determine heart rate.

- Meconium with poor muscle tone and breathing/crying needs to be addressed by suctioning the mouth and pharynx before the nose while ensuring oxygenation is maintained. Routine meconium suctioning is not required (Wyckoff et al., 2015).

- The administration of EPINEPHrine IM for anaphylaxis does not apply to this directive. It would be a very rare circumstance, and the differential diagnosis even more complicated.

- If central cyanosis is present, but respirations appear adequate and the heart rate is greater than 100 bpm, oxygen administration is not required.

- If respiratory distress is present (i.e.: sternal retractions, grunting, nasal flaring), administer oxygen by mask at 5-6 L/min or by cupping a hand around the oxygen tubing and holding the tubing 1-2 cm from the patient's face; slowly withdraw as the patient's colour improves.

RETURN OF SPONTANEOUS CIRCULATION (ROSC) MEDICAL DIRECTIVE

Oxygenation:

- Optimizing oxygenation and targeting a SpO_2 of 94 to 98% (avoiding 100%) will provide adequate oxygenation and will minimize vasoconstriction and the development of oxygen free radicals. Despite ideal SpO_2 values, oxygen administration should be continued if the patient remains unstable (Callaway, Donnino, Fink, Geocadin, Golan, Kern, Leary, Meurer, Peberdy, Thompson & Zimmerman, 2015).

$ETCO_2$:

- Post ROSC, the goal is to maintain ventilation at a rate of approximately ten (10) breaths per minute (or one (1) breath every six [6] seconds) for adults, and at a rate of twenty (20) breaths/minute (one [1] every three [3] seconds) for child and infants and titrate to achieve an $ETCO_2$ (with waveform capnography) of 30 - 40 mmHg (Callaway et al., 2015).

- Hyperventilation MUST be avoided, but be mindful not to hypoventilate in an attempt to artificially raise a low $ETCO_2$; a low $ETCO_2$ may reflect metabolic acidosis.

Fluid Therapy:

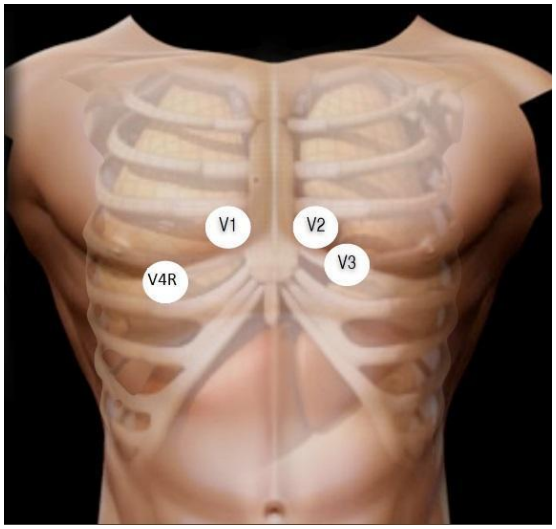
- Regardless of the amount of fluid administered prior to ROSC, if chest auscultation is "clear", a 10 ml/kg 0.9% NaCl fluid bolus may be administered to a maximum of 1,000 ml targeting a SBP of ≥ 90 mmHg.

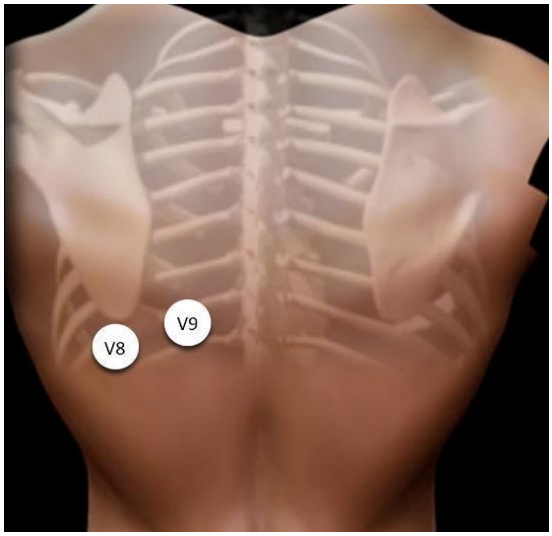
CARDIAC ISCHEMIA MEDICAL DIRECTIVE

12 Lead Acquisition:

- Considering 12 lead acquisition and interpretation for STEMI is now a defined step in the treatment of cardiac ischemia and precedes Nitroglycerin consideration.

- While not specified, manual interpretation of the 12 lead is preferred over a computer generated interpretation.
- The recommendation that a 12 lead be performed within the first 10 minutes of patient contact is a goal.
- Understanding that not all situations allow for a 12 lead to be performed within the first 10 minutes of patient contact, the Paramedic should document barriers that did not allow for this goal to be achieved.
- In the event the 12 lead ECG identifies an Inferior STEMI, a minimum V4R must be completed to rule in or out a RVI when considering nitroglycerin. These patients are often preload dependent and the administration of nitroglycerin to these patients may cause significant hypotension.
- If performing a complete 15 lead ECG, the following image depicts the proper placement of electrodes to complete a 15 lead ECG. V4=V4R, V5=V8 and V6=V9.





- Once a STEMI has been identified there is no need to repeat the 12 lead ECG.
- If there is no evidence of STEMI, serial 12 lead ECGs would be recommended.

ASA Administration:

- ASA is a safe medication with a wide therapeutic index (the effective dose without side effects can be from 80 – 1500 mg). The additional dose provided by Paramedics will not exceed the therapeutic dose while ensuring the correct administration of correct dose of the medication. Therefore, apply the cardiac ischemia medical directive as if no care had been rendered prior to your arrival.

Nitroglycerin Administration:

- Conditions for nitroglycerin use are: “a prior history OR an established IV”. An IV must be initiated prior to the administration of nitroglycerin in first time suspected cardiac ischemia patients. If the patient already had an IV in place (i.e. outpatient), the IV would need to be assessed for patency and once confirmed, would allow for first time administration. This will only apply to the PCP(s) with Autonomous IV Certification.
- Prior history is defined as previously authorized or prescribed to the patient for use by a certified Medical Doctor.
- Many patients who are at risk of having a cardiac event (MI) may also have a history of CHF and it can sometimes be difficult to determine what issue is driving the other. It is likely that the STEMI is causing, or exacerbating the CHF, and as such, following the Cardiac Ischemia Medical Directive and administering a maximum of 3 x 0.4mg doses of nitroglycerin is most appropriate. The reduced number of doses in STEMI

reduces adverse outcomes associated with liberal nitroglycerin use. Also, a reminder that CPAP is appropriate for these patients should they meet the criteria outlined in the Continuous Positive Airway Pressure Medical Directive.

- Nitroglycerin is a symptom relief medication that has not demonstrated changes in a patient's morbidity or mortality and should be used with caution in patients presenting with tachycardia or with SBP close to 100 mmHg.

- Nitroglycerin may be administered for an isolated posterior STEMI.

STEMI Positive:

- In the setting of right ventricular STEMI (identified via V4R), no nitroglycerin is to be administered.

Phosphodiesterase Inhibitors:

- The use of these medications has diversified to include treatment of pulmonary hypertension and congestive heart failure (CHF).

- The most appropriate categorization is as phosphodiesterase (PDE) 5 inhibitors.

- Phosphodiesterase (PDE) 5 inhibitor list (many known as erectile dysfunction drugs [EDD]): Viagra, Levitra, Cialis, Revatio, Sildenafil, Tadalafil, Vardenafil, Udenafil and Avanafil, Lodenafil, Mirodenafil, Acetildenafil, Aildenafil, Benzamidenafil, Zaprinast and Icariin (a natural product). This may not be an exhaustive list and was current as of the date written.

- If myocardial ischemic symptoms/acute coronary syndromes resolve prior to the arrival of Paramedics, a decision to administer ASA will be made based on patient assessment and critical thinking.

- If a patient's vital signs fall outside the medical directive's parameters (i.e.: hypotension), the patient can no longer receive that medication (i.e.: nitroglycerin or morphine) even if the patient's vital signs return to acceptable ranges, given risk for recurrent decompensation (i.e. hypotension).

ACUTE CARDIOGENIC PULMONARY EDEMA MEDICAL DIRECTIVE

- The notes listed above regarding the Cardiac Ischemia Medical Directive are applicable to the Acute Cardiogenic Pulmonary Edema Medical Directive as well.

- The maximum of 6 doses is of either 0.4 mg or 0.8 mg. The patient may **not** receive 6 doses for pulmonary edema and 6 more doses for cardiac ischemia symptoms should they co-exist.

- Note that an initial 12 or 15 lead acquisition and interpretation is not a requirement for nitroglycerin administration in this medical directive because Right Ventricular infarctions do not generally present with acute pulmonary edema. However, it is advisable to acquire and interpret a 12 or 15 lead ECG as soon as possible or when practical to do so.

- In cases where the administration of nitroglycerin results in hypotension in patients with acute cardiogenic pulmonary edema and a PCP AIV paramedic is attending, a fluid bolus is permitted despite the presence of crackles. Once the patient is normotensive, discontinue the fluid bolus and withhold further doses of nitroglycerin.

HYPOGLYCEMIA MEDICAL DIRECTIVE

- Blood glucometry is performed using the Paramedic's supplied device.

Capillary Blood Sample Sites:

- Finger tips and the heel of the foot (pediatric patients who have not begun to walk).

- Samples **cannot be obtained from the flash chamber of an IV catheter**. Not only is the practice inherently unsafe, but it involves manipulating a medical device for purposes that it is not intended for and the blood sample obtained is not a capillary sample.

- Dextrose is listed first and is the preferred medication, but is only applicable to the PCP Autonomous IV certified Paramedic. There is now an option to administer Dextrose 10% to a maximum of 25 g or 50% to a maximum of 25 g.

- It is recommended that the max single dose of D10W OR D50W for your *hypoglycemic* patient be administered gradually over 3 minutes, with a discontinuation in the event your patient attains a level of consciousness where they can safely consume carbohydrates. The goal is to avoid over treatment since this can result in rebound hyperglycemia.

- Premixed D10W should be run as a piggyback onto an existing IV line to ensure accurate dose administration.

- If Glucagon was initially administered with no patient improvement and an IV is subsequently established (if certified and authorized); perform a second glucometry and if the patient remains hypoglycemic administer dextrose regardless of the elapsed time since glucagon administration.

- When considering providing oral carbohydrates, the 15-15 rule can be used to treat hypoglycemia in patients who are able to safely ingest carbohydrates. The patient is to ingest 15 grams of simple carbohydrates followed by a repeat glucose check in 15 minutes, which allows time for the glucose to enter the bloodstream and raise the blood glucose. If the blood sugar remains low after 15 minutes, the process can be repeated. By utilizing the 15-15 rule, ingesting only 15 grams of simple carbohydrates helps to prevent rebound hyperglycemia from occurring after eating a large quantity of food. In most patients, 15 grams of carbohydrates is enough glucose to raise blood glucose by 2.1 mmol/L in approximately 20 minutes. [1][2][3]

- Examples of 15 grams of simple carbohydrates include:
    - 15 grams of glucose tabs, paste, or other formulation
    - 15 ml of water with 3 sugar packets dissolved
    - 150 ml of juice or regular soft drink
    - 15 ml of honey

BRONCHOCONSTRICTION MEDICAL DIRECTIVE

- Suspected bronchoconstriction applies to asthma, COPD, and other causes of bronchoconstriction. Symptoms of bronchoconstriction may include wheezing, coughing, dyspnea, decreased air entry and silent chest.

- EPINEPHrine 1:1,000 (1 mg/ml) IM is indicated when the patient is asthmatic and BVM ventilation is required. This is typically after salbutamol has had no effect, however salbutamol could be bypassed and EPINEPHrine be administered immediately due to the severity of the patient's condition. The indications to administer

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[1] Diabetes Canada (n.d.). Lows and highs: Blood sugar levels. https://www.diabetes.ca/diabetescanadawebsite/media/managing-my-diabetes/tools%20and%20resources/lows-and-highs-blood-sugar-levels.pdf?ext=.pdf

[2] American Diabetes Association (n.d.). Blood Glucose Testing and Management Hypoglycemia (Low Blood Glucose). https://diabetes.org/healthy-living/medication-treatments/blood-glucose-testing-and-control/hypoglycemia

[3] Yale , J. F., Paty , B., & Senior , P. A. (2018). Hypoglycemia Diabetes Canada Clinical Practice Guidelines Expert Committee (42nd ed., pp. S104-S108). Canadian Journal of Diabetes.

EPINEPHrine do not change based on the ability to administer salbutamol.

- When a dose of MDI salbutamol is administered, the intent is to deliver all six (6) (pediatric) or eight (8) (adult) sprays to complete a dose. It would be under unusual circumstances to deliver less than the full dose.

- MDI administration is preferred over nebulization. If the patient is unable to accept or cooperate with MDI administration, the nebulized route may be considered (maximum three (3) doses).

- Technique for administration of MDI salbutamol: provide one MDI spray, followed by 4 breaths to allow for inhalation. It will take 1 minute to deliver a full adult dose to a patient breathing at a rate of 32 breaths per minute.

- The MDI and spacer device should be considered a single patient use device.

- Nebulization increases the mobilization of any contagion and a Paramedic should use PPE.

- Dexamethesone manufactured for IV/IM use can be administered PO. PO is the preferred route for administration, and it should only be given IM/IV if the patient is extremely short of breath in suspected respiratory failure and all other care has been provided.

- Dexamethasone can be used in conjunction with salbutamol, EPINEPHrine and CPAP. Salbutamol and EPINEPHrine are still priority treatments.

- When treating with dexamethasone, the contraindication to steroids only applies to systemic steroids (PO, parenteral) and not inhaled or topical steroids. Inhaled steroids are very specific to lung tissue and do not contribute to systemic absorption.

- COPD is underdiagnosed in Canadians, and smoking is a significant risk factor in the development of COPD. The likelihood of a long-time smoker having COPD is high. Therefore, for undiagnosed patients who smoke or previously smoked and are 20 pack-years, they would be considered for dexamethasone. Pack-years is a way to measure smoking exposure, considering how long someone has smoked and how much they have smoked. For example, if you have smoked a pack a day for the last 20 years or two packs a day for the last 10 years, you have 20 pack-years.

MODERATE TO SEVERE ALLERGIC REACTION MEDICAL DIRECTIVE

- The medical directive now includes a range of allergic reactions from moderate to severe and the administration of diphenhydrAMINE.

- Anaphylaxis is life-threatening and delays in administration of EPINEPHrine are associated with greater mortality. If the patient meets the indications and none of the contraindications, EPINEPHrine should be administered because it may prove to be life-saving.

- EPINEPHrine 1:1000 (1 mg/ml) in anaphylaxis is administered via the IM route only.

- IV access should be considered after IM administration of EPINEPHrine to reduce the chance of inadvertently administering the medication via the IV route.

- Skin findings are most common but up to 20% of patients do not have hives or other skin symptoms. Therefore, ensure that all body systems are assessed to determine the most appropriate treatment plan.

- Urticaria alone is not an indication for administration of EPINEPHrine IM, the patient must present with at least one other sign or symptom involving another organ system or severe symptom.

- diphenhydrAMINE administration should always follow the administration of EPINEPHrine as outlined in the

Medical Directive.

Please refer to the following table as a reference for differentiating an anaphylactic reaction from a local reaction.

How to differentiate between a localized allergic reaction and an anaphylactic reaction

Diagnosis based on detailed history and recognition of presenting signs & symptoms post possible exposure to a possible allergen	
Body System Involvement • **Integumentary** (skin): Hives, itching, flushing, swelling, angioedema • **Cardio-Vascular**: Increased HR, decrease BP, syncope, decreased LOC, hypoxemia • **Respiratory**: Shortness of breath, wheeze, cough, stridor • **Gastro-Intestinal**: Cramping, nausea, vomiting, diarrhea	
Localized Allergic Reaction	**Anaphylactic Reaction**
→ Minor to Moderate Allergic Reaction	**→ Moderate to Severe Allergic Reaction**
Localized reaction	Systemic reaction
Degranulation of localized mediators	Degranulation of systemic mediators
Involves one local area or one body organ system ****Severe symptoms to a single body system (respiratory system) should be considered as a severe allergic reaction****	***Usually*** involves symptoms in more than one body organ or system, with symptoms presenting as per above post exposure ****Severe symptoms to a single body system should be considered as a severe allergic reaction****
Degranulation of localized chemical mediators	Degranulation of systemic chemical mediators
	Some patients may present with a biphasic reaction within 72 hours of the initial symptoms having resolved without further exposure to an allergen
	Consider the following groups High Risk Patients: • Very young and very old • Hx asthma • Hx Cardiovascular disease • Hx Mast cell disease
Primary treatment: • diphenhydrAMINE (slow onset) relieves symptoms (itching, flushing, urticaria, angioedema, eye and nasal symptoms) does NOT prevent or relieve upper airway obstruction, hypotension, shock.	**Primary treatment:** • EPINEPHrine - concentration of 1 mg/mL = 1:1,000 IM (fast onset) will increase blood pressure, prevent and relieves hypotension, decreases upper airway obstruction, decreases wheezing, decreases urticaria and angioedema. **Secondary treatment to be considered post EPINEPHrine administration:** • diphenhydrAMINE IM/IV • PRN IV Fluids as per Medical Directive

	• PRN Salbutamol as per Medical Directive

(Simons, 2013)

CROUP MEDICAL DIRECTIVE

- For severe presentations, EPINEPHrine should be your priority treatment. Dexamethasone can be considered. For mild to moderate presentation, only dexamethasone should be considered.
- Prior to initiating nebulized EPINEPHrine, moist/cold air may be attempted if available and patient's condition permits.
- Croup is occurring more and more frequently in older patients including adults, and if the indications are met, a patch to a BHP would be required to consider treatment under this medical directive.
- When treating with dexamethasone, the contraindication to steroids only applies to systemic steroids (PO, parenteral) and not inhaled or topical steroids. Inhaled steroids are very specific to lung tissue and do not contribute to systemic absorption.
- If a patient has received systemic steroids in the past 48 hours, an additional dose is unlikely to improve their condition due to its long half-life.

ANALGESIA MEDICAL DIRECTIVE

- Paramedics are encouraged to use their clinical judgement when choosing which analgesia is best suited for their patient. The following points are things to consider when choosing the appropriate analgesia:
    - Acetaminophen and ibuprofen should be utilized as first line analgesia for patients who are able to tolerate oral administration. Oral administration is as effective and is less invasive than parenteral analgesia.
    - Administration of acetaminophen and ibuprofen can provide analgesia similar to low-dose opioids without the euphoric effect.
    - Whenever possible, acetaminophen and ibuprofen should be co-administered.
    - Ketorolac should not be administered in conjunction with ibuprofen as they are both NSAIDs and administration of both may increase the adverse effects.

Suspected Renal Colic:

- Suspected renal colic patients should routinely be considered for NSAIDS (either ibuprofen or ketorolac) administration because of the anti-inflammatory action and smooth muscle relaxant effects (reduces the glomerular filtration rate which reduces renal pelvic pressure and stimulation of the stretch receptors) as well as its inhibition of prostaglandin production makes them ideal agents to treat renal colic (Davenport & Waine, 2010). The only advantage of parenteral ketorolac over oral ibuprofen is the ability to administer an NSAID despite vomiting. The overall clinical effect of these drugs is almost identical.
- Ketorolac should not be administered in conjunction with ibuprofen as they are both NSAIDs and administration of both would increase the adverse effects.

Active Bleed Defined:

- External trauma that has been dressed and controlled is not considered an active bleed.
- Occult bleeding should be considered active bleeding (hematuria/GI bleed).
- Trace blood in urine with suspected renal colic is not considered active bleed.

OPIOID TOXICITY MEDICAL DIRECTIVE

- Naloxone may be administered to patients who are not responding to assisted ventilations or in situations whereby the provision of persistent ventilations is difficult (i.e. challenging extrications, prolonged transport times). Upfront airway management is paramount and the initial priority.

- The age for Naloxone administration is now ≥ 24 hours. The age cut off of ≥ 24 hours minimizes the risk of life-threatening opioid withdrawal syndrome in the newborn.

- Naloxone may unmask alternative toxidromes in mixed overdose situations (leading to possible seizures, hypertensive crisis, etc.).

- Naloxone is shorter acting than most opioids and these patients are at high risk of having a recurrence of their opioid effect. Every effort should be made to transport the patient to the closest appropriate receiving facility for ongoing monitoring.

- Remember, naloxone is ONLY being administered to improve respiratory status, NOT to improve LOA or for any other purpose.

- IV naloxone titration refers to administering only small increments of the 0.4 mg dose at a time to restore respiratory effort, but limit the rise in wakefulness. Consider dilution for easier titration of IV Naloxone.

- The directive now allows for three (3) total doses of naloxone, administered in five (5) minute intervals by all routes.

- In the setting of bystander administered naloxone, the Paramedic should use his/her judgment to determine the most appropriate patient care, being mindful of the potential risks (i.e. unmasking alternative toxidromes and those associated with the route of administration) with the administration of subsequent naloxone.

- The BLS DNR standard and Ministry of Health DNR Confirmation Form were created to ensure that appropriate and compassionate measures could be taken for those patients who are considered palliative and nearing the end of life. Any situation, including but not limited to opioid antagonist administration for an accidental or intentional opioid overdose, where the paramedic could provide treatment to a patient that is not considered end-of-life or palliative, should be considered.

HOME DIALYSIS EMERGENCY DISCONNECT MEDICAL DIRECTIVE

- While there are several variations of dialysis machines/tubing, the best practice is to disconnect the patient by using the materials and instructions that are typically found in the disconnect kit. In the event instructions are not available, the tubing should be clamped first on the patient side, secondly on the machine side, and finally separated in the middle.

SUSPECTED ADRENAL CRISIS MEDICAL DIRECTIVE

- Patients with Primary Adrenal Insufficiency generally require little assistance from EMS, except in cases of stress when they can become critically ill; in which case they will require the administration of hydrocortisone. Hydrocortisone is not carried by Paramedics.
    - Examples of underlying issues/stressors may include, but are not limited to:
        - Hypoglycemia
        - Hypotension

        - Gastrointestinal issues
        - Fractures

- If the patient presents with signs and symptoms consistent with the medical directive, AND his/her OWN medication is available, a Paramedic may administer 2 mg/kg up to 100 mg IM/IV of hydrocortisone. IV administration of Hydrocortisone applies only to PCPs authorized for PCP Autonomous IV.

- These patients should be transported to a receiving facility for additional care and follow up.

EMERGENCY CHILDBIRTH MEDICAL DIRECTIVE

- The Condition of "Age - Childbearing years" refers to the approximate ages of 14 – 50 years.

- Paramedics are not authorized to perform internal vaginal exams for any reason, for example Paramedics are not to examine for cervical dilation.

- Paramedics should consider inspection of the perineum in the following situations to determine whether signs of imminent birth are present:
    - History is suggestive of ruptured membranes or umbilical cord prolapse.
    - The patient is in labor and reports an urge to push, bear down, strain or move the bowels with contractions or reports that "the baby is coming".
    - The patient is near term, level of consciousness is decreased and history is unavailable, inconclusive or indicates that labor was on-going prior to decrease in/loss of consciousness.
    - Vaginal bleeding is heavy and the patient is hypotensive or in shock.

- Signs of second stage labor include:
    - Contractions every two to three minutes, lasting 60-90 seconds;
    - Contractions associated with maternal urge to push or to move the bowels;
    - Heavy "red show" visible at the vaginal opening; or
    - Presenting part or bulging membranes visible at vaginal opening and / or perineum bulging with contraction.

- Signs of imminent birth:
    - Crowning or other presenting part is visible or;
    - In primips, presenting part is visible during and between contractions, maternal urge to push or bear down, and contractions are less than two (2) minutes apart, or;
    - In multips, contractions five minutes apart or less and any other signs of second stage labor present.

- Complicated Delivery includes:
    - Shoulder dystocia - An inability of the fetal shoulders to deliver spontaneously
        - Paramedics should suspect shoulder dystocia if the fetus's body does not emerge with the contraction following the delivery of head. **It is important not to direct the patient to push if a contraction is not present to allow restitution of the head.** The presence of 'turtling' or the 'turtle sign' (the fetal head, often quite purple, retracting firmly against the perineum following the contraction) is an indication to attempt the McRoberts Manoeuvre.
        - Paramedics should attempt the McRoberts Manoeuvre and apply suprapubic pressure.
            - With the patient lying flat, flex the maternal thighs onto the abdomen (squatting position); this is achieved by one person grasping a leg and assisting with hyperflexion of the maternal thighs against the abdomen.
            - If a second Paramedic is available, have him/her place their hand slightly above and just behind the maternal symphysis pubis and exert steady firm downward pressure with the heel of the hand.
        - If delivery is not achieved, Paramedics should attempt the Gaskin Manoeuvre (position change to hands-and-knees):

- Attempt to deliver the posterior shoulder.

- Breech Delivery – The delivery of a fetus with the buttocks or feet presenting first.
  - In the presence of a breech presentation, Paramedics should remain relatively "hands off" the fetus until it has delivered to the umbilicus to avoid stimulating premature respiration.
  - Allow the head to deliver spontaneously, or gently lift and hold the neonate upwards and backwards while avoiding hyperextension.
  - Attempt the "Mauriceau – Smellie – Veit Manoeuvre" if the head does not deliver within three minutes of the body.
    - Lay the neonate along one forearm with palm supporting the neonate's chest and the two fingers exerting gentle pressure on the neonate's face to increase flexion.
    - Place other hand on the neonate's back and with two fingers hooked over the shoulders and the middle finger pushing up on the occiput to aid flexion.
    - When the hairline becomes visible, lift the body in an arc to assist the fetal head to pivot around the symphysis pubis and allow the face to be born slowly.
    - If a second Paramedic is available, have him/her apply suprapubic pressure.

- Nuchal or Prolapsed Cord
  - If a cord prolapse is present, place the patient in a knee-chest position or Exaggerated Sims Position. Gently cradle cord in hand and replace cord in vagina while inserting fingers/hand into vagina to apply manual digital pressure to the presenting part. Elevate the presenting fetal part off the cord and maintain manual elevation until transfer of care.

    Exaggerated Sims Position:
    - The patient lies in left lateral position with left arm lying along the back and the right knee drawn towards the chest.
    - Place a pillow/wedge under the left hip/buttocks to raise the pelvis and use gravity to move fetus toward the fundus.
    - Exaggerated Sims Position is preferred for safe transport, however, the knee chest position is more effective at elevating the presenting part of the cord in the presence of strong uterine contractions.
  - If a nuchal cord is present, the cord should be slipped over the neonate's head or over the shoulders. If the nuchal cord cannot be relieved by manual means, it should be clamped and cut while the neonate is still on the perineum.

- Lack of progression of labor refers to situations where there are signs of imminent birth but there has been no further progression of delivery. Paramedics should discourage the patient from pushing or bearing down during contractions and initiate transport.

- Once the neonate is delivered, the cord should be immediately clamped and cut only if multiple gestation is suspected, neonatal or maternal resuscitation is required or due to transport considerations (after approximately three minutes; once cord pulsations have ceased).
  - Clamp the umbilical cord in two places using the OBS clamps:
    - Approximately 15 cm from the neonate's abdomen and approximately 5-7 cm from the first clamp.
    - Cut the umbilical cord between the clamps using the OBS scissors.

- External uterine massage should be performed only when the placenta has been delivered and there is presence of excessive bleeding. External uterine massage should continue until bleeding stops. Do not pack the vagina to control bleeding.

- External uterine massage requires firm pressure and will be uncomfortable/painful for the mother when it is being performed correctly. Remember to make the patient aware of this and the reasoning for performing this maneuver.

- In the circumstance where the Paramedic is unable to control excessive bleeding, external bimanual compression should be performed. External bimanual compression can be performed regardless of if the placenta is delivered or not.

- The addition of oxytocin has the potential to dramatically affect maternal morbidity and mortality in a high acuity low occurrence event (massive post-partum hemorrhage). Oxytocin is an ideal agent with evidence supported and endorsed globally by the World Health Organization for the management and care of post-partum hemorrhage.

- There is some evidence indicating that oxytocin can induce vasoconstriction, therefore exacerbating hypertension.

ENDOTRACHEAL AND TRACHEOSTOMY SUCTIONING & REINSERTION MEDICAL DIRECTIVE

- To minimize hypoxia and possible trauma, do not suction more frequently than once per minute.

- Exceeding the recommended suction pressures or maximum number can cause injury and swelling to the mucosal tissues of the airway and increases the risk of arrhythmia. Starting at the lower end of the suction pressure range will also help minimize adverse events.

- If all suctioning attempts have been made to clear the tracheostomy and the Paramedic is unable to oxygenate/ventilate using positive pressure ventilation (PPV), the tracheostomy is to be considered a foreign body airway obstruction (FBAO). In an attempt to relieve the FBAO, remove the tracheostomy to gain access to the stoma for oxygenation/PPV.

- In the event that the tracheostomy tube or inner cannula has been withdrawn and the patient is in respiratory distress consider utilizing a family member or caregiver who is on scene and knowledgeable to replace the tracheostomy tube or inner cannula. The rationale for this consideration is the expectation that they will be more experienced and comfortable with the act of replacing the tracheostomy tube or inner cannula.

- If there is no family member/caregiver available who is knowledgeable in replacing the tracheostomy tube or inner cannula consider proceeding with the tracheostomy/cannula reinsertion. If available, prepare a new tracheostomy tube or inner cannula for reinsertion. If a new tracheostomy tube or inner cannula is not available, remove the inner cannula (if not already done), deflate the cuff, if present, and clean the current tracheostomy tube or inner cannula with a saline or water rinse.

- To optimize the insertion of the tracheostomy tube, optimal patient positioning is a 30-90 degree sitting position.

- In the absence of an obturator, paramedics are still able to insert the outer cannula, but are advised to be cautious because the outer cannula may damage soft tissue of the trachea.

- The tracheostomy tube or inner cannula should be inserted during the inhalation phase.

- If a patient requires assisted ventilations, and there is no appropriate inner cannula available with a 15 mm adaptor, paramedics are recommended to utilize an appropriate sized mask attached to a BVM to provide ventilation through the outer cannula ensuring an adequate seal.

- In situations where a reinsertion fails, paramedics should occlude the stoma and attempt standard oral airway maneuvers and ventilation through the mouth and nose. Attempts to ventilate through the mouth and nose with the stoma occluded may not work depending on the reason the patient has a tracheostomy.

- In situations where occlusion of the stoma and attempts to ventilate the patient through the mouth and nose is unsuccessful or impossible (Laryngectomy), paramedics should utilize an appropriate sized mask that can provide a seal around the stoma attached to a BVM to provide ventilation through the stoma ensuring an adequate seal.

SUPRAGLOTTIC AIRWAY MEDICAL DIRECTIVE

- Consider withholding the supraglottic airway (SGA) if the patient is actively vomiting due to an increased risk of aspiration. Active vomiting is considered ongoing vomiting where the Paramedic is unable to clear the airway.
- If the patient has vomited, and the airway has been cleared successfully, a supraglottic airway may be inserted.
- The number of attempts is clearly defined as two (2) total per patient, and not per provider.
- Confirmation of SGA insertion requires $ETCO_2$ waveform capnography. It is the most reliable method to monitor placement of an advanced airway (AHA guidelines 2015, Part 7). If it is not available, at least two (2) secondary methods must be used. SGA placement should be verified frequently and again at transfer of care. Findings and witness (where possible) should be documented on the patient care record.

ROSC:

- In the event the patient with a SGA in place sustains a ROSC, the SGA should only be removed if the gag reflex is stimulated or the patient begins to vomit; expect to remove it as the level of awareness improves.

NAUSEA / VOMITING MEDICAL DIRECTIVE

- While the indications list nausea or vomiting, patients presenting with these symptoms do not necessarily require treatment.
- Overdose on antihistamines, anticholinergics or TCAs are contraindications for the administration of dimenhyDRINATE. For a comprehensive list of these medications, please refer to the most current CPS or contact your RBH.
- If dimenhyDRINATE is administered via the IV route, it must be diluted as per the medical directive with saline to facilitate a slower and less painful administration. Based on a supply of 50 mg in 1 ml, either dilution method of 5 mg/ml (diluted with 9 ml of NaCl) or 10 mg/ml (diluted with 4 ml of NaCl) is acceptable.
- The addition of ondansetron allows the Paramedics to use their clinical judgment in their selection of medication based on the suspected underlying cause of nausea or vomiting.

dimenhyDRINATE	ondansetron
• motion sickness or vertigo • upset stomach due to food ingestion • best for people on SSRIs • hyperemesis for a pregnant patient • avoid with head injuries as it can cause increased ICP	• cause from drug interactions - i.e. chemotherapy, alcohol, cannabis, illicit drugs • head trauma (less risk of ICP) • taking diphenhydrAMINE, anticholinergics or tricyclic antidepressants (TCAs) • elderly patients

- If a patient has received dimenHYDRINATE and has no relief of their nausea & vomiting symptoms after 30 minutes, ondansetron may be considered if the patient meets the conditions and has no contraindications.
- The rationale for the contraindication of dimenhyDRINATE being co-administered with diphenhydrAMINE is that the combined effect can lead to anticholinergic side effects, and over-sedation.

- The rationale for the contraindication of apomorphine use with ondansetron is that it may precipitate profound hypotension.
- dimenhyDRINATE has negative effects of somnolence and confusion, especially in the elderly. For further information on dangerous medications for the elderly population, reference ISMP "Beers List": https://www.ismp-canada.org/beers_list/#l=tab2

PRIMARY CARE PARAMEDIC AUXILIARY MEDICAL DIRECTIVES

INTRAVENOUS AND FLUID THERAPY MEDICAL DIRECTIVE – AUXILIARY

- The contraindication of a suspected fracture may not seem obvious, but a lack of integrity in a bone may jeopardize the integrity of the associated vascular structures and may result in extravasation.
- Pulmonary edema is a sign of fluid overload secondary to a fluid bolus. As such, frequent chest assessments are required.
- The treatment line specifies "consider IV cannulation". This may encompass upper and lower extremity veins depending on your Base Hospital's authorization.
- The Indications for the Intravenous and Fluid Therapy Medical Directive state; "Actual or potential need for intravenous medication OR fluid therapy". These indications apply to not only prehospital use of the intravenous but also for some in-hospital use. If the patient meets the criteria of the Paramedic Prompt Card for Acute Stroke Protocol or the STEMI Hospital Bypass Protocol Prompt Card, then paramedics may consider the initiation of an intravenous. The initiation of an intravenous for these purposes should never delay transport and should only be attempted en route. Some hospital partners may prefer specific gauge needles and access sites. If available, refer to your local base hospital direction for this specific information.

Mandatory Patch Point:

- Required before administering a fluid bolus to a hypotensive patient ≥ 2 years and < 12 years of age, and is suspected of being in ketoacidosis. A patch is required so that the physician can carefully control the volume of fluid administered to prevent cerebral edema.

Cardiogenic Shock and ROSC:

- The maximum volume of NaCl is lower for patients in cardiogenic shock or with ROSC. The maximum volume in those settings is 10 ml/kg or 1,000 ml.
- Formulas for pediatric normotension and hypotension are to be used until the calculation meets or exceeds the adult definitions at which point the adult values are to be used. For example, at 6 years of age, the pediatric calculation for normotension results in 102 mmHg; therefore, use the adult value of 100 mmHg.
- Hypotension in pediatric patients (up to age 10) is based on the formula: SBP = 70 + (2 x age).
- The references to macro, mini, and buretrol drip sets have been removed. Although the choice of drip sets have been left to service operators based on local requirements and RBH insight, some form of rate control must be utilized for patients less than 12 years of age to prevent accidental fluid overload.

- Prior to initiating a fluid bolus, two blood pressures (of which one should be manually obtained) indicating hypotension are preferred.

- Once a bolus has been initiated, a minimum volume of 100 ml in pediatrics and 250 ml in adults may be administered prior to discontinuing the fluid bolus should the patient become normotensive.

CARDIOGENIC SHOCK MEDICAL DIRECTIVE - AUXILIARY

- This directive is applicable only to those Paramedics who are authorized to apply PCP Autonomous IV therapy.

- Cardiogenic shock is normally defined as a state in which the heart has been damaged to such an extent that it is unable to supply enough blood to the organs, tissues and cells of the body.

- A 10 ml/kg 0.9% NaCl fluid bolus may be administered to a maximum of 1,000 ml. This reflects the fact that the patient is not actually be volume depleted but is in need of preload.

CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP) MEDICAL DIRECTIVE – AUXILIARY

- This is for the treatment of severe respiratory distress AND acute pulmonary edema (regardless of origin) or COPD.

- CPAP should be considered as additive therapy to the bronchoconstriction (specifically COPD exacerbation) or acute cardiogenic pulmonary edema medical directives, not a replacement.

- CPAP may be interrupted momentarily to administer nitroglycerin (salbutamol can be administered via MDI port).

ASSESSMENT OF PATIENTS WITH POSSIBLE COVID-19 MEDICAL DIRECTIVE – AUXILIARY

- This directive is intended for implementation in the event that there is a surge in patient volumes that may overwhelm the existing system. This directive may only be implemented upon authorization of the Regional Base Hospital medical director.

- Approach the directive in a systematic way.
    1. Assess the patient for eligibility under the release from care criteria.
    2. Patch to confirm that the patient can be released from care. A BHP patch is required for any patient who has been assessed to be CTAS 3 with mild or no respiratory distress.
    3. Once it has been confirmed that the patient will be released from care, perform the COVID testing swab (if available/authorized).

- The directive refers specifically to patients who call 911 due to COVID-19 related symptoms/complaints.

- COVID-19 Symptoms may include but are not limited to:
    - Fever
    - Dry cough
    - Shortness of breath

    - Fatigue
    - Lack of appetite
    - Body aches
    - Sore throat
    - Stuffy/runny nose
    - New vomiting/diarrhea/abdominal pain with no pre-existing condition
    - Loss of smell/taste disturbance

- Note that the indications do not follow the MOH screening tool exactly due to the broad nature of the MOH screening tool. Indications include primarily respiratory symptoms.

- Due to potential increased risk of leaving pediatric patients or patients over 65 years of age at home we should consider transport of these patients to the hospital.

- Vital signs listed under conditions align with CTAS considerations.

- Pregnancy is listed as a contraindication for the consideration of this directive as pregnancy may increase the risk of COVID-19 to the patient.

- Ensure the patient/SDM has capacity prior to your BHP patch.
    - patient has capacity (described above; link to aid to capacity assessment in the ACR completion manual below)
    - relates to patient disposition decision (in this case)
    - informed (fully informed; not just what the patient asks)
    - voluntary (without coercion/threats)
    - without misrepresentation or fraud (open and honest, as unbiased as possible)

- Provide the following information to the BHP during your patch for consideration of release from care under the directive:
    - Age (gender)
    - patient's COVID-19 screening result
    - travel history
    - history of illness and symptoms
    - past medical history
    - vital signs
    - additional assessment findings, including respiratory assessment
    - patient and/or SDM's wishes and follow-up plans (if known)

- If considering release from care, ensure that the patient is able to self-isolate, can care for themselves or there is a caregiver available and has access to 911 if needed.

- Best practice means that prior to release from care, the patient should be able to:
    - verbalize/communicate an understanding and appreciation of their clinical situation
    - verbalize/communicate an understanding and appreciation of the applicable risks
    - verbalize/communicate the ability to make an alternate care plan
    - verbalize/communicate an understanding of how to self-isolate for 14 days

- Ensure you know how to direct the patient/SDM to contact their local public health unit.

- A signature is not required to release a patient from care however ensure that thorough documentation includes the following information:
    - Describe all aid to capacity assessments completed and who they refer to (i.e. patient or SDM),
    - Describe all actions taken with regards to the directive,
    - Describe all discussions had with the patient with regards to the directive,
    - Describe the alternate care plan discussed with the patient/SDM including a plan to self-isolate for 14 days.

- Symptom management is specific to COVID-19 related symptoms. The patient should be able to complete activities of daily living at home by themselves, or with assistance from family. The patient should have the necessities of sustenance (food, water, warmth, shelter, etc.). Patients should be informed of the possible progression, sometimes rapid progression, of their specific illness or complaint, in addition to progression of respiratory symptoms related to COVID-19, and given information for contacting PH, primary care (if able), paramedics, or arranging transport to the ED if they are able. Please provide follow up instructions as per your Regional Base Hospital.

- Definitions provided under the clinical considerations section may not be all inclusive.

MINOR ABRASIONS MEDICAL DIRECTIVE – AUXILIARY – SPECIAL EVENT

- Topical antibiotic ointment is left generic to allow for service provider specifications in consultation with the BHP.

MINOR ALLERGIC REACTION MEDICAL DIRECTIVE – AUXILIARY – SPECIAL EVENT

- Signs and symptoms MUST be consistent with a mild allergic reaction.

MUSCULOSKELETAL PAIN MEDICAL DIRECTIVE – AUXILIARY – SPECIAL EVENT

- The patient cannot have taken acetaminophen within the last 4 hours to receive it from the Paramedic.

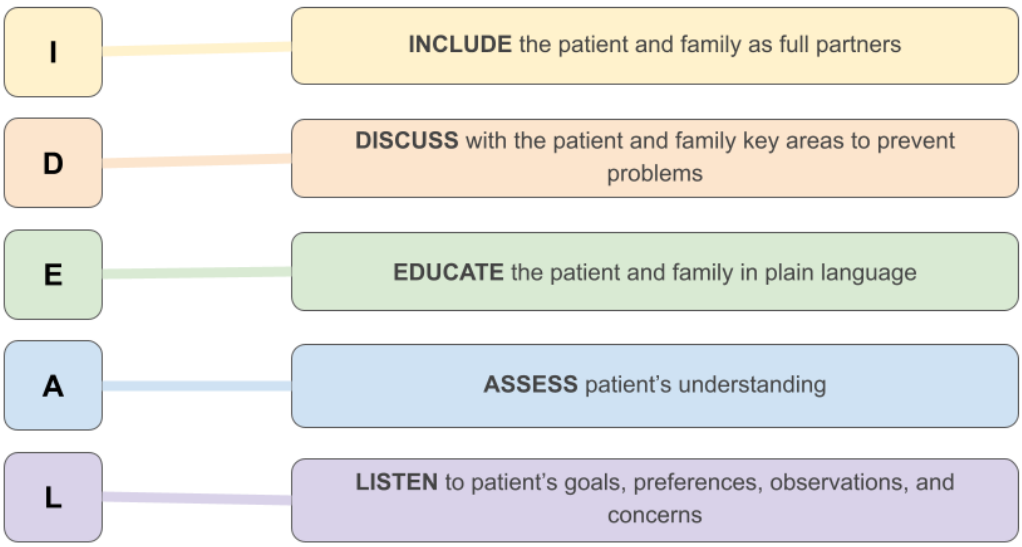
HEADACHE MEDICAL DIRECTIVE – AUXILIARY – SPECIAL EVENT

- The patient cannot have taken acetaminophen within the last 4 hours to receive it from the Paramedic.

TREAT AND DISCHARGE MEDICAL DIRECTIVES

General:

- Conveying a diagnosis is a controlled medical act, therefore, treat and discharge from care is a fundamentally distinct and different process from a patient refusing treatment as defined in the BLS PCS
- A responsible adult is defined as a person that is the age of majority (≥18 years old) and is someone who, in the reasonable belief of the paramedic, is capable of remaining with the patient and will assume responsibility for the patient.
- The IDEAL mnemonic for patient discharge comes from a hospital evidence-based system that was put together with patient safety in mind.



- **INCLUDE** the patient and family as full partners in the discharge planning process
- **DISCUSS** with the patient and family key areas to prevent problems
    - Highlight warning signs and problems
    - Exacerbation of symptoms or new symptoms
    - Explain assessments you've done
    - Discuss plans for follow-up
    - Discuss patient/family wishes
- **EDUCATE** the patient and family in plain language about the patient's condition, the discharge process, and the next steps
    - Patient's current condition
    - Clinically reasonable differential diagnosis
    - Inform/acknowledge our limitations
    - Discharge process
    - Calling 911 back
- **ASSESS** patient's understanding
    - Use teach back to determine patient comprehension
    - Ensure understanding and accuracy
- **LISTEN** to patient's goals, preferences, observations, and concerns

- Pay attention to body language
- Use open-ended questions to elicit answers

Hypoglycemia:

- Patients can receive multiple forms of treatment for hypoglycemia. For example, a patient may initially not be able to safely consume carbohydrates and require dextrose and/or glucagon prior to consuming carbohydrates. These patients can still be considered for Discharge from Care.
- Patients who receive multiple doses of the same medication for example, two doses of glucagon, D50 or D10, should be transported to hospital.
- New and novel medications are constantly being approved and prescribed to patients who are diagnosed with diabetes. If you are unable to determine what class the medication is (i.e. insulin, oral hypoglycemic, other), then a patch to the Base Hospital Physician should be initiated to discuss the suitability of the patient in meeting the treat and discharge medical directive.

Seizure:

- A confirmed history of epilepsy must be diagnosed by a physician.
- "New medication" refers to any new anti-seizure medication that is newly prescribed or where a recent dosage change has occurred. The addition of new or changes to anti-seizure medications (dosage or type) in the past 30 days should be considered as they can potentially lower a patient's seizure threshold. Some medications may be increased weekly to achieve optimal clinical response.
- A "single seizure episode" is defined as a single seizure.
- A seizure cluster is multiple seizures that occur within a 24 hour period. Patients who experience seizure clusters do not qualify for treat and discharge.

ADVANCED CARE PARAMEDIC CORE MEDICAL DIRECTIVES

MEDICAL CARDIAC ARREST MEDICAL DIRECTIVE

- The initial rhythm interpretation/analysis and defibrillation should be performed as soon as possible. Following the initial rhythm interpretation/analysis, additional rhythm interpretations/analyses should occur at two (2) minute intervals with a focus on the delivery of high quality chest compressions.

- The energy settings used for defibrillation typically follow specific manufacturer guidelines and are supported by each respective RBH program.

- As a general rule, Paramedics do **NOT** count pre-arrival interventions into their patient care. Care delivered prior to arrival can be "considered" and documented. However, in the setting of cardiac arrest where a medical TOR might apply, the Paramedics should complete a full 20 minutes of resuscitation. Consider patching early if there are extenuating circumstances.

- Compressions during the charge cycle should be considered to minimize the peri-shock pause.

- When en-route and using semi-automated rhythm analysis, the ambulance must be stopped to minimize artifact and the risk of an inaccurate rhythm interpretation/analysis.

- For a witnessed arrest in the back of the ambulance paramedics can decide whether to stay and perform three full analysis and then proceed/patch or to provide one analysis and go. The paramedic should provide at minimum one analysis. Factors that are part of the decision process include distance to closest hospital, probable cause of arrest, ability to provide adequate CPR/ventilation, shockable vs non-shockable etc.

Supraglottic Airways (SGA):

- The sequence listed for the advanced airways is deliberate, and based on:
    1. The reduced importance placed on the airway as outlined in the 2015 AHA guidelines,
    2. The ease of supraglottic airway insertion vs. the complexity and risks of intubation,
    3. The emphasis placed on minimally interrupted compressions.

  And does not preclude the ACP from placing an Endotracheal Tube (ETT) when there is airway compromise or in a prolonged resuscitation. Intubation should normally not require compressions to be stopped or altered as any pause in compressions can lead to a poor outcome.

- Once the ETT or supraglottic airway is placed, compressions should be continuous and ventilations provided asynchronously at a rate of 10 breaths/minute (one [1] every six [6] seconds) for adults, and at a rate of twenty (20) breaths/minute (one [1] every three [3] seconds) for child and infants.

Medication and Fluid Administration:

- If the timing were to fall such that EPINEPHrine and an antiarrhythmic were to be administered within the same CPR cycle, proceed, ensuring to provide a saline flush between the two medications. The IV and IO (and CVAD) routes of administration are preferred over ETT. ETT may be utilized if the preferred routes are delayed by more than 5 minutes.

- Fluid bolus may be indicated for patients in PEA to provide preload and possibly enough circulation to support vital functions. If hypovolemia is suspected, a bolus is also indicated.

Mandatory Patch Point:

- ACPs will patch following 20 minutes of resuscitation if considering the medical TOR. The intention of this patch point is to receive advice as to whether transport, terminate resuscitation or to follow additional orders.

Early Transport Considerations:

- The medical directive defines some specific clinical considerations for early transport after a minimum of one analysis (and defibrillation if indicated) once an egress plan is organized. To expand on the consideration of other known reversible cause of arrest not addressed could be:
  - Hypovolemia
  - Hypoxia
  - Hydrogen ion (acidosis)
  - Hyper/Hypokalemia
  - Toxins
  - Tension Pneumothorax
  - Thrombosis (pulmonary & coronary)
  - Tamponade (cardiac)

Re-Arrest:

- In the event a return of spontaneous circulation (ROSC) is achieved and the patient re-arrests en-route, Paramedics utilizing semi-automated defibrillators will adhere to the following sequence:
  1. Pull over,
  2. Initiate one immediate rhythm interpretation,
  3. Treat the rhythm appropriately AND,
  4. Continue with transportation to the receiving facility with no further stops.

Blood Glucometry:

- Glucometry in the vital signs absent (VSA) patient is of no clinical value and is not indicated.

Anaphylactic Cardiac Arrest:

- A single dose of IM EPINEPHrine 1:1,000 (1 mg/ml) is indicated if the Paramedic believes the arrest is directly related to the anaphylactic reaction. This patient then continues to be treated under the medical arrest directive and may be transported early as specified in the primary clinical consideration. An IM dose of EPINEPHrine for anaphylaxis does not alter the sequence and timing of IV administered EPINEPHrine and should not delay defibrillation.

Asthmatic Cardiac Arrest:

- While there is provision for treatment with EPINEPHrine 1:1,000 (1 mg/ml) in the anaphylactic arrest, there is no similar recommendation in the asthmatic cardiac arrest. It may be difficult to deliver salbutamol effectively in cardiac arrests, so the focus is placed on effective ventilation and oxygenation.

Electrocution:

- The Paramedic must use judgment in this setting. A simple electrocution is a medical cardiac arrest that should respond well to defibrillation. In the event the electrocution is associated with significant trauma, it should be treated as a trauma cardiac arrest.

Pulse Checks:

- Following the initial pulse check, subsequent pulse checks are indicated when a rhythm interpretation/analysis reveals a non-shockable rhythm (PEA or Asystole), or there are signs of life present.

Commotio Cordis and Hangings:

- Should be treated as medical cardiac arrests (unless life threatening trauma is noted).

ACP vs. PCP Care Plan:

- An ACP crew will not defer patient care decisions when a PCP crew is on-scene with a potential TOR. Once an ACP arrives on scene; the ACP shall assume patient care.

TRAUMA CARDIAC ARREST MEDICAL DIRECTIVE

- An intravenous fluid bolus may be considered to assist with reversible causes if transport to the ED will not be delayed.

NEWBORN RESUSCITATION MEDICAL DIRECTIVE

- Approximately 10% of newborns require some assistance to begin breathing following delivery; less than 1% require extensive resuscitation (Wyckoff et al., 2015).

- If any of the following are **absent** or **abnormal**, begin with resuscitative assessment and interventions:
    - Term gestation,
    - Good muscle tone,
    - Breathing or crying.

- While drying, positioning and stimulating are intended for the newborn, this medical directive is applicable to all patients under <24hrs of age. In the patient that is not newly born, begin by assessing respirations and heart rate; then proceed.

- If ventilations are ineffective consider trying 'MR SOPA'
    - **M**ask to assure good seal
    - **R**eposition airway to "sniffing" position
    - **S**uction mouth and nose of secretions if necessary
    - **O**pen mouth using manual manoeuvres
    - **P**ressure increase to achieve adequate chest rise
    - **A**lternate **A**irway if available

- An oxygen saturation chart has been added as a guideline. These values are ideal targets and require application of the pre-ductal SpO_2 using a probe attached to the right hand.

- Ensure cardiac monitoring is initiated (Wyckoff et al., 2015) to accurately determine heart rate.

- Meconium with poor muscle tone and breathing/crying needs to be addressed by suctioning the mouth and pharynx before the nose while ensuring oxygenation is maintained. Routine meconium suctioning is not required (Wyckoff et al., 2015).

- If central cyanosis is present, but respirations appear adequate and the heart rate is greater than 100 bpm, oxygen administration is not required.

- If respiratory distress is present (i.e.: sternal retractions, grunting, nasal flaring), administer oxygen by mask at 5-6 L/min or by cupping a hand around the oxygen tubing and holding the tubing 1-2 cm from the patient's face; slowly withdraw as the patient's colour improves.

EPINEPHrine:

- The administration of EPINEPHrine IM for anaphylaxis **does not apply to this directive**. It would be a very rare circumstance, and the differential diagnosis even more complicated.

- The dosing of EPINEPHrine is very specific in this directive. ONLY the 1:10,000 (0.1 mg/ml) solution is used for any route of administration. Unlike the adult, the dose administered via the ETT route is 10 times the dose of the IV/IO routes.

RETURN OF SPONTANEOUS CIRCULATION (ROSC) MEDICAL DIRECTIVE

- Optimizing oxygenation and targeting SpO_2 of 94 to 98% (avoiding 100%) will provide adequate oxygenation and will minimize vasoconstriction and the development of oxygen free radicals. Despite ideal SpO_2 values, oxygen administration should be continued if the patient remains unstable (Callaway et al., 2015).

- There is insufficient evidence to support the routine use of an antiarrhythmic post ROSC (AHA guidelines 2015, Part 7)

Fluid Bolus and DOPamine Administration:

- The fluid bolus precedes the administration of DOPamine. If started, ensure time is allowed for the intervention to have effect and be evaluated prior to initiating DOPamine. IO and CVAD have been added as appropriate routes for fluid administration.

- DOPamine is optimally administered via a dedicated IV line, however if required, may be piggybacked onto a primary line.

$ETCO_2$:

- Post ROSC, the goal is to maintain ventilation at a rate of approximately ten (10) breaths per minute (or one [1] breath every six [6] seconds) for adults, and at a rate of twenty (20) breaths/minute (one [1] every three [3] seconds) for child and infants and titrate to achieve an $ETCO_2$ (with waveform capnography) of 30 - 40 mmHg (Callaway et al., 2015). Hyperventilation MUST be avoided, but be mindful not to hypoventilate in an attempt to artificially raise a low $ETCO_2$; a low $ETCO_2$ may reflect metabolic acidosis.

Fluid Therapy:

- Regardless of the amount of fluid administered prior to ROSC and if chest auscultation is "clear", a 10 ml/kg fluid bolus may be administered to a maximum of 1,000 ml targeting a SBP of ≥ 90 mmHg.

CARDIAC ISCHEMIA MEDICAL DIRECTIVE

12 Lead Acquisition:

- Considering 12 lead acquisition and interpretation for STEMI is now a defined step in the treatment of cardiac ischemia and precedes Nitroglycerin consideration.

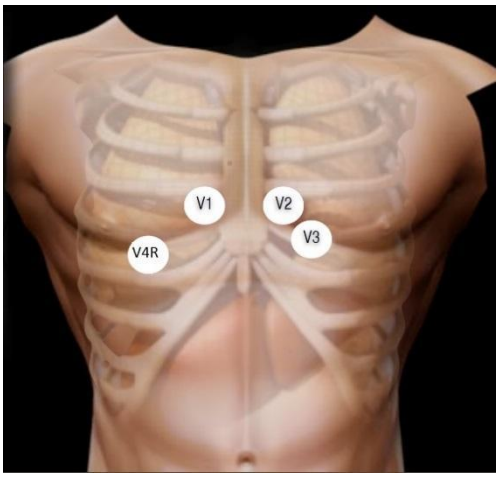
- While not specified, manual interpretation of the 12 lead is preferred over a computer generated interpretation.

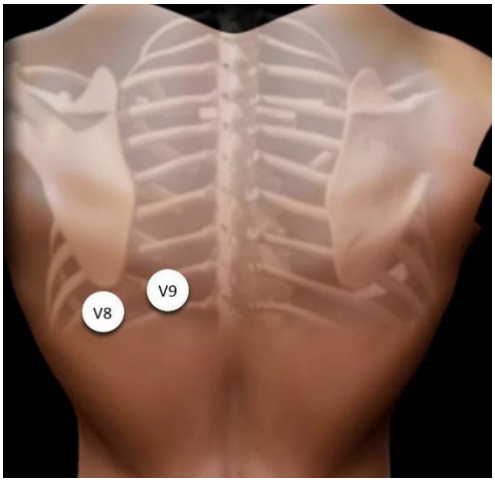
- The recommendation that a 12 lead be performed within the first 10 minutes of patient contact is a goal.

- Understanding that not all situations allow for a 12 lead to be performed within the first 10 minutes of patient contact, the Paramedic should document barriers that did not allow for this goal to be achieved.

- In the event the 12 lead ECG identifies an Inferior STEMI, a minimum V4R must be completed to rule out a RVI when considering nitroglycerin. These patients are often preload dependent and the administration of nitroglycerin to these patients may cause significant hypotension.

- If performing a complete 15 lead ECG, the following image depicts the proper placement of electrodes to complete a 15 lead ECG. V4=V4R, V5=V8 and V6=V9.





- Once a STEMI has been identified there is no need to repeat the 12 lead ECG.
- If there is no evidence of STEMI, serial 12 lead ECGs would be recommended.

ASA Administration:

- ASA is a safe medication with a wide therapeutic index (the effective dose without side effects can be from 80 – 1500 mg). The additional dose provided by Paramedics will not exceed the therapeutic dose while ensuring the correct administration of correct dose of the medication. Therefore, apply the cardiac ischemia medical directive as if no care had been rendered prior to your arrival.

Nitroglycerin Administration:

- Conditions for nitroglycerin use are: “a prior history OR an established IV”. An IV must be initiated prior to the administration of nitroglycerin in first time suspected cardiac ischemia patients. If the patient already had an IV in place (i.e. outpatient), the IV would need to be assessed for patency and once confirmed, would allow for first time administration. This will only apply to the PCP(s) with Autonomous IV Certification.
- Prior history is defined as previously authorized or prescribed to the patient for use by a certified Medical Doctor.
- Nitroglycerin doses taken by the patient for their current ischemic episode should not be used to decide whether to administer morphine.
- Many patients who are at risk of having a cardiac event (MI) may also have a history of CHF and it can sometimes be difficult to determine what issue is driving the other. It is likely that the STEMI is causing, or exacerbating the CHF, and as such, following the Cardiac Ischemia Medical Directive and administering a maximum of 3 x 0.4mg doses of nitroglycerin is most appropriate. The reduced number of doses in STEMI reduces adverse outcomes associated with liberal nitroglycerin use. Also, a reminder that CPAP is appropriate for these patients should they meet the criteria outlined in the Continuous Positive Airway Pressure Medical Directive.
- Nitroglycerin is a symptom relief medication that has not demonstrated changes in a patient’s morbidity or mortality and should be used with caution in patients presenting with tachycardia or with SBP close to 100 mmHg.
- Nitroglycerin may be administered for an isolated posterior STEMI.

STEMI Positive:

- In the setting of right ventricular STEMI (identified via V4R), no nitroglycerin is to be administered.

Phosphodiesterase Inhibitors:

- The use of these medications has diversified to include treatment of pulmonary hypertension and congestive heart failure (CHF).
- The most appropriate categorization is as phosphodiesterase (PDE) 5 inhibitors.
- Phosphodiesterase (PDE) 5 inhibitor list (some known as erectile dysfunction drugs [EDD]): Viagra, Levitra, Cialis, Revatio, Sildenafil, Tadalafil, Vardenafil, Udenafil and Avanafil, Lodenafil, Mirodenafil, Acetildenafil, Aildenafil, Benzamidenafil, Zaprinast and Icariin (a natural product). This may not be an exhaustive list and was current as of the date written.
- If myocardial ischemic symptoms/acute coronary syndromes resolve prior to the arrival of Paramedics, a decision to administer ASA will be made based on patient assessment and critical thinking.
- Morphine is only to be considered following the third dose of nitroglycerin (unless nitroglycerin is contraindicated) and where pain is severe.
- If a patient's vital signs fall outside the medical directive's parameters (i.e.: hypotension), the patient can no longer receive that medication (i.e.: nitroglycerin or morphine) even if the patient's vital signs return to acceptable ranges, given risk for recurrent decompensation (i.e. hypotension).

ACUTE CARDIOGENIC PULMONARY EDEMA MEDICAL DIRECTIVE

- The notes listed above regarding the Cardiac Ischemia Medical Directive are applicable to the Acute Cardiogenic Pulmonary Edema Medical Directive as well.
- The maximum of 6 doses is of either 0.4 mg or 0.8 mg. The patient may not receive 6 doses for pulmonary edema and 6 more doses for cardiac ischemia symptoms should they co-exist.
- Note that an initial 12 or 15 lead acquisition and interpretation is not a requirement for Nitroglycerin administration in this medical directive because Right Ventricular infarctions do not generally present with acute pulmonary edema. However, it is advisable to acquire and interpret a 12 or 15 lead ECG as soon as possible or when practical to do so.
- In cases where the administration of nitroglycerin results in hypotension in patients with acute cardiogenic pulmonary edema, a fluid bolus is permitted despite the presence of crackles. Once the patient is normotensive, discontinue the fluid bolus and withhold further doses of nitroglycerin.

CARDIOGENIC SHOCK MEDICAL DIRECTIVE

- Cardiogenic shock is normally defined as a state in which the heart has been damaged to such an extent that it is unable to supply enough blood to the organs, tissues and cells of the body leading to hypoperfusion and commonly hypotension.
- The directive specifies that fluid (if applicable) is to be used as a means to reverse hypotension prior to the administration of DOPamine. IO and CVAD have been added as routes for fluid administration.
- The clinical consideration: 'contact BHP if patient is bradycardic' is intended to allow the Paramedic to use his/her judgment.
- A contraindication to Dopamine administration is mechanical shock. Examples of mechanical shock include

tension pneumothorax, pulmonary embolism, and cardiac tamponade.

- Notify the receiving hospital staff if the DOPamine drip goes interstitial as DOPamine can cause tissue necrosis which can be mitigated by a phentolamine injection at the hospital into the affected tissue.

SYMPTOMATIC BRADYCARDIA MEDICAL DIRECTIVE

- Hemodynamic instability refers specifically to hypotension (SBP < 90 mmHg) that requires pharmacologic or electrical intervention(s).
- 12 lead ECG should be obtained as early as possible.
- Atropine is to be administered in the setting of sinus bradycardia, junctional bradycardia, atrial fibrillation, first degree block or second degree block type I. Further, patients presenting in second degree type II or third degree block may receive a single dose of atropine while preparing pacing or if pacing is unavailable or unsuccessful.
- Transcutaneous pacing should not be delayed to initiate IV access if the patient is unstable.
- Transcutaneous pacing is to be initiated at a rate of 80 bpm with milliamps (mAmps) then increased to obtain electrical capture. Capture is highly variable depending on patient size, weight, pad placement, skin condition, etc. It is difficult to state the target values for capture, however 80 to 100 mAmps is common. If unable to gain capture at maximum mAmps, pacing should be discontinued. Treatment should not be discontinued if the patient responds and develops an improved blood pressure.
- Pad placement for pacing should follow the cardiac monitor manufacturer's recommendations but typically include anterior/posterior or sternum/apex.
- Transcutaneous pacing is initiated when the patient is hypotensive. As the blood pressure improves, pacing is not discontinued, but the patient may be more aware of the discomfort and may require sedation.
- Patients may receive multiple interventions to maintain their heart rate and blood pressure. The treatment provided must be permitted time to take effect and to be evaluated before moving on to the next treatment.
- A contraindication to DOPamine administration is mechanical shock. Examples of mechanical shock include tension pneumothorax, pulmonary embolism, and cardiac tamponade.
- Notify the receiving hospital staff if the DOPamine drip goes interstitial as DOPamine can cause tissue necrosis which can be mitigated by a phentolamine injection at the hospital into the affected tissue.

TACHYDYSRHYTHMIA MEDICAL DIRECTIVE

- Specific to this directive, treatments do not necessarily follow the order in which they should be administered. The initial treatment choice will be based on rhythm interpretation (narrow vs. wide) and hemodynamic stability.
- Early lead II and 12 lead acquisitions will prove invaluable for determining the origin of the electrical impulses, the rhythm regularity and the QRS durations.

Contraindications for Adenosine Administration:

- Dipyridamole – brand name: Persantine.
- Carbamazepine – brand name: Tegretol

- Bronchoconstriction research has shown that inhaled adenosine provokes bronchoconstriction in asthmatic individuals (but not in the control group) and is therefore a contraindication for administration.

Adenosine Therapy:

- Has changed to 6 mg and 12 mg based on AHA guideline findings that a second 12 mg dose is likely ineffective. No BHP patch is required for the administration of adenosine for narrow complex regular tachycardia.

Lidocaine Dosing:

- Initial dose: 1.5 mg/kg to a max of 150 mg. The second and third doses are calculated as 0.75 mg/kg with the same maximum dose of 150 mg.

- Lidocaine is limited to a maximum of 3 mg/kg total dosing via IV.

- Topical doses of Lidocaine as administered in the intubation directive count towards a 5 mg/kg total dose.

- In the event the patient receives the maximum dose of Lidocaine and then experiences cardiac arrest, he/she will not receive further doses of Lidocaine.

Amiodarone Dosing:

- An Amiodarone infusion may be initiated following a BHP order.

INTRAVENOUS AND FLUID THERAPY MEDICAL DIRECTIVE

- The contraindication of a suspected fracture may not seem obvious, but a lack of integrity in a bone may jeopardize the integrity of the associated vascular structures and may result in extravasation.

- Pulmonary edema is a sign of fluid overload secondary to a fluid bolus. As such, frequent chest assessments are required.

- The treatment line specifies “consider IV cannulation”. This may encompass upper and lower extremity veins depending on your Base Hospital’s authorization.

- The Indications for the Intravenous and Fluid Therapy Medical Directive state; “Actual or potential need for intravenous medication OR fluid therapy”. These indications apply to not only prehospital use of the intravenous but also for some in-hospital use. If the patient meets the criteria of the Paramedic Prompt Card for Acute Stroke Protocol or the STEMI Hospital Bypass Protocol Prompt Card, then paramedics may consider the initiation of an intravenous. The initiation of an intravenous for these purposes should never delay transport and should only be attempted en route. Some hospital partners may prefer specific gauge needles and access sites. If available, refer to your local base hospital direction for this specific information.

Mandatory Patch Point:

- Is required before administering a fluid bolus to a patient <12 years old, who is hypotensive and suspected of being in ketoacidosis. A patch is required so that the physician can carefully control the volume of fluid administered to prevent cerebral edema.

Cardiogenic Shock and ROSC:

- The maximum volume of NaCl is lower for patients in cardiogenic shock or with ROSC. The maximum volume in those settings is 10 ml/kg or 1,000 ml.

- Formulas for pediatric normotension and hypotension are to be used until the calculation meets or exceeds the adult definitions at which point the adult values are to be used. For example, at 6 years of age, the pediatric calculation for normotension results in 102 mmHg; therefore, use the adult value of 100 mmHg.

- Hypotension in pediatric patients (up to 10 years old) is based on the formula: SBP = 70 + (2 x age).
- The references to macro, mini, and buretrol drip sets have been removed. Although the choice of drip sets have been left to service operators based on local requirements and RBH insight, some form of rate control must be utilized for patients less than 12 years of age to prevent accidental fluid overload.
- External jugular access, while not stated in the directives, remains in the ACP scope of practice and is typically reserved for cardiac arrest.
- Prior to initiating a fluid bolus, two blood pressures (of which one must be manually obtained) indicating hypotension are expected.
- Once a bolus has been initiated, a minimum volume of 100 ml in pediatrics and 250 ml in adults may be administered prior to discontinuing the fluid bolus should the patient become normotensive.

PEDIATRIC INTRAOSSEOUS MEDICAL DIRECTIVE

- "IV access is unobtainable" does not imply that you must attempt an IV and fail before proceeding to the IO, but it must be considered. Documentation on the ACR to support the rationale to bypass the IV attempt will be expected.
- The typical insertion site is the proximal tibia. Other sites are dependent on RBH approval.
- Aspiration may be recommended as part of the procedural skill, but an inability to aspirate should be confirmed by testing patency by attempting to push fluid.

HYPOGLYCEMIA MEDICAL DIRECTIVE

- Blood glucometry is performed using the Paramedic's supplied device.

Capillary Blood Sample Sites:

- Finger tips and the heel of the foot (pediatric patients who have not begun to walk).
- Samples **cannot be obtained from the flash chamber of an IV catheter**. Not only is the practice inherently unsafe, but it involves manipulating a medical device for purposes that it is not intended for and the blood sample obtained is not a capillary sample.
- It is recommended that the max single dose of D10W OR D50W for your *hypoglycemic* patient be administered gradually over 3 minutes, with a discontinuation in the event your patient attains a level of consciousness where they can safely consume carbohydrates. The goal is to avoid over treatment since this can result in rebound hyperglycemia.
- Premixed D10W should be run as a piggyback onto an existing IV line to ensure accurate dose administration.
- If Glucagon was initially administered with no patient improvement and an IV is subsequently established (if certified and authorized); perform a second glucometry and if the patient remains hypoglycemic administer dextrose regardless of the elapsed time since glucagon administration.

Preparation of 10% Solution:

- To prepare a **10%** solution: Waste 40 ml of the preload and replace the 40 ml with sterile water or saline. This will create a 5 g/50 ml solution. Administer 0.2 g/kg for the gram dose or 2 ml/kg for fluid volume and administer no more than 50 ml.

- When considering providing oral carbohydrates, the 15-15 rule can be used to treat hypoglycemia in patients who are able to safely ingest carbohydrates. The patient is to ingest 15 grams of simple carbohydrates followed by a repeat glucose check in 15 minutes, which allows time for the glucose to enter the bloodstream and raise the blood glucose. If the blood sugar remains low after 15 minutes, the process can be repeated. By utilizing the 15-15 rule, ingesting only 15 grams of simple carbohydrates helps to prevent rebound hyperglycemia from occurring after eating a large quantity of food. In most patients, 15 grams of carbohydrates is enough glucose to raise blood glucose by 2.1 mmol/L in approximately 20 minutes. [4][5][6]

- Examples of 15 grams of simple carbohydrates include:
  - 15 grams of glucose tabs, paste, or other formulation
  - 15 ml of water with 3 sugar packets dissolved
  - 150 ml of juice or regular soft drink
  - 15 ml of honey

SEIZURE MEDICAL DIRECTIVE

- The indications have been simplified to describe an active generalized motor seizure. This implies the classic tonic clonic presentation (regardless of causation) and therefore excludes partial seizures, petit mals, Jacksonian, etc.

Routes of Administration:

- Midazolam has a wide variety of routes of administration to suit the varied presentations. Utilize the route that can be accessed the quickest.

- IV: best route to provide anti-seizure medication, but the administration and time required to secure the route can be difficult. When in place, midazolam should be administered over 1 – 2 minutes.

- IO: is to be accessed **only** in the setting of pre-arrest.

- IM: easy access to large muscle groups with excellent blood flow, but the patient may be difficult to restrain. Consider sharp safety.

- IN: rapid access to the circulation with no sharps to worry about. Split doses between nares.

- Buccal: good absorptive surface and ease of administration. Consider the risk of aspiration.

OPIOID TOXICITY MEDICAL DIRECTIVE

- Naloxone may be administered to patients who are not responding to assisted ventilations or in situations whereby the provision of persistent ventilations is difficult (i.e. challenging extrications, prolonged transport times). Upfront airway management is paramount and the initial priority.

- The age for Naloxone administration is now ≥ 24 hours. The age cut off of ≥ 24 hours minimizes the risk of life-

[4] Diabetes Canada (n.d.). Lows and highs: Blood sugar levels. https://www.diabetes.ca/diabetescanadawebsite/media/managing-my-diabetes/tools%20and%20resources/lows-and-highs-blood-sugar-levels.pdf?ext=.pdf

[5] American Diabetes Association (n.d.). Blood Glucose Testing and Management Hypoglycemia (Low Blood Glucose). https://diabetes.org/healthy-living/medication-treatments/blood-glucose-testing-and-control/hypoglycemia

[6] Yale , J. F., Paty , B., & Senior , P. A. (2018). Hypoglycemia Diabetes Canada Clinical Practice Guidelines Expert Committee (42nd ed., pp. S104-S108). Canadian Journal of Diabetes.

threatening opioid withdrawal syndrome in the newborn.

- Naloxone may unmask alternative toxidromes in mixed overdose situations (leading to possible seizures, hypertensive crisis, etc.).
- Naloxone is shorter acting than most opioids and these patients are at high risk of having a recurrence of their opioid effect. Every effort should be made to transport the patient to the closest appropriate receiving facility for ongoing monitoring.
- Remember, naloxone is ONLY being administered to improve respiratory status, NOT to improve LOA or for any other purpose.
- IV naloxone titration refers to administering only small increments of the 0.4 mg dose at a time to restore respiratory effort, but limit the rise in wakefulness. Consider dilution for easier titration of IV Naloxone.
- In the setting of bystander administered naloxone, the Paramedic should use his/her judgment to determine the most appropriate patient care, being mindful of the potential risks (i.e. unmasking alternative toxidromes and those associated with the route of administration) with the administration of subsequent naloxone.
- The BLS DNR standard and Ministry of Health DNR Confirmation Form were created to ensure that appropriate and compassionate measures could be taken for those patients who are considered palliative and nearing the end of life. Any situation, including but not limited to opioid antagonist administration for an accidental or intentional opioid overdose, where the paramedic could provide treatment to a patient that is not considered end-of-life or palliative, should be considered.

OROTRACHEAL INTUBATION MEDICAL DIRECTIVE

- ETI (Endotracheal Intubation) is not mandatory. The importance of definitive airway management has given way to basic airway management and less invasive approaches.
- The contraindication which references age < 50 refers specifically to patients experiencing an asthma exacerbation and who are NOT in or near cardiac arrest.
- The onset of action for topical Lidocaine is within 1 minute but it may take up to 3 – 5 minutes to have full effect.
- In the treatment statement, “consider intubation” is followed by “with or without facilitation devices”. This is a generic statement to address everything from the air trach, to the bougie to all things as yet undefined. The generic statement enables us to continue to use the directives despite changes in technology without being prescriptive.
- The formula that is recommended for sizing a **cuffed** pediatric endotracheal tube is **3.5+ (Age in years/4)**. This formula allows for a slightly smaller tube as the cuff will create the seal versus the tube only.
- It is recommended that paramedics start with smaller volume of air when inflating the cuff (example 1 ml increments) and continue until no air is heard on auscultation escaping past the cuff. It is also appropriate to use a smaller syringe such a 3ml or 5ml to avoid over inflating the cuff in smaller patients.
- ETI confirmation has been updated and now requires $ETCO_2$ waveform capnography as the only primary method. It is the most reliable method to monitor placement of an advanced airway (AHA guidelines 2015, Part 7). In the event it is not available, three (3) secondary methods must be used; for example: colourimetric detector that changes color with exposure to CO_2.
- Definition of intubation attempt: Introducing the laryngoscope into the patient’s mouth with the intent to then

insert an endotracheal tube is considered an attempt and should be documented as such including success or failure.

- The number of advanced airway attempts is clearly defined as two (2) attempts per patient regardless of the route chosen.

BRONCHOCONSTRICTION MEDICAL DIRECTIVE

- Suspected bronchoconstriction applies to asthma, COPD, and other causes of bronchoconstriction. Symptoms of bronchoconstriction may include wheezing, coughing, dyspnea, decreased air entry and silent chest.

- EPINEPHrine 1:1,000 (1 mg/ml) IM is indicated when the patient is asthmatic and BVM ventilation is required. This is typically after salbutamol has had no effect, however salbutamol could be bypassed and EPINEPHrine be administered immediately due to the severity of the patient's condition. The indications to administer EPINEPHrine do not change based on the ability to administer salbutamol.

- When a dose of MDI salbutamol is administered, the intent is to deliver all six (6) (pediatric) or eight (8) (adult) sprays to complete a dose. It would be under unusual circumstances to deliver less than the full dose.

- MDI administration is preferred over nebulization. If the patient is unable to accept or cooperate with MDI administration, the nebulized route may be considered (maximum three (3) doses).

- Technique for administration of MDI salbutamol: provide one MDI spray, followed by 4 breaths to allow for inhalation. It will take 1 minute to deliver a full adult dose to a patient breathing at a rate of 32 breaths per minute.

- The MDI and spacer device should be considered a single patient use device.

- Nebulization increases the mobilization of any contagion and a Paramedic should use PPE.

- Dexamethesone manufactured for IV/IM use can also be administered PO. PO is the preferred route for administration, and it should only be given IM/IV if the patient is extremely short of breath and all other care has been provided.

- Dexamethasone can be used in conjunction with salbutamol, epinephrine and CPAP. Salbutamol and EPINEPHrine are still priority treatments.

- When treating with dexamethasone, the contraindication to steroids only applies to systemic steroids (PO, parenteral) and not inhaled or topical steroids. Inhaled steroids are very specific to lung tissue and do not contribute to systemic absorption.

- COPD is underdiagnosed in Canadians, and smoking is a significant risk factor in the development of COPD. The likelihood of a long-time smoker having COPD is high. Therefore, for undiagnosed patients who smoke or previously smoked and are 20 pack-years, they would be considered for dexamethasone. Pack-years is a way to measure smoking exposure, considering how long someone has smoked and how much they have smoked. For example, if you have smoked a pack a day for the last 20 years or two packs a day for the last 10 years, you have 20 pack-years.

MODERATE TO SEVERE ALLERGIC REACTION MEDICAL DIRECTIVE

- The medical directive now includes a range of allergic reactions from moderate to severe and the administration of diphenhydrAMINE.

- Anaphylaxis is life-threatening and delays in administration of EPINEPHrine are associated with greater mortality. If the patient meets the indications and none of the contraindications, EPINEPHrine should be administered because it may prove to be life-saving.
- EPINEPHrine 1:1,000 (1 mg/ml) in anaphylaxis is administered via the IM route only.
- IV access should be considered after IM administration of EPINEPHrine to reduce the chance of inadvertently administering the medication via the IV route.
- Skin findings are most common but up to 20% of patients do not have hives or other skin symptoms. Therefore, ensure that all body systems are assessed to determine the most appropriate treatment plan.
- Urticaria alone is not an indication for administration of EPINEPHrine IM, the patient must present with at least one other sign or symptom involving another organ system or severe symptom.
- DiphenhydrAMINE administration (when available) should always follow the administration of EPINEPHrine as outlined in the Medical Directive.

Please refer to the table on page 15 as a reference for differentiating an anaphylactic reaction from a local reaction.

CROUP MEDICAL DIRECTIVE

- For severe presentation both EPINEPHrine and dexamethasone can be considered. For mild or moderate presentation, only Dexamethasone should be considered.
- Prior to initiating nebulized EPINEPHrine, moist/cold air may be attempted if available and patient's condition permits.
- Croup is occurring more and more frequently in older patients including adults, and if the indications are met, a patch to a BHP would be required to consider treatment under this medical directive.
- If a patient has received steroids in the past 48 hours, an additional dose is unlikely to improve their condition due to its long half-life.

TENSION PNEUMOTHORAX MEDICAL DIRECTIVE

- A chest seal with a one-way valve over a catheter. The chest seal blocks your view of the needle, and there is limited evidence to demonstrate a benefit.
- A Heimlich valve or Cook chest drain valve may be applied at or below the level of the catheter to assist in the evacuation of air from the pleural space.
- When determining the catheter sizing for pediatrics, the age of the patient should be taken into consideration. Pediatrics that are adolescents of adult size, should be treated as adults and a needle thoracostomy should be performed using the 4th intercostal space anterior axillary line with a minimum of a 14G 2 inch angiocath needle.
- For pediatrics that are less than 13 years of age, or small adolescents, a 14G or 16G 1.5 inch angiocath needle is appropriate for performing a needle thoracostomy. Any needle that is longer can increase the risk of iatrogenic injury to the patient. A 2-inch needle is more than double the chest wall thickness of most children. The 2nd intercostal space is the preferred location for this patient population.

ANALGESIA MEDICAL DIRECTIVE

- Paramedics are encouraged to use their clinical judgment when choosing which analgesia is best suited for their patient. The following points are things to consider when choosing the appropriate analgesia:
    - Acetaminophen and ibuprofen should be utilized as first line analgesia for patients who are able to tolerate oral administration. Oral administration is as effective and is less invasive than parenteral analgesia.
    - Administration of acetaminophen and ibuprofen can provide analgesia similar to low-dose opioids without the euphoric effect.
    - Whenever possible, acetaminophen and ibuprofen should be co-administered.
    - Ketorolac should not be administered in conjunction with ibuprofen as they are both NSAIDs and administration of both would increase the adverse effects.
- Active labour is defined as an increase in strength and duration of contractions with a decrease in time between contractions. Often patients will begin to feel the urge to push and will likely be unable to move around during the contraction.
- The routes of administration for morphine are listed as IV/SC and both routes are listed together and therefore are considered equivalent. The decision on the route chosen should be based on one of availability.
- The routes of administration for fentaNYL are listed as IV/IN and both routes are listed together and therefore are considered equivalent. The decision on the route chosen should be based on one of availability. The IN route for fentaNYL has a more rapid onset than that of SC morphine and can allow for a short onset of narcotic level analgesia in situations where an IV is unattainable.
- Aliquots for the purpose of the Analgesia Medical Directive is defined as: small, equal parts of the maximum single dose that are administered q 3 minutes until the desired analgesia is achieved or the maximum single dose is reached. Paramedics should document the total amount of a single dose administered and not each individual aliquot as a separate dose.
- The next dose of morphine can be administered 15 minutes after the last aliquot or the max single dose was administered.
- The next dose of fentaYNL can be administered 5 minutes after the last aliquot or the max single dose was administered.

Suspected Renal Colic:

- Suspected renal colic patients should routinely be considered for NSAIDS (either ibuprofen or ketorolac) administration in addition to morphine or fentaNYL because of the anti-inflammatory action and smooth muscle relaxant effects (reduces the glomerular filtration rate which reduces renal pelvic pressure and stimulation of the stretch receptors) as well as its inhibition of prostaglandin production makes them ideal agents to treat renal colic (Davenport & Waine, 2010). The only advantage of parenteral ketorolac over oral ibuprofen is the ability to administer an NSAID despite vomiting. The overall clinical effect of these drugs is almost identical.
- Ketorolac should not be administered in conjunction with ibuprofen as they are both NSAIDs and concomitant administration of both would increase the adverse effects.

Active Bleed Defined:

- External trauma that has been dressed and controlled is not considered an active bleed.
- Occult bleeding should be considered active bleeding (hematuria/GI bleed).

- Trace blood in urine with suspected renal colic is not considered active bleed.

HYPERKALEMIA MEDICAL DIRECTIVE

Recognition of hyperkalemia can be improved by considering:

- Patients most at risk:
    - Patients unable to excrete potassium, for example the chronic kidney disease patient on dialysis that may have missed treatment(s),
    - Conditions that may precipitate extracellular potassium shift such as crush syndrome, acid-base disturbances, prolonged status seizures, major burns or prolonged immobilization.

- Signs and symptoms:
    - CNS: muscle twitches, cramps or paresthesia.
    - GI: abdominal cramps, diarrhea or nausea/vomiting.
    - CVS: progression to hypotension, decreased LOA, bradycardia or ECG changes.

- ECG changes consistent with severe hyperkalemia:
    - Peaked T-waves, flattened P-waves, lengthened PR interval or widened QRS.
    - Progressive widening of QRS or bizarre QRS morphology such as sine-wave appearance.
    - Not all severe hyperkalemia manifests with all possible ECG changes. Consider the overall patient condition and risk factors and include these findings in your patch to the BHP.

Prehospital Goals in Hyperkalemia Treatment are focused on:

- Electrophysiological effects of excessive extracellular potassium on myocardium. Calcium Gluconate stabilizes cardiac cell membranes and may prevent life-threatening dysrhythmias. In circumstances of severe hyperkalemia such as cardiac arrest, multiple administrations may be indicated. In the unstable hyperkalemia patient, calcium Gluconate should always be the priority treatment. Routine treatments common in medical cardiac arrest management may not respond until calcium is administered.

- Redistribution of extracellular potassium into the cells. Salbutamol in large doses may temporarily enhance potassium cellular uptake.

Considerations:

- Sodium bicarbonate is not a very effective agent for hyperkalemia and it should not be routinely administered. This would be a patch point for discussion with a BHP.

Safety Consideration:

- Ensure the IV line is patent and flowing well as calcium gluconate may cause necrosis if it extravasates.

- In the treatments, 12 lead acquisition and interpretation is listed both before and after treatment with calcium gluconate and salbutamol. This is intentional to measure ECG changes. This is only applicable to the patient NOT in cardiac arrest.

COMBATIVE PATIENT MEDICAL DIRECTIVE

- Patients who require a volume greater than 5 ml will require two separate injections in different limbs to achieve a desired dose. Separate injections to achieve a single dose should be administered within the closest, safest timeframe as possible to each other. The vastus lateralis muscle can accommodate up to 5 ml per injection per leg.

- Paramedics should consider establishing IV access once the patient is sedated.

- When using emergent high dose sedation, patients are at risk of cardiovascular collapse and respiratory arrest, which necessitates full cardiorespiratory monitoring $ETCO_2$.

- The dosing range of midazolam enables the paramedic to use their clinical judgment to determine an appropriate dose. The patient's physical size is not always the best determinant of required dose.

HOME DIALYSIS EMERGENCY DISCONNECT MEDICAL DIRECTIVE

- While there are several variations of dialysis machines/tubing, the best practice is to disconnect the patient by using the materials and instructions that are typically found in the disconnect kit. In the event instructions are not available, the tubing should be clamped first on the patient side, secondly on the machine side, and finally separated in the middle.

SUSPECTED ADRENAL CRISIS MEDICAL DIRECTIVE

- Patients with primary adrenal failure generally require little assistance from EMS, except in cases of stress when they can become critically ill; in which case they will require the administration of hydrocortisone. Hydrocortisone is not carried by paramedics.
    - Examples of stress may include, but are not limited to:
        - Hypoglycemia
        - Hypotension
        - Gastrointestinal issues
        - Fractures

    If the patient presents with signs and symptoms consistent with the medical directive, AND his/her medication is available, a Paramedic may administer 2 mg/kg up to 100 mg IM/IV/IO/CVAD of hydrocortisone.

- These patients should be transported to a receiving facility for additional care and follow up.

EMERGENCY CHILDBIRTH MEDICAL DIRECTIVE

- The Condition of "Age - Childbearing years" for Delivery, Umbilical Cord Management and External Uterine Massage refers to the approximate ages of 14 – 50 years.

- Paramedics are not authorized to perform internal vaginal exams to determine cervical dilation.

- Paramedics should consider inspection of the perineum in the following situations to determine whether signs of imminent birth are present:
    - History is suggestive of ruptured membranes or umbilical cord prolapse.
    - The patient is in labor and reports an urge to push, bear down, strain or move the bowels with contractions or reports that "the baby is coming".
    - The patient is near term, level of consciousness is decreased and history is unavailable, inconclusive or indicates that labor was on-going prior to decrease in/loss of consciousness.
    - Vaginal bleeding is heavy and the patient is hypotensive or in shock.

- Signs of second stage labor include:
    - Contractions every two to three minutes, lasting 60-90 seconds;

- Contractions associated with maternal urge to push or to move the bowels;
- Heavy red show visible at the vaginal opening; or
- Presenting part or bulging membranes visible at vaginal opening and / or perineum bulging with contraction.

- Signs of imminent birth:
  - Crowning or other presenting part is visible or;
  - In primips, presenting part is visible during and between contractions, maternal urge to push or bear down, and contractions are less than two (2) minutes apart, or;
  - In multips, contractions five minutes apart or less and any other signs of second stage labor present.

- Complicated Delivery includes:
  - Shoulder dystocia - An inability of the fetal shoulders to deliver spontaneously
    - Paramedics should suspect shoulder dystocia if the fetus's body does not emerge with the contraction following the delivery of head. **It is important not to direct the patient to push if a contraction is not present to allow restitution of the head.** The presence of 'turtling' or the 'turtle sign' (the fetal head, often quite purple, retracting firmly against the perineum following the contraction) is an indication to attempt the McRoberts Manoeuvre.
    - Paramedics should attempt the McRoberts Manoeuvre and apply suprapubic pressure.
      - With the patient lying flat, flex the maternal thighs onto the abdomen (squatting position); this is achieved by one person grasping a leg and assisting with hyperflexion of the maternal thighs against the abdomen.
      - If a second Paramedic is available, have him/her place their hand slightly above and just behind the maternal symphysis pubis and exert steady firm downward pressure with the heel of the hand.
    - If delivery is not achieved, Paramedics should attempt the Gaskin Manoeuvre (position change to hands-and-knees):
      - Attempt to deliver the posterior shoulder.

  - Breech Delivery – The delivery of a fetus with the buttocks or feet presenting first.
    - In the presence of a breech presentation, Paramedics should remain relatively "hands off" the fetus until it has delivered to the umbilicus to avoid stimulating premature respiration.
    - Allow the head to deliver spontaneously, or gently lift and hold the neonate upwards and backwards while avoiding hyperextension.
    - Attempt the "Mauriceau – Smellie – Veit Manoeuvre" if the head does not deliver within three minutes of the body.
      - Lay the neonate along one forearm with palm supporting the neonate's chest and the two fingers exerting gentle pressure on the neonate's face to increase flexion.
      - Place other hand on the neonate's back and with two fingers hooked over the shoulders and the middle finger pushing up on the occiput to aid flexion.
      - When the hairline becomes visible, lift the body in an arc to assist the fetal head to pivot around the symphysis pubis and allow the face to be born slowly.
      - If a second Paramedic is available, have him/her apply suprapubic pressure.

  - Nuchal or Prolapsed Cord
    - If a cord prolapse is present, place the patient in a knee-chest position or Exaggerated Sims Position. Gently cradle cord in hand and replace cord in vagina while inserting fingers/hand into vagina to apply manual digital pressure to the presenting part. Elevate the presenting fetal part off the cord and maintain manual elevation until transfer of care.

      Exaggerated Sims Position:
      - The patient lies in left lateral position with left arm lying along the back and the right knee drawn towards the chest.
      - Place a pillow/wedge under the left hip/buttocks to raise the pelvis and use gravity to move fetus toward the fundus.

        - Exaggerated Sims Position is preferred for safe transport, however, the knee chest position is more effective at elevating the presenting part of the cord in the presence of strong uterine contractions.
    - If a nuchal cord is present, the cord should be slipped over the neonate's head or over the shoulders. If the nuchal cord cannot be relieved by manual means, it should be clamped and cut while the neonate is still on the perineum.

- Lack of progression of labor refers to situations where there are signs of imminent birth but there has been no further progression of delivery. Paramedics should discourage the patient from pushing or bearing down during contractions and initiate transport.

- Once the newborn is delivered, the cord should immediately be clamped and cut only if multiple gestation is suspected, neonatal or maternal resuscitation is required or due to transport considerations (after approximately three minutes; once cord pulsations have ceased).
    - Clamp the umbilical cord in two places using the OBS clamps:
        - Approximately 15 cm from the neonate's abdomen and approximately 5-7 cm from the first clamp.
        - Cut the umbilical cord between the clamps using the OBS scissors.

- External uterine massage should be performed only when the placenta has been delivered and there is presence of excessive bleeding. External uterine massage should continue until bleeding stops. Do not pack the vagina to control bleeding.

- External uterine massage requires firm pressure and will be uncomfortable/painful for the mother when it is being performed correctly. Remember to make the patient aware of this and the reasoning for performing this maneuver.

- In the circumstance where the Paramedic is unable to control excessive bleeding, external bimanual compression should be performed. External bimanual compression can be performed regardless of if the placenta is delivered or not.

- The addition of oxytocin has potential to dramatically affect maternal morbidity and mortality in a high acuity low occurrence event (massive post-partum hemorrhage). Oxytocin is an ideal agent with evidence supported and endorsed globally by the World Health Organization for the management and care of post-partum hemorrhage.

- There is some evidence indicating that oxytocin can induce vasoconstriction, therefore exacerbating hypertension.

ENDOTRACHEAL AND TRACHEOSTOMY SUCTIONING & REINSERTION MEDICAL DIRECTIVE

- Insert the catheter and apply suction (10 seconds or less) while gently twisting and withdrawing the catheter.

- To minimize hypoxia and possible trauma, do not suction more frequently than once per minute.

- Exceeding the recommended suction pressures or maximum number can cause injury and swelling to the mucosal tissues of the airway and increases the risk of arrhythmia.

- If all suctioning attempts have been made to clear the tracheostomy and the Paramedic is unable to oxygenate/ventilate using positive pressure ventilation (PPV), the tracheostomy is to be considered a foreign body airway obstruction (FBAO). In an attempt to relieve the FBAO, remove the tracheostomy to gain access to the stoma for oxygenation/PPV.

- In the event that the tracheostomy tube or inner cannula has been withdrawn and the patient is in respiratory distress consider utilizing a family member or caregiver who is on scene and knowledgeable to replace the tracheostomy tube or inner cannula. The rationale for this consideration is the expectation that they will be more experienced and comfortable with the act of replacing the tracheostomy tube or inner cannula.

- If there is no family member/caregiver available who is knowledgeable in replacing the tracheostomy tube or inner cannula consider proceeding with the tracheostomy/cannula reinsertion. If available, prepare a new tracheostomy tube or inner cannula for reinsertion. If a new tracheostomy tube or inner cannula is not available, remove the inner cannula (if not already done), deflate the cuff, if present, and clean the current tracheostomy tube or inner cannula with a saline or water rinse.

- To optimize the insertion of the tracheostomy tube, optimal patient positioning is a 30-90 degree sitting position.

- Insert the obturator into the outer cannula and lubricate the end of the tracheostomy tube with water based lubricant or saline to prevent tissue damage.

- In the absence of an obturator, paramedics are still able to insert the outer cannula, but are advised to be cautious because the outer cannula may damage soft tissue of the trachea.

- The tracheostomy tube or inner cannula should be inserted during the inhalation phase.

- If a patient requires assisted ventilations, and there is no appropriate inner cannula available with a 15 mm adaptor, paramedics are recommended to utilize an appropriate sized mask attached to a BVM to provide ventilation through the outer cannula ensuring an adequate seal.

- In situations where a reinsertion fails, paramedics should occlude the stoma and attempt standard oral airway maneuvers and ventilation through the mouth and nose. Attempts to ventilate through the mouth and nose with the stoma occluded may not work depending on the reason the patient has a tracheostomy.

- In situations where occlusion of the stoma and attempts to ventilate the patient through the mouth and nose is unsuccessful or impossible (Laryngectomy), paramedics should utilize an appropriate sized mask that can provide a seal around the stoma attached to a BVM to provide ventilation through the stoma ensuring an adequate seal.

CENTRAL VENOUS ACCESS DEVICE ACCESS (CVAD) MEDICAL DIRECTIVE

- While establishing a new peripheral IV line is preferred in the prehospital environment, central venous access devices (CVAD) offer additional parenteral routes of therapy administration should a routine IV be difficult or impossible to place and a patient has a CVAD in place.

- The patient must be critically ill to access a CVAD device. This requirement is due to the associated risks involved with CVAD access including contamination of the line requiring replacement.

- The steps for accessing a CVAD are very specific. Please refer to provided skill sheets.

- Access must be performed with meticulous consideration of maintaining sterility, as CVAD lines carry with them an increased risk of infection. Connectors must be cleaned thoroughly before access, including all the cracks and grooves.

- If unable to aspirate blood, re-clamp the lumen and attempt to use another if available. If clots are present during aspiration, do not proceed. Failure to properly aspirate can embolize microthrombi that can form around the distal tip of these catheters, bringing with them a risk of stroke, coronary event, pulmonary

embolus or extremity thrombus.

- If a CVAD is accidentally dislodged, place firm pressure on the insertion site for at least 10 minutes with several sterile 4x4 gauze squares or a trauma dressing to control bleeding.

- The following are some examples of CVAD devices (not an exhaustive list):
    - Hickman: Central catheter inserted through the anterior chest wall.
    - Peripherally Inserted Central Catheter (PICC): Located on the patient's upper arm, but is still direct to central circulation.

SUPRAGLOTTIC AIRWAY MEDICAL DIRECTIVE

- Consider withholding the supraglottic airway (SGA) if the patient is actively vomiting due to an increased risk of aspiration. Active vomiting is considered ongoing vomiting where the Paramedic is unable to clear the airway.

- If the patient has vomited, and the airway has been cleared successfully, a supraglottic airway may be inserted.

- The number of attempts is clearly defined as two (2) total per patient, and not per provider.

- Confirmation of SGA insertion requires $ETCO_2$ waveform capnography. It is the most reliable method to monitor placement of an advanced airway (AHA guidelines 2015, Part 7). If it is not available, at least two (2) secondary methods must be used. SGA placement should be verified frequently and again at transfer of care. Findings and witness (where possible) should be documented on the patient care record.

ROSC:

- In the event the patient with a SGA in place sustains a ROSC, the SGA should only be removed if the gag reflex is stimulated or the patient begins to vomit; expect to remove it as the level of awareness improves.

NAUSEA / VOMITING MEDICAL DIRECTIVE

- While the indications list nausea or vomiting, patients presenting with these symptoms do not necessarily require treatment.

- Overdose on antihistamines, anticholinergics or TCAs are contraindications for the administration of dimenhyDRINATE. For a comprehensive list of these medications, please refer to the most current CPS or contact your RBH.

  If dimenhyDRINATE is administered via the IV route, it must be diluted as per the medical directive with saline to facilitate a slower and less painful administration. Based on a supply of 50 mg in 1 ml, either dilution method of 5 mg/ml (diluted with 9 ml of NaCl) or 10 mg/ml (diluted with 4 ml of NaCl) is acceptable.

- The addition of ondansetron allows the Paramedics to use their clinical judgment in their selection of medication based on the suspected underlying cause of nausea and vomiting.

dimenhyDRINATE	ondansetron
• motion sickness or vertigo • upset stomach due to food ingestion • best for people on SSRIs • hyperemesis for a pregnant patient • avoid with head injuries as it can cause increased ICP	• cause from drug interactions - i.e. chemotherapy, alcohol, cannabis, illicit drugs • head trauma (less risk of ICP) • taking diphenhydrAMINE, anticholinergics or tricyclic antidepressants (TCAs) • elderly patients

- If a patient has received dimenHYDRINATE and has no relief of their nausea & vomiting symptoms after 30

minutes, ondansetron may be considered if the patient meets the conditions and has no contraindications.

- The rationale for the contraindication of dimenhyDRINATE being co-administered with diphenhydrAMINE is that the combined effect can lead to anticholinergic side effects, and over-sedation.
- The rationale for the contraindication of apomorphine use with ondansetron is that it may precipitate profound hypotension.
- The age for dimenhyDRINATE is now for <65 yrs. old. dimenhyDRINATE has negative effects of somnolence and confusion, especially in the elderly. For further information on dangerous medications for the elderly population, reference ISMP "Beers List": https://www.ismp-canada.org/beers_list/#l=tab2

ADVANCED CARE PARAMEDIC AUXILIARY MEDICAL DIRECTIVES

ADULT INTRAOSSEOUS MEDICAL DIRECTIVE – AUXILIARY

- This auxiliary directive requires service operator and Base Hospital advocacy, training and education prior to implementation.
- "IV access is unobtainable" does not imply that you must attempt an IV and fail before proceeding to the IO, but it must be considered. Documentation on the ACR to support the rationale to bypass the IV attempt will be expected.
- Typical IO needles range from 15-18 gauge.
- The typical insertion site is the proximal tibia. Other sites are dependent upon RBH approval and manufacturer recommendation.
- Aspiration may be recommended as part of the procedural skill, but an inability to aspirate should be confirmed by testing patency by attempting to push fluid in.

NASOTRACHEAL INTUBATION MEDICAL DIRECTIVE – AUXILIARY

- Topical Lidocaine dosing has been updated: A single spray is 10 mg, and the maximum body dose is 5 mg/kg which includes Lidocaine administered by any route (IV and topical).
- NTI confirmation has been updated and now requires $ETCO_2$ waveform capnography as the only primary method. It is the most reliable method to monitor placement of an advanced airway (AHA guidelines 2015, Part 7). In the event it is not available, two (2) secondary methods must be used; for example: colourimetric detector that changes color with exposure to CO2.
- Definition of intubation attempt: Insertion into a nare is considered one attempt and should be documented as such including success or failure.
- The number of attempts is clearly defined as two (2) intubation attempts per patient regardless of the route chosen.

CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP) MEDICAL DIRECTIVE – AUXILIARY

- This is for the treatment of severe respiratory distress AND acute pulmonary edema (regardless of origin) or COPD.
- CPAP should be considered as additive therapy to the bronchoconstriction (specifically COPD exacerbation) or acute cardiogenic pulmonary edema medical directives, not a replacement.
- CPAP may be interrupted momentarily to administer nitroglycerin (salbutamol can be administered via MDI port).

CRICOTHYROTOMY MEDICAL DIRECTIVE – AUXILIARY

- This is a last resort option for airway management. Cricothyrotomy should only be considered if the Paramedic cannot ventilate with the BVM and is unable to intubate or place a supraglottic airway.
- The frequency of complete airway obstructions that cannot be relieved is very low and therefore the frequency of use of this medical directive application is equally low. Frequent practice and review is necessary.

PROCEDURAL SEDATION MEDICAL DIRECTIVE – AUXILIARY

- This directive applies only after the ETT has been placed **OR** after pacing has been initiated.
- Once hypotension has been corrected, it is no longer a contraindication to use midazolam or fentaNYL.
- The intent of the directive is to administer both midazolam and fentaNYL concurrently.

ASSESSMENT OF PATIENTS WITH POSSIBLE COVID-19 MEDICAL DIRECTIVE – AUXILIARY

- This directive is intended for implementation in the event that there is a surge in patient volumes that may overwhelm the existing system. This directive may only be implemented upon authorization of the Regional Base Hospital medical director.
- Approach the directive in a systematic way.
    1. Assess the patient for eligibility under the release from care criteria.
    2. Patch to confirm that the patient can be released from care. A BHP patch is required for any patient assessed to be CTAS 3 with mild or no respiratory distress.
    3. Once it has been confirmed that the patient will be released from care, perform the COVID testing swab (if available/authorized).
- The directive refers specifically to patients who call 911 due to COVID-19 related symptoms/complaints.
- COVID-19 Symptoms may include but are not limited to:
    - Fever
    - Dry cough
    - Shortness of breath
    - Fatigue

- Lack of appetite
- Body aches
- Sore throat
- Stuffy/runny nose
- New vomiting/diarrhea/abdominal pain with no pre-existing condition
- Loss of smell/taste disturbance

- Note that the indications do not follow the MOH screening tool exactly due to the broad nature of the MOH screening tool. Indications include primarily respiratory symptoms.

- Due to potential increased risk of leaving pediatric patients or patients over 65 years of age at home we should consider transport of these patients to the hospital.

- Vital signs listed under conditions align with CTAS considerations.

- Pregnancy is listed as a contraindication for the consideration of this directive as pregnancy may increase the risk of COVID-19 to the patient.

- Ensure the patient/SDM has capacity prior to your BHP patch.
  - patient has capacity (described above; link to aid to capacity assessment in the ACR completion manual below)
  - relates to patient disposition decision (in this case)
  - informed (fully informed; not just what the patient asks)
  - voluntary (without coercion/threats)
  - without misrepresentation or fraud (open and honest, as unbiased as possible)

- Provide the following information to the BHP during your patch for consideration of release from care under the directive:
  - age/gender
  - patient's COVID-19 screening result
  - travel history
  - history of illness and symptoms
  - past medical history
  - vital signs
  - additional assessment findings, including respiratory assessment
  - patient and/or SDM's wishes and follow-up plans (if known)

- If considering release from care, ensure that the patient is able to self-isolate, can care for themselves or there is a caregiver available and has access to 911 if needed.

- Best practice means that prior to release from care, the patient should be able to:
  - verbalize/communicate an understanding and appreciation of their clinical situation
  - verbalize/communicate an understanding and appreciation of the applicable risks
  - verbalize/communicate the ability to make an alternate care plan
  - verbalize/communicate an understanding of how to self-isolate for 14 days

- Ensure you know how to direct the patient/SDM to contact their local public health unit.

- A signature if not required to release a patient from care however ensure that thorough documentation includes the following information:
  - Describe all aid to capacity assessments completed and who they refer to (i.e. patient or SDM),
  - Describe all actions taken with regards to the directive,
  - Describe all discussions had with the patient with regards to the directive,
  - Describe the alternate care plan discussed with the patient/SDM including a plan to self-isolate for 14 days.

- Symptom management is specific to COVID-19 related symptoms. The patient should be able to complete activities of daily living at home by themselves, or with assistance from family. The patient should have the necessities of sustenance (food, water, warmth, shelter, etc.). Patients should be informed of the possible progression, sometimes rapid progression, of their specific illness or complaint, in addition to progression of respiratory symptoms related to COVID-19, and given information for contacting PH, primary care (if able), paramedics, or arranging transport to the ED if they are able. Please provide follow up instructions as per your Regional Base Hospital.

- Definitions provided under the clinical considerations section may not be all inclusive.

MINOR ABRASIONS MEDICAL DIRECTIVE – AUXILIARY – SPECIAL EVENT

- Topical antibiotic ointment is left generic to allow for service provider specifications in consultation with the BHP.

MINOR ALLERGIC REACTION MEDICAL DIRECTIVE – AUXILIARY – SPECIAL EVENT

- Signs and symptoms MUST be consistent with a mild allergic reaction.

MUSCULOSKELETAL PAIN MEDICAL DIRECTIVE – AUXILIARY – SPECIAL EVENT

- The patient cannot have taken acetaminophen within the last 4 hours to receive it from the Paramedic.

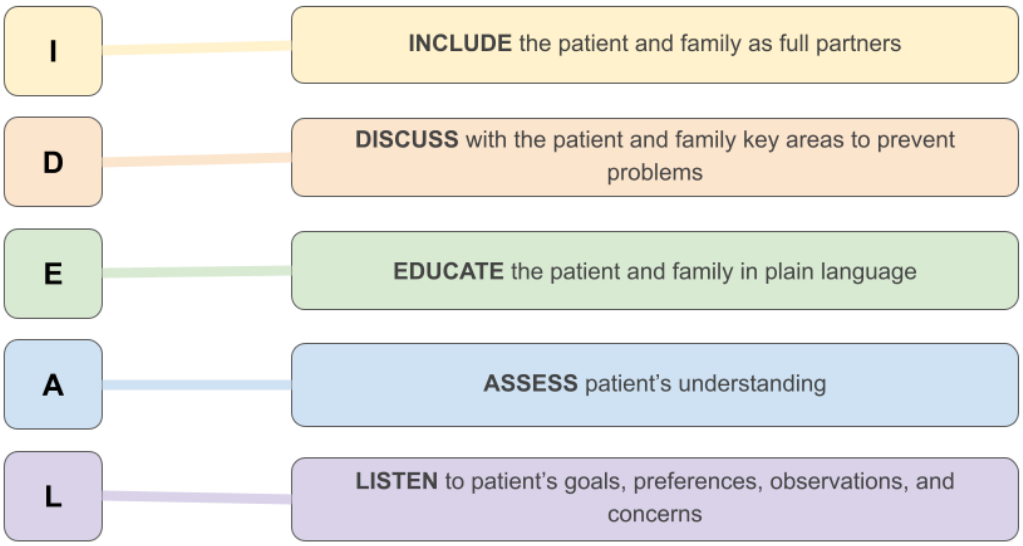
HEADACHE MEDICAL DIRECTIVE – AUXILIARY – SPECIAL EVENT

- The patient cannot have taken acetaminophen within the last 4 hours to receive it from the Paramedic.

TREAT AND DISCHARGE MEDICAL DIRECTIVES

General:

- Conveying a diagnosis is a controlled medical act, therefore, treat and discharge from care is a fundamentally distinct and different process from a patient refusing treatment as defined in the BLS PCS
- A responsible adult is defined as a person that is the age of majority (≥18 years old) and is someone who, in the reasonable belief of the paramedic, is capable of remaining with the patient and will assume responsibility for the patient.
- The IDEAL mnemonic for patient discharge comes from a hospital evidence-based system that was put together with patient safety in mind.



- **INCLUDE** the patient and family as full partners in the discharge planning process
- **DISCUSS** with the patient and family key areas to prevent problems
    - Highlight warning signs and problems
    - Exacerbation of symptoms or new symptoms
    - Explain assessments you've done
    - Discuss plans for follow-up
    - Discuss patient/family wishes
- **EDUCATE** the patient and family in plain language about the patient's condition, the discharge process, and the next steps
    - Patient's current condition
    - Clinically reasonable differential diagnosis
    - Inform/acknowledge our limitations
    - Discharge process
    - Calling 911 back
- **ASSESS** patient's understanding
    - Use teach back to determine patient comprehension
    - Ensure understanding and accuracy
- **LISTEN** to patient's goals, preferences, observations, and concerns
    - Pay attention to body language
    - Use open-ended questions to elicit answers

Hypoglycemia:

- Patients can receive multiple forms of treatment for hypoglycemia. For example, a patient may initially not be able to safely consume carbohydrates and require dextrose and/or glucagon prior to consuming carbohydrates. These patients can still be considered for Discharge from Care.
- Patients who receive multiple doses of the same medication for example, two doses of glucagon, D50 or D10, should be transported to hospital.
- New and novel medications are constantly being approved and prescribed to patients who are diagnosed with diabetes. If you are unable to determine what class the medication is (i.e. insulin, oral hypoglycemic,

other), then a patch to the Base Hospital Physician should be initiated to discuss the suitability of the patient in meeting the treat and discharge medical directive.

Seizure:

- A confirmed history of epilepsy must be diagnosed by a physician.
- "New medication" refers to any new anti-seizure medication that is newly prescribed or where a recent dosage change has occurred. The addition of new or changes to anti-seizure medications (dosage or type) in the past 30 days should be considered as they can potentially lower a patient's seizure threshold. Some medications may be increased weekly to achieve optimal clinical response.
- A "single seizure episode" is defined as a single seizure.
- A seizure cluster is multiple seizures that occur within a 24-hour period. Patients who experience seizure clusters do not qualify for treat and discharge.

APPENDIX A - DELEGATED ACTS/PROCEDURES

A

APPENDIX A

APPENDIX A – DELEGATED ACTS/PROCEDURES

The following delegated acts/procedures reference sheets have been developed to provide Paramedics across Ontario with a standardized step-by-step guide on how to perform the delegated skills utilized within the Advanced Life Support Patient Care Standards. It is acknowledged that there may be multiple methods of performing some of the delegated acts/procedures based on manufacturer recommendations for specific devices and/or equipment utilized by the paramedics. Where possible, these delegated acts/procedures have been written to be generic in regards to equipment utilized in the performance of the procedure.

DELEGATED ACTS/PROCEDURES

APPENDIX A

APPENDIX A

SEMI-AUTOMATED EXTERNAL DEFIBRILLATION (SAED)

INDICATIONS:

Confirm the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ Airway Equipment
- ❑ Towel
- ❑ O_2 source
- ❑ Cardiac Monitor with therapy pads
- ❑ Razor

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Confirm patient is VSA.
- ❑ Initiate CPR.
- ❑ Expose the chest.
- ❑ Prepare the chest for application of defibrillation pads *(dry, and/or shave if required).*
- ❑ Turn on monitor and enable CPR metronome/CPR feedback tools *(if available)*.
- ❑ Select and apply appropriate defibrillation pads *(adult vs pediatric)* to the patient as per manufacturer recommendation.
- ❑ Follow machine prompts, being sure not to touch patient during analysis.

No Shock Indicated:

- Check carotid pulse:
  - **No pulse:** immediately restart CPR; perform rhythm interpretations as per selected medical directive.
  - **Pulse palpated:** initiate ROSC medical directive and transport.

Shock Indicated:

- Perform CPR during charging *(if available)*.
- Ensure CPR is stopped and PPV ceased once defibrillator is charged.
- Ensure everyone is clear of patient prior to defibrillation.
- Deliver shock once it is safe to do so *(minimizing hands off chest time).*
- Immediately start CPR with no pulse check for 2-minute interval.
- Reassess patient, including rhythm, every 2 minutes as per monitor prompts or as defined by the associated medical directive.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Ensure defibrillation pads are adhered to skin on all sides.
  - If the pads are not properly placed on the chest, electrical arcing may occur.
- ❑ Repeated defibrillations can cause skin inflammation and minor burns.
- ❑ Rotate compressors every 2 minutes *(if possible)*.
- ❑ Stop CPR if patient shows signs of life.
- ❑ Electrical shock to the rescuer/bystander may occur if they are directly or indirectly touching the patient when defibrillation is taking place.
- ❑ Consider airway management and attaching $ETCO_2$ *(if not already done)*.

APPENDIX A

CHILDBIRTH COMPLICATION: PROLAPSED CORD

INDICATIONS:

Confirm that the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization is obtained.

EQUIPMENT REQUIRED:

- ❑ Obstetrical Kit
- ❑ O_2 as per BLS Standards
- ❑ Appropriate PPE
- ❑ Cardiac Monitor

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Gain consent to inspect perineum for prolapsed cord.
- ❑ Explain procedure and expected outcome to patient.
- ❑ Consider extrication strategy.
- ❑ As soon as possible assist patient into knee-chest position or exaggerated Sims position.
- ❑ Encourage, if cord has not retracted into the patient to breathe through contractions.
- ❑ Keep patient informed of your actions *(you will feel me touch you…you will feel pressure etc.).*
- ❑ Gently cradle cord in hand and replace cord into the vagina; insert finger(s)/hand into vagina until you feel presenting part and apply manual digital pressure lifting it off the cord *(this will be maintained until transfer of care at hospital. Ideally, do not remove hand until instructed to do so).*

COMPLICATIONS/CONSIDERATIONS:

- ❑ Perinatal morbidity and mortality can result from hypoxia associated with vasospasm and/or prolonged compression of the cord.
- ❑ In the very unlikely event that a birth is imminent with a cord prolapse, time is of the essence. Follow the normal delivery procedure with special attention to expediting delivery, as the flow of oxygen will likely be compromised due to the cord being compressed between the presenting part and the pelvis.

APPENDIX A

CHILDBIRTH COMPLICATIONS: BREECH DELIVERY

INDICATIONS:

Confirm the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ O_2 as per BLS Standards
- ❑ Obstetrical Kit
- ❑ Airway Equipment (*neonate)*
- ❑ Cardiac Monitor and SPO_2 (*if required*)

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain Procedure and expected outcome to patient.
- ❑ Obtain consent.
- ❑ Assess for signs of imminent breech birth.
- ❑ Position the patient to allow gravity to birth the baby.
  - Assist patient into an upright or supported squat position; **OR**
  - Bring buttocks to edge of bed, place feet on chair (*if possible*).
- ❑ **Hands off** the breech.
- ❑ Consider manual delivery of legs (*if possible/necessary*);
  - Apply pressure to the popliteal fossa once visible; **AND**
  - Gently sweep foot down and out.
- ❑ **Hands off** the breech.
- ❑ Note time baby delivered to umbilicus.
  - You have **4 MINUTES** to complete delivery of the head after umbilicus is visible.
- ❑ Consider manual delivery of arms (*if possible/necessary*);
  - If **hand or elbow visible** on fetal chest:
    - Gently sweep hand down and out.
- ❑ Allow baby to descent with gravity.
- ❑ **Hands off** the breech.
- ❑ Another paramedic **may apply gentle suprapubic pressure** to maintain flexion of the head.
- ❑ **Hands off** the breech.
- ❑ Initiate Mauriceau-Smellie-Veit (*MSV*) Manœuvre once.
  - Hairline/nape of the neck is visible; **OR**
  - Head does not deliver within **3 MINUTES** after the umbilicus is visible.
- ❑ If head does **NOT** deliver:
  - Maintain MSV Manoeuvre and transport.
- ❑ Once head delivers:
  - Assess and monitor adult patient and newborn for Breech Delivery complications.
  - Provide newborn care as per the current BLS and ALS PCS.
  - Address complications in accordance with BLS and ALS PCS.

MAURICEAU-SMELLIE-VEIT (*MSV*) MANOEUVER:

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- ❑ Discourage the patient from pushing during the manoeuvre.
- ❑ Support baby with forearm, palm supporting the chest.
    - Place second and fourth fingers on the malar bones (*cheekbones*) *(not in the mouth)*.
    - Exert pressure on cheekbones to increase flexion of the neck.
- ❑ Place other hand on baby's back;
    - Two fingers hooked over the shoulders.
    - Middle finger pushing the occiput to aid flexion.
- ❑ Once hairline/nape of neck is visible:
    - Lift the body in an arc.
    - Assist the head to pivot around the symphysis pubis.
    - Allow face to deliver.
- ❑ Ensure **controlled delivery of the head.**

COMPLICATIONS/CONSIDERATIONS:

- ❑ Signs of imminent Breech birth:
    - Fresh dark meconium at perineum.
    - Breech, foot/leg visibly protruding from vagina.
- ❑ Complications associated with breech birth:
    - Fetal:
        - Nuchal Cord.
        - Cord prolapse.
        - Hypoxic damage and asphyxia.
        - Damage to internal organs.
        - Fracture of humerus, clavicle, femur, and spine.
        - Dislocation of hip or shoulder.
        - Head and neck trauma.
        - Limb presentation.
        - Death.
            - Neonatal Resuscitation.
    - Adult patient:
        - Placental abruption.
        - Premature separation of placenta.
        - Patient trauma.
        - Post-partum hemorrhage.
- ❑ If limb presentation:
    - Cover limb with dry sheet to maintain warmth and discourage the patient from pushing.
    - If foot/leg presents, watch closely for progression of delivery/birth.
    - Place patient in anti-gravity position.

DOCUMENT:

- ❑ Breech visible on the perineum.
- ❑ Time umbilicus is visible.
- ❑ Manual release of legs.
- ❑ Manual release of arms.
- ❑ Time hairline is visible.
- ❑ Mauriceau-Smellie-Veit manoeuvre.
- ❑ Time of birth of baby.
- ❑ Time of delivery of placenta.
- ❑ Amount of bleeding – minimal/moderate/large amount/clots.

APPENDIX A

CHILDBIRTH COMPLICATION: EXTERNAL BI-MANUAL COMPRESSION

INDICATIONS:

Confirm that the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization is obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ Consider IV/Fluid Therapy *(if available)*

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all equipment required.
- ❑ Explain procedure and expected outcome to patient.
- ❑ Obtain consent.
- ❑ If not already performed/attempted:
  - Encourage infant latching/nipple stimulation.
  - Encourage patient to void her bladder.

Placenta In:

- Attempt to deliver the placenta; guarding the uterus use gentle controlled cord traction during contraction with the patient pushing.
- If the delivery of the placenta is unsuccessful and patient is exhibiting signs of post-partum hemorrhage; ensure resuscitative measures are in place and perform external bimanual compression as described below.

External Bi-Manual Compression:

- Place one hand on the lower portion of the abdomen, at the level of the symphysis pubis; cup hand, supporting the lower portion of the uterus.
- Place the other hand at the top of the uterine fundus. *(The uterus should now be palpable between the hands.)*
- Compress the uterus between each hand continuously compressing the uterus (*perform for as long as possible; this may require rotation of providers)* until post-partum hemorrhage stops.

Placenta Out:

- Perform external uterine massage *(EUM).*
- If EUM is unsuccessful, perform external bi-manual compression as described above.

COMPLICATIONS/CONSIDERATION:

- ❑ External Uterine Massage should not be considered or conducted until after placental delivery.
- ❑ A distended bladder may impede uterine contractility.
- ❑ Consider encouraging breastfeeding and/or self (*patient*) manual stimulation of nipples.
- ❑ Primary PPH: Occurs within 24 hours of birth.
- ❑ Secondary PPH: Occurs 24 hours up to 6 week post post-partum.

APPENDIX A

CHILDBIRTH COMPLICATION: SHOULDER DYSTOCIA

INDICATIONS:

Confirm the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ Obstetrical Kit
- ❑ Cardiac Monitor
- ❑ O_2 as per BLS Standards
- ❑ Airway Equipment *(neonate)*

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Assess for signs of imminent shoulder dystocia birth.
- ❑ Inform patient, support person(*s*) and second paramedic of the emergency situation.
- ❑ Explain procedure and expected outcome to patient.
- ❑ Obtain consent.
- ❑ Position the patient supine on the edge of a firm surface *(if possible)*.
- ❑ Note time of baby's head delivered:
  - You have **8 MINUTES** to complete delivery from time head is delivered.
- ❑ Perform **ALARM** manoeuvers.
- ❑ If first ALARM unsuccessful:
  - Paramedic partner performs ALARM manoeuvers.
- ❑ If second ALARM unsuccessful:
  - Transport immediately.
  - Perform ALARM en route to the hospital *(as safely as possible)*.
- ❑ If successful delivery of baby:
  - Assess and monitor adult patient and newborn for Shoulder Dystocia Delivery complications.
  - Provide newborn care in accordance with the current BLS and ALS PCS.
  - Address complications in accordance with the current BLS and ALS PCS.

ALARM MANOEUVERS

- ❑ Use the following 5 interventions.
  1. **A – Ask for assistance**
     - Ask patient to lay flat, on a firm surface *(if not already done)*.
     - Ask spouse/family/other healthcare professional to assist during ALARM.
     - Ask Paramedic Partner to assist during ALARM.
  2. **L – Legs abduction** (*MCROBERT'S MANOEUVER*)
     - Hyperflex hips by lifting legs and knees.
     - Aim to:
       - Bring knees to ears.
       - Form a squatting position.
     - Best performed by 2 people holding legs.
  3. **A – Adduct Shoulder** (*SUPRAPUBIC PRESSURE*)
     - Apply suprapubic pressure before the next contraction *(to be performed by paramedic partner)*.
     - Maintain throughout entire contraction.

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- Instruct the patient to push in this position.
- Apply gentle downward lateral flexion of the head.

4. **R – Roll Over** (*GASKIN MANOEUVER*)
   - If steps 1, 2 and 3 are unsuccessful:
     - Perform Gaskin manoeuver *(hands and knees)*.
       - Ask patient to change position, rolling over onto hands-and-knees position.
     - Apply upward lateral flexion of the baby's head to facilitate delivery of the body.
5. **M- Manually release posterior arm.**
   - If hand visible:
     - Follow humorous.
     - Sweep arm across fetal chest and out.
     - Deliver the posterior arm.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Signs of imminent Shoulder Dystocia birth:
  - Baby's head emerges slowly and chin may have difficulty sliding over perineum.
  - Head retracted against perineum *(turtle sign or turtling)*.
  - Cyanosis to baby's head.
  - Failure of spontaneous restitution.
  - Failure to deliver shoulders with patient's expulsive efforts and typical manoeuvers.
- ❑ Perform a MAXIMUM of 2 ALARMs on scene.
- ❑ Complications associated with Shoulder Dystocia birth:
  - Baby:
    - Clavicle fracture.
    - Humeral fracture.
    - Brachial plexus injury.
    - Pneumothorax.
    - Hypoxia/Asphyxia.
    - Death.
  - Adult patient:
    - Post-Partum hemorrhage.
    - Extension of laceration into the rectum.
    - Vaginal laceration.
    - Cervical tears.
    - Uterine rupture.

DOCUMENT:

- ❑ Colour of fluid.
- ❑ Time of birth of head.
- ❑ Turtle sign, if present.
- ❑ Time of each manoeuvre and attempt to deliver the baby.
  1. McRoberts and attempt to deliver.
  2. Apply suprapubic pressure and attempt to deliver.
  3. Roll over into Gaskin and attempt to deliver.
  4. Attempt to manually deliver posterior arm and attempt to deliver.
- ❑ Time other paramedic attempting ALARM and time of each manoeuvre and attempt to deliver the baby.
- ❑ Time of birth of baby.
- ❑ Time of delivery of placenta.
- ❑ Amount of bleeding – minimal/moderate/large amount/clots.

APPENDIX A

CHILDBIRTH: EXTERNAL UTERINE MASSAGE

INDICATIONS:

Confirm that the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization is obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ O_2 as per BLS Standards

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain procedure and expected outcome to patient.
- ❑ Obtain Consent.
- ❑ Assist with placental delivery utilizing controlled cord traction when signs of placental separation are observed:
  - Lengthening of the cord;
  - Sudden gush/trickle of blood from vagina with uterine contraction.
- ❑ Conduct external uterine massage once the placenta has been delivered if the fundus remains soft/'boggy' or there is continuous bleeding:
  - Place one hand on the lower portion of the abdomen, at the level of the symphysis pubis in a cupped position supporting the lower portion of the uterus.
  - Place one hand at the top of the uterine fundus. The uterus should now be palpable between the hands.
  - Begin massaging with the upper hand using a circular motion. The lower hand should remain still, supporting the lower portion of the uterus.
- ❑ Continue massaging until post-partum bleeding stops.
- ❑ If bleeding continues, perform:
  - External bi-manual compression; (*see procedure list)*
  - Encourage the patient to empty bladder.

COMPLICATIONS/CONSIDERATIONS:

- ❑ External Uterine Massage should not be conducted until **after** placental delivery.
- ❑ A distended bladder may impede uterine contractility.

APPENDIX A

CHILDBIRTH: UNCOMPLICATED WITH NUCHAL CORD AND PLACENTAL DELIVERY

INDICATIONS:

Confirm that the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization is obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ O_2 as per BLS Standards
- ❑ Cardiac Monitor
- ❑ Pediatric Resuscitation equipment
- ❑ Obstetrical Kit

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain procedure and expected outcome to patient.
- ❑ Obtain Consent.
- ❑ Provide warmth and adequate lighting *(as much as possible).*
- ❑ Position the patient supine on a firm surface with her head and shoulders slightly raised, legs flexed and abducted at hips and knees.
- ❑ Visualize the perineum.
- ❑ Place plastic sheet/bag/towel/drape under patient's buttocks.
- ❑ Observe for rupture of membranes (*if not already ruptured*) and note colour of fluid if possible.
- ❑ With non-dominant hand guard, the perineum with a 4x4.
- ❑ Deliver the head in a controlled fashion.
- ❑ Apply gentle pressure to vertex *(neonate's head)* to control delivery of the head.
- ❑ Once head is delivered; allow restitution of head to occur naturally.
- ❑ Observe for nuchal cord:
    - If cord is present and loose, slip cord over baby's head.
    - Only if nuchal cord is tight and cannot be slipped over baby's head, clamp and cut the cord.
- ❑ Encourage patient to push with next contraction (*or sooner if restitution has occurred and patient ready to push*).
- ❑ Provide gentle lateral flexion, followed by gentle upward flexion to deliver shoulders and body.
- ❑ Place newborn directly onto the patient's abdomen, prone with head to the side allowing airway to drain (*skin to skin for warmth*).
- ❑ Dry, stimulate newborn, and assess for tone, breathing and crying.
- ❑ Note the time of delivery.
- ❑ Cover newborn with new blanket/towel to maintain warmth. *(Do not re-use towel/blanket used to dry newborn.)*
- ❑ Allow cord to pulse before clamping and cutting cord (*at least 2 minutes*) unless neonatal resuscitation is required or multips are known or suspected.
- ❑ Clamp the umbilical cord in two places approximately 15 cm from the infant's abdomen and approximately 5 cm apart.
- ❑ Cut the umbilical cord using sterile (*disposable*) scissors.

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- ❑ Assess for placental detachment.

Placental Delivery:

- ❑ Guarding the uterus; place a hand on the lower portion of the abdomen, just above the symphysis pubis in a cupped position *(supporting the lower portion of the uterus)*.
- ❑ With other hand apply gentle controlled cord traction *(working with patient's contractions)* using up and downward motion; when membrane trail is seen; ask patient to cough or laugh and gently tease out membranes in an up and down motion, until completely delivered.
- ❑ Perform external uterine massage *(see procedure list)*.
- ❑ Place placenta into provided plastic bag and transport with Mom and newborn. Label bag with patient's name and document time of delivery.

COMPLICATIONS/CONSIDERATION:

- ❑ Nuchal cord.
- ❑ Prolapsed umbilical cord.
- ❑ Malpresentation.
- ❑ Shoulder dystocia.
- ❑ Post-partum hemorrhage.

APPENDIX A

CLOSED SUCTIONING OF ENDOTRACHEAL AND TRACHEOSTOMY TUBE

INDICATIONS:

Confirm that the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization is obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ Electronic suction unit
- ❑ Syringe 10 ml
- ❑ Saline
- ❑ Sharps container
- ❑ ETT or Tracheostomy
- ❑ Suction catheters (*appropriate sizes*)
- ❑ BVM with filter
- ❑ $ETCO_2$ adapter
- ❑ O_2 source
- ❑ SPO_2 Monitor

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all appropriate equipment.
- ❑ Explain procedure and expected outcome to patient/guardian.
- ❑ Obtain consent (*if possible*).
- ❑ Position patient at 30 to 90 degree sitting position (*if applicable*).
- ❑ Pre oxygenate the patient.
- ❑ Ensure pulse oximetry is attached.
- ❑ Select appropriate sized catheter (*half the inner diameter of the artificial airway*).
- ❑ Inspect packaging before opening for compromised packaging and expiry date.
- ❑ Open package and remove Closed Suction catheter using a clean technique.
- ❑ Select the appropriate negative pressure setting:
    - Infant = 60-100 mmHg
    - Child = 100 - 120 mmHg
    - Adult = 100-150 mmHg
- ❑ While securing ETT or Tracheostomy tube, disconnect all the components of the BVM, and install the Closed Suction Catheter patient port directly onto the 15 mm adaptor of the ETT or Tracheostomy tube and reattach BVM with filter and $ETCO_2$.
- ❑ Support the elbow connector and the ETT or tracheostomy tube with one hand and then grasp the catheter through the sleeve and advance the catheter slowly until proper depth (until cough reflex or resistance is met). Do not suction while advancing catheter.
- ❑ Withdraw 0.5 cm then, while supporting the elbow connector and the ETT or tracheostomy tube with one hand, engage the thumb valve with the other hand and gently pull back slowly until the suction catheter is fully retracted (*10 seconds or less*).
- ❑ **Place thumb valve back into locked position. *IMPORTANT***
- ❑ Re-oxygenate patient between suctioning events.
- ❑ Rinse catheter thoroughly prior to next attempt.

Catheter Cleaning:

- ❑ Draw up 5 ml normal saline.
- ❑ Ensure the coloured marking is visible in the sleeve (*fully retracted*).
- ❑ Unlock thumb control valve.
- ❑ Uncap and attach syringe to lavage port.
- ❑ Introduce the fluid slowly while depressing the thumb control valve at the same time.
- ❑ Continue until catheter is clear.

APPENDIX A

- ❑ Close lavage port.
- ❑ Lock thumb control valve.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Suction attempts should be limited to 10 seconds or less.
- ❑ Exceeding the recommended suction pressures can cause injury and swelling to the mucosal tissues of the airway and increases the risk of arrhythmia.
- ❑ To minimize hypoxia, do not suction more frequently than once per minute.

APPENDIX A

CONTINUOUS POSITIVE AIRWAY PRESSURE (*CPAP*) MAC/PORT-A-VENT TYPE

INDICATIONS:

Confirm the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

- ❑ Appropriate PPE
- ❑ CPAP Equipment
- ❑ Oxygen source
- ❑ O_2 as per BLS Standards
- ❑ $ETCO_2$ adaptor *(if applicable)*
- ❑ Cardiac monitor

EQUIPMENT REQUIRED:

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain procedure and expected outcome to patient/guardian.
- ❑ Obtain consent.
- ❑ Assemble circuit as per manufacturer requirements *(including face mask, filter and $ETCO_2$ adaptor)* and attach to the CPAP device.
- ❑ Attach CPAP device to a high-pressure oxygen source.
- ❑ Turn on oxygen source.
- ❑ Adjust the CPAP control to the level desired as per the current CPAP Medical Directive.
- ❑ Guide mask to the patient's face, ensuring snug fit.
- ❑ Attach the head strap on the hook rings.
- ❑ Check around the mask for any leaks.
- ❑ Adjust the mask and/or head strap accordingly.
- ❑ Re-assess patient every 5 minutes and adjust CPAP as required.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Paramedics should follow manufacturers, EMS operator and local Base Hospital directions for proper assembly of circuit and applicable peripheral devices *($ETCO_2$ adaptor, filters, MDI, etc.)*.
- ❑ CPAP can be interrupted intermittently for brief periods of time in order to administer medication *(Nitro SL, etc.)*.
- ❑ Initially CPAP may not be well tolerated by the patient. The paramedic may be required to initially hold the CPAP mask by the patient's face *(or alternatively get the patient to hold the mask on their face)*, coach the patient, then switch to the head strap as tolerated.
- ❑ The positive pressure in the thorax may impede ventricular filling resulting in decreased preload. Patients should be continuously monitored for signs of hypo-perfusion.
- ❑ Consider titration of $Fi0_2$ *(if available)* as per medical directive.

APPENDIX A

CONTINUOUS POSITIVE AIRWAY PRESSURE (*CPAP*) VENTURI/BOUSSIGNAC TYPE

INDICATIONS:

Confirm the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

- ❑ Appropriate PPE
- ❑ CPAP Equipment
- ❑ Oxygen source
- ❑ O_2 as per BLS Standards
- ❑ $ETCO_2$ adaptor *(if applicable)*
- ❑ Cardiac monitor

EQUIPMENT REQUIRED:

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain procedure and expected outcome to the patient/guardian.
- ❑ Obtain consent.
- ❑ Assemble circuit as per manufacturer requirements *(including face mask, filter and $ETCO_2$ adaptor)* and attach to the CPAP device.
- ❑ Attach CPAP device to an oxygen source.
- ❑ Turn on oxygen source.
- ❑ Adjust O_2 flow to the level desired as per the current CPAP medical directive.
- ❑ Guide mask to the patient's face, ensuring a snug fit.
- ❑ Attach the head strap on the hook rings.
- ❑ Check around the mask for any leaks.
- ❑ Adjust the mask and/or head strap accordingly.
- ❑ Re-assess patient condition every 5 minutes and adjust CPAP as required.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Paramedics should follow manufacturer's, EMS operator and local Base Hospital directions for proper assembly of circuit and applicable peripheral devices *($ETCO_2$ adaptor, filters, MDI, etc.)*.
- ❑ CPAP can be interrupted intermittently for brief periods of time in order to administer medication *(Nitro SL, etc.)*.
- ❑ Initially CPAP may not be well tolerated by the patient. The paramedic may be required to initially hold the CPAP mask by the patient's face *(or alternatively get the patient to hold the mask on their face)*, coach the patient, then switch to the head strap as tolerated.
- ❑ The positive pressure in the thorax may impede ventricular filling resulting in decreased preload. Patients should be continuously monitored for signs of hypo-perfusion.
- ❑ Consider titration of $Fi0_2$ *(if available)* as per medical directive.

APPENDIX A

CENTRAL VENOUS ACCESS DEVICE (*CVAD*)—EXTERNAL

INDICATIONS:

Confirm that the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ 10 ml syringe, x2
- ❑ Alcohol swab
- ❑ Tape
- ❑ Transparent sterile dressing
- ❑ Infusion set
- ❑ Blunt cannula
- ❑ Sharps container
- ❑ 0.9% NaCl

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain procedure and expected outcome to patient/guardian.
- ❑ Obtain consent (*if possible*).
- ❑ Follow aseptic technique throughout.
- ❑ Prime an infusion set with 0.9% NaCl ensuring no air bubbles are left in the line.
- ❑ Fill a 10 ml syringe with sterile NaCl.
- ❑ Ensure that the lumen to be accessed is clamped.
- ❑ Grasp the connection between the cap and catheter with an alcohol swab.
- ❑ Clean the connection area and PRN adaptor with the alcohol swab.
- ❑ Remove PRN adapter from lumen exposing luer lock end.
- ❑ Connect an empty 10 ml syringe to the lumen and unclamp the lumen.
- ❑ Using aseptic technique, aspirate 3-5 ml of blood from the lumen you wish to use (*to remove instilled heparin*), keeping a closed system.
- ❑ Clamp the lumen and disconnect the syringe used to aspirate blood.
- ❑ Connect the 10 ml saline filled syringe, and then unclamp the lumen.
- ❑ Inject approximately 2 ml of NaCl, then withdraw 1-2 ml and visualize blood return to ensure the line is patent. Then flush remaining NaCl- if resistance is met, assume the lumen is obstructed and repeat procedure on the second lumen (if a second lumen is available).
- ❑ Alternately, push 2 ml, pause, push 2 ml and continue until the full flush is delivered.
- ❑ Once lumen patency has been confirmed, re-clamp lumen and remove syringe.
- ❑ Attach IV bag and flushed tubing to lumen, unclamp lumen and run IV at an appropriate rate.
- ❑ Ensure IV tubing is well secured to CVAD lumen and the patient.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Air embolism – ensure there are no air bubbles in the syringe, IV tubing or CVAD.
- ❑ Infection.
- ❑ Hemorrhage.

APPENDIX A

ELECTRONIC CONTROL DEVICE PROBE REMOVAL

INDICATIONS:

Confirm that the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization is obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ Alcohol swab
- ❑ Adhesive bandage
- ❑ Sharps container
- ❑ 2x2 or 4x4 gauze

PROCEDURE:

- ❑ Follow aseptic technique throughout.
- ❑ Ensure that the wires from the probe to the device gun have been deactivated by the Police Department.
- ❑ Place the patient in a position conducive to probe removal.
- ❑ Explain procedure and expected outcome to the patient.
- ❑ Pull the skin taunt with non-dominant hand 6-8 inches from the probe.
- ❑ Using the dominant hand, firmly grip the probe with your thumb and forefinger.
- ❑ Forcefully remove the probe in a linear motion away from the patient. A slight twisting motion may be necessary to remove the probe from the tissue.
- ❑ Visually inspect the probe to ensure that no fragments were left in the tissue.
- ❑ Dispose of the probe appropriately into a sharps container.
- ❑ Repeat the procedure for all additional probe(*s*).
- ❑ If required, use sterile NaCl and gauze to clean the affected area.
- ❑ Apply direct pressure for up to 30 seconds as needed.
- ❑ Apply adhesive bandage to probe entry site.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Do no remove probe(*s*) embedded above the clavicles, in the nipple(*s*), or in the genital area.
- ❑ Police may require preservation of probe(*s*) for evidentiary purposes, follow local Police protocols.
- ❑ This directive is for removal of ECD only and in no way constitutes treat and release, normal principles of patient assessment and care apply.
- ❑ This procedure may result in soft tissue and/or vessel trauma.
- ❑ Probe(*s*) may break, leaving fragments in the tissue.

APPENDIX A

EMERGENCY DIALYSIS DISCONNECT

INDICATIONS:

Confirm that the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ End caps (*in kit with patient*)
- ❑ Clamps (*integrated into connections*)
- ❑ Saline lock (*can be used as caps*)
- ❑ Tape

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Ensure aseptic technique throughout procedure.
- ❑ Ensure that the dialysis machine is turned off (*if applicable*).

Hemodialysis Steps:

- ❑ Clamp the two clamps on the patient side (*vascular access*) of the connection tubing.
- ❑ Clamp the two clamps on the machine (*hemodialysis*) side of the connection tubing.
- ❑ Disconnect the luer lock connection between the two sets of clamps.
- ❑ Disconnect patient from dialysis setup and attach sterile endcap (*if available*) or saline lock to the patient's connection tubing.
- ❑ Repeat this process on the additional connections when disconnecting from hemodialysis.
- ❑ Secure and cover all access tubing to the patient with tape and sterile abdominal pad.

Continuous Ambulatory Peritoneal Dialysis (CAPD) and Continuous Cycling Peritoneal Dialysis (CCPD) Steps:

- ❑ Twist closed the transfer set clamp on the patient side of the connection.
- ❑ Clamp both the fill bag and drain bag tubing.
- ❑ Disconnect luer lock connection on transfer set.
- ❑ Attach sterile mini cap to exposed transfer set tubing.
- ❑ Secure and cover all access tubing to the patient with tape and sterile abdominal pad.

Automatic Peritoneal Dialysis (APD)

- ❑ Twist closed the transfer set clamp on the patient side of the connection.
- ❑ Disconnect the patient tubing from the machine tubing
- ❑ Attach a sterile mini cap on the patient tubing
- ❑ Attach a mini cap on the machine tubing
- ❑ Secure patient tubing by coiling the tubing and taping to the skin
- ❑ Secure and cover all access tubing to the patient with tape and sterile abdominal pad.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Face shield/eye protection should be worn in addition to normal PPE to prevent exposure to blood from loose tubing.
- ❑ During clamping, alarms will sound if machine is still on, these are to be ignored.
- ❑ Bring the Emergency Dialysis Disconnect Kit, with patient information sheet, to the hospital.

APPENDIX A

EMERGENCY TRACHEOSTOMY REINSERTION

INDICATIONS:

Confirm the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ 10 ml syringe
- ❑ Tracheostomy tube (*supplied by patient*)
- ❑ BMV with filter
- ❑ $ETCO_2$ adapter (*if applicable*)
- ❑ O_2 source
- ❑ SPO_2 Monitor

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Obtain consent (*if possible*).
- ❑ Ensure adequate oxygenation/ventilation.
- ❑ Best practice is to prepare a new tracheostomy tube (*provided patient/care giver on scene*). If a new one is not available, clean existing tracheostomy tube to the best of your ability (*saline bath*).
- ❑ Remove the inner cannula (*if applicable*).
- ❑ Deflate the cuff (*if present*).
- ❑ Insert the obturator into the outer cannula (*if available*).
- ❑ Lubricate the end of the tube with water based lubricant or saline.
- ❑ If no contraindication, slightly extend the neck to open the stoma.
- ❑ As the patient inhales, gently insert the tube into the stoma using a curved upward motion (*while facing the patient*). Do not force.
- ❑ Hold the tracheostomy tube in place and remove the obturator (*if applicable*).
- ❑ Secure the tracheostomy tube using the tube tie provided.
- ❑ Insert a new inner cannula (*provided to you by patient or family*) into the outer cannula. Twist to lock in place (*if applicable*).
- ❑ Inflate the cuff to the proper volume (*approximately 8 ml of air*).

COMPLICATIONS/CONSIDERATIONS:

If unable to reinsert tracheostomy and the patient is not breathing and/or needs Positive Pressure Ventilation (*PPV*):

PCP:

- ❑ Use a neonatal or pediatric face mask over the stoma and ventilate with a BVM (*Tracheal-Stoma Ventilation*), or;
- ❑ Cover the stoma and use standard oral airway manoeuvres.

  Note: This may not always be possible if anatomy has been altered due to the tracheostomy or disease.

ACP:

- ❑ Use a neonatal or pediatric face mask over the stoma and ventilate with a BVM (*Tracheal-Stoma Ventilation*), or;
- ❑ Attempt intubation of the stoma with an uncut ETT approximately 2 sizes smaller than the stoma, or;
- ❑ Cover the stoma and orally intubate with a downsized tube to advance beyond the stoma.

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Note: This may not always be possible if anatomy has been altered due to the tracheostomy or disease.

- ❑ Suction the patient as required as per the Endotracheal and Tracheostomy Suctioning medical directive.

ENDOTRACHEAL MEDICATION ADMINISTRATION *(ETT)*

INDICATIONS:

Confirm that the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ Alcohol swabs
- ❑ Appropriate size syringe for the medication
- ❑ Blunt needle, if applicable
- ❑ Sharps container
- ❑ Medication via ampoule, preload or vial
- ❑ Suctioning equipment

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain the procedure and expected outcome to patient/guardian.
- ❑ Obtain consent.
- ❑ Ensure safe practice of medication administration process is utilized.

If Administering Medication via MDI:

- Attach MDI BVM adaptor according to manufacturer's recommendations ensuring that medication does not go through the BVM filter.
- Prime canister of inhaler as per manufacturer's recommendations prior to the delivery of the first dose of the medication.
- Administer medication as per medical directive.

If Administering Medication via Syringe - ***NO Injection Port*** *(incl. preloads)*:

- Pre-oxygenate patient.
- Remove O_2 source from ETT.
- Remove the needle from the syringe and discard into a sharps container.
- Inject medication directly into the ETT as per the appropriate Medical Directive.
- Re-attach O_2 source and continue with positive pressure ventilations (*PPV*).

If Administering Medication via Syringe - WITH Injection Port *(incl. preloads)**:***

- Continue oxygenation as is without any interruptions.
- Clean injection port with alcohol swab.
- Leave needle attached to syringe.
  - Inject medication directly into the injection port, as per appropriate Medical Directive.
  - Remove syringe and needle from port and discard into sharps container.
  - Continue with PPV throughout.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Use the acronym NAVEL to remember medications that may be administered via the ETT route.
  - **N:** Narcan
  - **A**: Atropine
  - **V:** Ventolin
  - **E:** EPINEPHrine

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L: Lidocaine.

ENDOTRACHEAL OR TRACHEOSTOMY TUBE SUCTIONING OPEN

INDICATIONS:

Confirm that the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ Electronic suction unit
- ❑ Saline
- ❑ Sharps container
- ❑ ETT or Tracheostomy
- ❑ Suction catheters (*appropriate sizes*)
- ❑ BVM and filter
- ❑ $ETCO_2$ adapter
- ❑ O_2 source
- ❑ SPO_2 Monitor

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain procedure and expected outcome to the patient/guardian.
- ❑ Position patient at 30 to 90 degree sitting position.
- ❑ Pre -oxygenate the patient for 30 to 60 seconds.
- ❑ Attach pulse oximetry.
- ❑ Select appropriate sized catheter *(half the inner diameter of the artificial airway).*
- ❑ Inspect packaging before opening for compromised packaging and expiry date.
- ❑ Open package and remove suction catheter using an aseptic technique.
  Select the appropriate negative pressure setting.
  Infant = 60-100 mmHg
  Child = 100-120 mmHg
  Adult = 100-150 mmHg
- ❑ Lubricate the catheter with water/saline.
- ❑ Gently advance the catheter into the ETT or Tracheostomy tube until cough reflex or resistance is met. ***Do not suction while advancing catheter***.
- ❑ Withdraw the suction catheter approximately 0.5 cm.
- ❑ Begin suctioning by placing a finger over the vent hole and gently withdraw the catheter continuously with a twisting motion for a maximum of 10 seconds or until the suction catheter is removed from the ETT or tracheostomy tube.
- ❑ Reattach BVM and $ETCO_2$.
- ❑ Re-oxygenate patient for 60 seconds between suctioning attempts.
- ❑ Rinse catheter thoroughly in sterile water prior to additional attempts.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Suction attempts should be limited to a maximum of 10 seconds.
- ❑ Exceeding the recommended suction pressures or maximum number of attempts can cause injury and swelling to the mucosal lining of the airway, as well as, increase the risk of an arrhythmia.
- ❑ To minimize hypoxia, do not suction more frequently than once per minute.

APPENDIX A

EXTERNAL JUGULAR VENOUS ACCESS

INDICATIONS:

Confirm the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ Primed NaCl IV solution set
- ❑ Large bore IV catheter
- ❑ Gauze dressing
- ❑ Alcohol swabs
- ❑ Sharps container
- ❑ Tape/Tegaderm

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Place the patient in a supine, head-down position with the head turned away from the side to be utilized for access.
- ❑ Cleanse site appropriately with alcohol swab. Maintain aseptic technique throughout.
- ❑ Align the IV catheter with the vein to be punctured.
- ❑ Tourniquet the vein at the distal end, just above the clavicle, with the index finger of the non-dominant hand. Use the thumb of the same hand to anchor the proximal end of the vein.
- ❑ Puncture the vein in the middle, between the angle of the jaw and the clavicle. To prevent the vein from rolling, select a point of bifurcation or puncture from the side. Maintain a 5-10-degree angle throughout the puncture.
- ❑ Observe early for flashback along catheter and/or flash chamber.
- ❑ Upon flashback, lower catheter to almost flush with the skin and advance another approximately 2 mm.
- ❑ Slide the catheter over the needle and into the vein while maintaining anchor with index finger and thumb.
- ❑ Remove the needle from the catheter and dispose of into a sharps container.
- ❑ Release non-dominant hand anchor and use index finger to occlude catheter hub to prevent air from entering venous system. Thumb can be used to manually stabilize catheter hub at the same time.
- ❑ Secure catheter and attach primed NaCl IV tubing set.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Infection.
- ❑ Profuse bleeding.
- ❑ Pneumothorax.

APPENDIX A

INTRAOSSEOUS (*EZ-IO*®) CANNULATION

INDICATIONS:

Confirm that the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization is obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ Sharps container
- ❑ 10 ml syringe filled with normal saline
- ❑ Pressure bad for infusing fluids or 30-60 ml syringe for fluid bolus
- ❑ Extension set
- ❑ Alcohol swabs
- ❑ Dressings x2, tape, splint and gauze if no securing device
- ❑ EZ-IO® driver with assorted EZ-IO® needles and required accessories as per manufacturer

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all appropriate equipment.
- ❑ Explain procedure and expected outcome to patient/guardian.
- ❑ Obtain consent (*if possible*).
- ❑ Locate and prep the appropriate site using aseptic technique: As authorized by local Base Hospital.
- ❑ Select appropriate gauge needle and attach to drill:
  A. EZ-IO® 45 mm Needle Set (*yellow* hub) should be considered for proximal humerus insertion in patients ≥40 kg or patients with excessive tissue over any insertion site
  B. EZ-IO® 25 mm Needle Set (*blue hub*) should be considered for patients ≥3 kg.
  C. EZ-IO®15 mm Needle Set (*pink hub*) should be considered for patients 3-39 kg.
- ❑ Attach needle to driver.
- ❑ Insert needle.

Proximal Tibia – Adult and Pediatric <12 years of age

Adult:

- o Landmark anteromedial aspect of tibia, approximately 2 cm medial to the tibial tuberosity or approximately 3 cm below the patella and approximately 2 cm medial, along the flat aspect of the tibia.
- o Aim the needle set at a 90-degree angle to the bone. Push the needle set tip through the skin until the tip rests against the bone. **The 5 mm mark must be visible above the skin for confirmation of adequate needle set length.**
- o Gently drill, advancing the needle set approximately 1-2 cm after entry into the medullary space or until the needle set hub is close to the skin.

Pediatric:

- o Landmark anteromedial aspect of tibia, approximately 1 cm medial to the tibial tuberosity, or just below the patella (approximately 1 cm) and slightly medial (approximately 1 cm), along the flat aspect of the tibia.
- o Gently drill, immediately release the trigger when you feel the loss of resistance as the needle set enters the medullary space.

Proximal Humerus – Adult

- o Landmark by placing the patient's hand over the abdomen (*elbow adducted and humerus internally rotated*).
- o Place palm on the patient's shoulder anteriorly to identify the "ball" under the palm as a general target area.

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- Place the ulnar aspect of one hand vertically over the axilla and the ulnar aspect of the other hand along the midline of the upper arm laterally.
- Place the thumbs together over the arm to identify the vertical line of insertion on the proximal humerus.
- Palpate deeply up the humerus to surgical neck then move 1-2 cm proximal to the most prominent aspect of the greater tubercle.
- Aim the needle set at a 45-degree angle to the anterior plane but 90 degrees to the skin.
- Push the needles set tip through the skin until the tip rests against the bone. **The 5 mm mark must be visible above the skin for confirmation of adequate needle set length.**
- Gently drill into the humerus approximately 2 cm or until the hub is close to the skin; the hub of the needle set should be perpendicular to the skin.

❑ Remove stylet from the catheter in a counter clockwise motion. The catheter should feel firmly seated in the bone (*1st confirmation of proper placement*).

❑ Dispose of stylet into a sharps container.

❑ Apply stabilizer (*if available*) over catheter and attach the primed extension to the catheter hub by twisting clockwise.

❑ Aspirate for bone marrow (*2nd confirmation of proper placement*).

- If bone marrow is not aspirated then attempt confirmation of intraosseous insertion by other means (*flushes with no extravasation, IO needle at appropriate depth, site and inserted well into bone*).

❑ Flush the device with 10 ml normal saline checking for extravasation.

❑ If no extravasation, attach primed line and secure arm in place across the abdomen.

❑ Initiate infusion of appropriate fluid/drugs based on patient condition:

- Use a pressure bag inflated to 300 mmHg for fluid infusion
- Discontinue infusion if extravasation occurs.

REMOVAL TECHNIQUE:

❑ Remove extension set and dressing.

❑ Stabilize catheter hub and attach a Luer lock syringe to the hub.

❑ Maintaining axial alignment, twist clockwise and pull straight out. Do **not** rock the syringe.

❑ Dispose of catheter with syringe attached into sharps container.

❑ Apply pressure to site as needed to control bleeding and apply dressing as indicated.

COMPLICATIONS/CONSIDERATIONS:

❑ Difficulty penetrating periosteum.

❑ Slow infusion rates (even under pressure).

❑ Displacement after insertion.

❑ Difficulty injecting fluids/drugs.

❑ Tissue necrosis.

❑ Bending/breaking of needle.

❑ Extravasation.

❑ Compartment syndrome.

❑ Osteomyelitis.

❑ Sub-periosteal infusion.

APPENDIX A

INTRAVENOUS CANNULATION

INDICATIONS:

Confirm the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization is obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ Tourniquet
- ❑ Alcohol swabs
- ❑ Appropriate size IV catheter-over-needle
- ❑ Sharps container
- ❑ Transparent sterile dressing
- ❑ Band-Aid
- ❑ Saline lock (*if applicable*)
- ❑ 0.9% normal saline
- ❑ Appropriate IV administration set (*if applicable*)
- ❑ Tape
- ❑ Sterile 2x2 gauze dressing

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain procedure and expected outcome to patient/guardian.
- ❑ Obtain consent (*if possible*).
- ❑ Prepare equipment in the order of the procedure to be performed.
- ❑ Check IV solution bag for solution type, expiry date, colour, clarity, and no leaks or precipitates.
- ❑ Prime the saline lock or the IV solution administration set connected to the IV solution bag.
- ❑ Place the sharps container on your dominant hand side.
- ❑ Select appropriate vein and IV catheter size for IV cannulation.
- ❑ Position yourself adjacent to the patient for proper alignment for IV cannulation.
- ❑ Apply tourniquet to arm for IV cannulation.
- ❑ Inspect integrity of catheter and needle.
- ❑ Aseptically clean insertion site with alcohol swab.
- ❑ Stabilize vein throughout with tension parallel and/or adjacent to vein.
- ❑ Puncture skin with catheter-over-needle, bevel side up.
- ❑ Use appropriate angle of entry for IV insertion.
- ❑ Observe for flashback in IV chamber.
- ❑ Lower angle of IV catheter and advance cannula about 2 mm into vein.
- ❑ Retract the needle stylet or advance catheter 1-2 mm depending on the IV catheter used.
- ❑ Advance catheter into vein, stabilizing vein throughout.
- ❑ Release the tourniquet.
- ❑ Apply transparent sterile dressing to protect puncture site and give some stability to the catheter, tenting the transparent dressing around the catheter hub.
- ❑ Place sterile 2x2 gauze dressing under cannula hub for support and collection of blood (*if required*).
- ❑ Occlude the vein just distal to the tip of the catheter with fingertip pressure and hold the hub of the catheter with non-dominant thumb and index finger, and remove needle stylet with dominant hand and place needle immediately into a sharps container**.**
- ❑ Remove cap on end of primed IV tubing (*or primed saline lock*) and connect to IV catheter hub using luer lock.

For IV solution bags:

- o Open up clamp at drip chamber and assess patency of IV line, looking for signs of infiltration.
- o Regulate the rate of infusion according to the indications (*TKVO, bolus*).

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- Reassess the lungs and vital signs when required, monitoring for signs of fluid overload.

For saline locks:

- Ensure that the IV line is patent by injecting approximately 1 ml of Normal Saline into the primed saline lock and observe for signs of infiltration at the IV site.
- If no infiltration is noted, inject the remainder of the prepared Normal Saline flush into the saline lock and remove the syringe.

- ❑ Secure IV tubing and site, with the appropriate dressing and tape.
- ❑ Instruct the patient on potential complications at the IV site, e.g., pain, soreness, redness, swelling, coolness, hematoma, blood in tubing, etc., and to notify you immediately if any occur.
- ❑ Reassesses patency of IV line and infusion rate on a regular basis or as required by a Medical Directive, as well as the volume remaining in the IV solution bag.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Avoid areas of suspected fracture proximal to the IV cannulation access site.
- ❑ Avoid arms with fistulas or shunts.
- ❑ Avoid the inner wrist, if possible.
- ❑ Avoid arms on same side as prior mastectomy.
- ❑ Avoid arms/legs that have sustained burns.
- ❑ If unsuccessful, aseptically remove the IV catheter and immediately discard into the sharps container.
  - Apply a sterile Band-Aid to the insertion site.
  - Pressure on this site may be required depending on patient condition and medication.
  - Inspect catheter to ensure it is intact prior to discarding.

APPENDIX A

INTRAVENOUS MEDICATION ADMINISTRATION

INDICATIONS:

Confirm the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization is obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ Alcohol swabs
- ❑ Appropriate size syringe for medication administration
- ❑ Blunt cannula
- ❑ Medication, which could be supplied as a preload, an ampoule, or a vial
- ❑ Sharps container
- ❑ Mannequin arm with established IV

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain procedure and expected outcome to patient/guardian.
- ❑ Obtain consent (*if possible*).
- ❑ Ensure safe practice of medication administration process is utilized.
- ❑ Ensure aseptic technique throughout the procedure.
- ❑ Remove the top of the vial, or use gauze/ampule cracker to safely crack the ampule and dispose of the top into a sharps container.
- ❑ If using a vial, clean the top stopper with an alcohol swab.
- ❑ Draw the dosage of medication into the syringe (*using the blunt tip needle if available*).
- ❑ If the medication requires dilution, draw up the required amount of saline using an aseptic technique.
- ❑ Remove blunt tip needle (if required).
- ❑ Zero the medication to the appropriate dosage while being mindful of the direction of any overflow/spray.
- ❑ Confirm the dosage for administration with a competent party, if available.
- ❑ Dispose of the ampule/vial and blunt tip needle into a sharps container.
- ❑ Confirm patency of IV line or saline lock.
- ❑ Clean the lock or IV port on the main IV line that will be used as a connection point with an alcohol swab.
- ❑ Connect the syringe with confirmed medication and dose to the intravenous medication port nearest to the patient; or to the medication port on the PRN adapter of the saline lock.

For IV line:

- Close the roller regulating clamp on the IV line between the medication port being used and the IV solution bag (*if applicable*).
- Administer the appropriate volume (*dose*) of the medication over the appropriate time frame, i.e., slow IV push (*morphine*), or rapid IV push (*adenosine*).
- Open the previously closed roller clamp on the IV line.
- Reset the IV line to the appropriate rate (*if applicable*).

For saline locks:

- Administer the appropriate volume (*dose*) of the medication over the appropriate time frame, i.e., slow IV push (*morphine*) or rapid IV push (*adenosine*).
- Flush the IV line or saline lock with an appropriate volume of normal saline.

IV 50 ml 0.9% NS or D5W (mini bag) preparation and administration:

- Cleanse the injection port of the 50 ml 0.9% NS or D5W bag with an alcohol swab.
- Insert the needle of the syringe with the prepared medication into the 50 ml bag via the injection port and inject the prepared dose.
- Ensure only a single dose is prepared in the 50 ml 0.9% NS or D5W bag and is appropriately labeled:

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- Medication name.
- Medication dose.
- Time initiated.
- Paramedic name and initials.

- Attach drip set to the 50 ml 0.9% NS or D5W with medication and prime the line.
- Close the roller regulating clamp on the primary IV line.
- Clean the upper injection port on the primary IV tubing with an alcohol swab.
- Remove the cap on the distal end of the secondary tubing and carefully insert into the upper injection port.
- Ensure piggyback 50 ml 0.9% NS or D5W (*mini bag*) is hung above the primary IV solution bag. Position of the IV solutions influences the flow of the IV fluid into the patient.
- Open the roller clamp of the secondary IV set (*mini bag*) and set the desired drip rate based on the time required for the specific medication to be infused.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Aliquots administration:
  - Refers to the administration of slow, deliberate and equal increments of a medication to achieve a desired response to the medication. The dose is complete when a desired response is reached, or the complete dose has been administered as per the medical directive.
- ❑ Monitor for extravasation of medication into interstitial spaces.
- ❑ Consider diluting IV medications for accuracy and better control.

APPENDIX A

MANUAL DEFIBRILLATION

INDICATIONS:

Confirm the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ Airway Equipment
- ❑ Towel
- ❑ O_2 source
- ❑ Cardiac Monitor with therapy pads
- ❑ Razor

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Confirm patient is VSA.
- ❑ Initiate CPR.
- ❑ Expose the chest.
- ❑ Prepare the chest for application of defibrillation pads *(dry and/or shave if required).*
- ❑ Turn on monitor and enable CPR metronome/CPR feedback tools *(if available).*
- ❑ Select and apply appropriate defibrillation pads *(adult vs pediatric)* to the patient as per manufacturer recommendation.
- ❑ Enter manual mode *(if required).*
- ❑ Stop CPR and ensure no one is touching patient.
- ❑ Manually interpret rhythm.

Non- Shockable Rhythm:

- Check carotid pulse
  - **No pulse:** immediately restart CPR; perform rhythm interpretations as per selected medical directive.
  - **Pulse palpated:** initiate ROSC medical directive and transport.

Shockable Rhythm:

- Immediately restart CPR *(perform compressions throughout entire charging phase- if device allows)*.
- Ensure proper joule setting.
- Charge defibrillator.
- Ensure CPR is stopped and PPV ceased once defibrillator is charged.
- Ensure everyone is clear of patient prior to defibrillation.
- Deliver shock once it is safe to do so *(minimizing hands off chest time).*
- Immediately start CPR with no pulse check for 2-minute interval.
- Reassess patient, including rhythm, every 2 minutes as per monitor prompts or as defined by the associated medical directive.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Ensure defibrillation pads are adhered to skin on all sides.
  - If the pads are not properly placed on the chest, electrical arcing may occur.
- ❑ Repeated defibrillations can cause skin inflammations and minor burns.
- ❑ Pediatric joule settings should be increased to the next available joule setting if the required joule setting is not an option.
- ❑ Rotate compressors every 2 minutes *(if possible)*.
- ❑ Stop CPR if patient shows signs of life.
- ❑ Electrical shock to the rescuer/bystander may occur if they are touching the patient when defibrillation is taking place.

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- ❑ Consider airway management and attaching $ETCO_2$ *(if not already done)*.

MEDICATION ADMINISTRATION: SUBCUTANEOUS INJECTION (*SC*)

INDICATIONS:

Confirm the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ Syringe *(1 ml, 3 ml)*
- ❑ Needle 25G-27G, 3/8" – 5/8"
- ❑ Blunt-tip Needle *(if available)*
- ❑ Alcohol Swab
- ❑ Gauze/Ampule Cracker
- ❑ Self-adhesive Bandages
- ❑ Sharps Container
- ❑ Ampule or vial of Medication

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain procedure and expected outcome to patient/guardian.
- ❑ Obtain consent *(if possible)*.
- ❑ Ensure safe practice of medication administration process is utilized.
- ❑ Ensure aseptic technique is utilized throughout the procedure.
- ❑ Remove the top of the vial, or use gauze/ampule cracker to safely crack the ampule and dispose of the top into a sharps container.
- ❑ If using a vial, clean the top stopper with an alcohol swab.
- ❑ Draw the dosage of medication using an appropriately sized syringe (*using the blunt tip needle if available*).
- ❑ Remove blunt tip needle and apply the appropriate needle for injection.
- ❑ Zero the medication to the appropriate dosage while being mindful of the direction of any overflow/spray.
- ❑ Confirm the dosage for administration with a competent party, if available.
- ❑ Dispose of the ampule/vial and blunt tip needle into a sharps container.
- ❑ Select and landmark the site for the injection based of the medical directive, medication requirements, volume of medication and patient size.
- ❑ Cleanse insertion site in an aseptic manner.
- ❑ Hold the syringe in your dominant hand.
- ❑ With non-dominant hand pinch the skin and insert the needle bevel-up at a 45-degree angle until syringe is well into subcutaneous tissue.
- ❑ Stabilize the syringe with the fingers of your non-dominant hand and proceed with the injection.
- ❑ Withdraw the syringe with needle at the same angle of insertion and dispose into a sharps container.
- ❑ Massage and clean injection site.
- ❑ Cover with a self-adhesive bandage.

COMPLICATIONS/CONSIDERATIONS:

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- ❑ Do not inject into an area of injury.
- ❑ The recommended maximum volume for a subcutaneous injection of an adult is 2 ml.
- ❑ The recommended needle size is 1.6 cm (⅝”), 25 gauge.
- ❑ The recommended injection sites are as follows:
    - <12 months age: anterolateral thigh.
    - >12 months age: upper tricep area.
- ❑ For dosages of less than 1 ml, use a 1 ml syringe.
- ❑ For dosages of 1-2 ml, use a 3 ml syringe.
- ❑ Mild to moderate discomfort at the injection site is common.

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MEDICATION ADMINISTRATION: INTRANASAL (*IN*)

INDICATIONS:

Confirm the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ Syringe (*1 ml, 3 ml*)
- ❑ Blunt Tip Needle
- ❑ Atomizer
- ❑ Gauze or Ampule Cracker *(if applicable)*
- ❑ Sharps Container
- ❑ Alcohol Swabs
- ❑ Ampule or vial of Medication

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain procedure and expected outcome to patient/guardian.
- ❑ Obtain consent *(if possible)*.
- ❑ Ensure safe practice of medication administration process is utilized.
- ❑ Remove the top of the vial, or use gauze/ampule cracker to safely crack the ampule and dispose of the top into a sharps container.
- ❑ If using a vial, clean the top stopper with an alcohol swab.
- ❑ Draw the dosage of medication using an appropriately sized syringe (*using the blunt tip needle if available*).
- ❑ Remove blunt tip needle and attach the atomizer to the syringe.
- ❑ Zero the medication to the appropriate dosage while being mindful of the direction of any overflow/spray.
- ❑ Confirm the dosage for administration with a competent party, if available.
  Dispose of the ampule/vial and blunt tip needle into a sharps container
- ❑ Visually inspect the patient's nares for obstructions *(i.e., blood, mucous, etc.)* and suction if required.
- ❑ Stabilize the patient's head with your non-dominant hand.
- ❑ Insert the atomizer into a nare and administer the full dose divided equally between the two nares. Ensure that you use a reasonable amount of force when depressing the plunger of the syringe, to make sure that the medication is properly atomized.
- ❑ Withdraw and dispose of the atomizer and syringe into a sharps container.

COMPLICATIONS/CONSIDERATIONS:

- ❑ The maximum recommended volume for intranasal administration is **1 ml per nostril**.
- ❑ Providing half of the dosage into each nare doubles the surface area for absorption allowing for faster absorption.
- ❑ The atomizer has 0.1 ml of dead space that may need to be considered in dosage calculations.
- ❑ Failure to depress syringe plunger with adequate force will result in the medication not atomizing properly.

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MEDICATION ADMINISTRATION: BUCCAL

INDICATIONS:

Confirm that the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ Sharps container
- ❑ Alcohol wipe/swab
- ❑ Medication
- ❑ Syringe
- ❑ Blunt tip

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain procedure and expected outcome to patient/guardian.
- ❑ Obtain consent *(if possible*).
- ❑ Ensure safe practice of medication administration process is utilized.
- ❑ Ensure aseptic technique is utilized throughout the procedure.
- ❑ Remove the top of the vial, or use gauze/ampule cracker to safely crack the ampule and dispose of the top into a sharps container.
- ❑ If using a vial, clean the top stopper with an alcohol swab.
- ❑ Draw the dosage of medication using an appropriately sized syringe (*using the blunt tip needle if available*).
- ❑ Remove blunt tip needle.
- ❑ Zero the medication to the appropriate dosage while being mindful of the direction of any overflow/spray.
- ❑ Confirm the dosage for administration with a competent party, if available.
- ❑ Dispose of the ampule/vial and blunt tip needle into a sharps container.
- ❑ Place patient in head's-up or lateral position.
- ❑ Open patient's mouth.
    - Aim to prevent harm to provider and patient when opening mouth.
- ❑ Stabilize the head.
- ❑ Insert needless syringe into mouth between gum and cheek.
- ❑ Depress plunger.
- ❑ Administer the medication in sweeping motion along buccal mucosa.
- ❑ Clean and dispose all equipment in appropriate manner.
- ❑ Reassess patient continuously.
- ❑ Document.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Buccal route is defined as:
    - Topical route of administration.
    - Medications:
        - are held or applied in the buccal area (*in the cheek*).
        - diffuse through the oral mucosa.
- ❑ When localized trauma to mucosa consider:

- Alternate routes of administration; OR
- Different medication.

❑ Absorption may be affected by sores, food, etc.

MEDICATION ADMINISTRATION: INTRAMUSCULAR INJECTION

INDICATIONS:

Confirm that the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization is obtained.

EQUIPMENT REQUIRED:

❑ Appropriate PPE
❑ Appropriately-sized syringe
❑ Blunt-tip needle (*if available*)
❑ Appropriately-sized needle
❑ Alcohol swab
❑ 2x2 or 4x4 gauze, *x2*
❑ Band-Aid
❑ Ampule cracker (*if available*)
❑ Sharps container

PROCEDURE:

❑ Don appropriate PPE.
❑ Gather all required equipment.
❑ Explain procedure and expected outcome to patient/guardian.
❑ Obtain consent (*if possible*).
❑ Ensure safe practice of medication administration process is utilized.
❑ Ensure aseptic technique is utilized throughout the procedure.
❑ Remove the top of the vial, or use gauze/ampule cracker to safely crack the ampule and dispose of the top into a sharps container.
❑ If using a vial, clean the top stopper with an alcohol swab.
❑ Draw the dosage of medication using an appropriately sized syringe (*using the blunt tip needle if available*).
❑ Remove blunt tip needle and apply the appropriate needle for injection.
❑ Zero the medication to the appropriate dosage while being mindful of the direction of any overflow/spray.
❑ Confirm the dosage for administration with a competent party, if available.
❑ Dispose of the ampule/vial and blunt tip needle into a sharps container.
❑ Select and landmark the site for the injection based of the medical directive, medication requirements, volume of medication and patient size.
❑ Cleanse insertion site in an aseptic manner.
❑ Using Z-track method, apply slight pressure to the skin while pulling laterally away from the injection site until the dermis is taught over injection site.
❑ Insert the needle swiftly with a dart like motion and well into the muscle tissue at a 90-degree angle.
❑ Inject medication slowly over 5-10 seconds.
❑ Withdraw the needle at the same angle of insertion and dispose syringe into a sharps container.
❑ After you've removed the needle, release your hold on the skin and tissue. This disrupts the hole that the needle left in the tissues and prevents the medication from leaking out of the muscle.
❑ Apply pressure to the site with a piece of gauze (do not massage the site when using Z-track method).
❑ Apply a Band-Aid to the injection site.

COMPLICATIONS/CONSIDERATIONS:

❑ Avoid injecting into an area of injury.
❑ Recommended needle sizes are:
  - adult: 2.5 cm-3.8 cm (*1"-1.5"*) length and 22-25 gauge

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- pediatric: 2.2-2.5 cm (⅞" - 1") length and 22-25 gauge

❑ Recommended injection sites are:
- <12 months age: anterolateral thigh (*vastus lateralis*)
- >12 – 36 months age: Vastus lateralis muscle preferred until deltoid muscle has developed adequate mass (approximately age 36 months).

❑ Consider the volume of fluid and patient age/size when choosing the appropriate injection site. For adults, keep in mind:
- Deltoid max volume for injection:2 ml
- Vastus lateralis max volume for injection:5 ml

❑ Dosages of less than 1 ml should be drawn with a 1 ml syringe for increased accuracy.

❑ Dosages of exactly 1 ml should be done with a 3 ml syringe to simplify the drawing/zeroing process.

❑ Mild-moderate soreness is common following the injection.

❑ Though very uncommon, if a blood vessel is inadvertently cannulated upon needle insertion:
- Withdraw and dispose of the needle into a sharps container.
- Apply gauze/Band-Aid to injection site.
- Secondary attempts at administration can follow, but should be attempted in a different muscle group when possible.

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MEDICATION ADMINISTRATION: ORAL (*PO*)

INDICATIONS:

Confirm that the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

- ❑ Appropriate PPE
- ❑ Medication
- ❑ Water

EQUIPMENT REQUIRED:

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain procedure and expected outcome to patient/guardian.
- ❑ Obtain consent.
- ❑ Ensure safe practice of medication administration process is utilized.
- ❑ Ensure patient is in a semi-sitting or sitting position.
- ❑ In accordance with medication preparation and administration safety practices:
  - Calculate correct dose / number of tablets to be administered.
  - Ensure that the medication packaging is intact.
  - Confirm the dosage for administration with a competent party, if available.

If administering ASA:

  - Give the patient the medication.
  - Ask the patient to chew the tablets, making a paste, and then swallow the paste without water.

If administering other PO medication:

  - Give the patient the medication.
  - Ask the patient to swallow medication tablet(*s*) with water provided.
- ❑ Confirm with patient that the medication is swallowed.
- ❑ Reassess patient continuously.
- ❑ Document.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Patients must have the ability to protect their own airway.
- ❑ ASA is given without water.

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MEDICATION ADMINISTRATION: SUBLINGUAL (*SL*)

INDICATIONS:

Confirm the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization is obtained as per directive or verbal order.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ Medication

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain procedure and expected outcome to patient/guardian.
- ❑ Obtain consent.
- ❑ Ensure safe practice of medication administration process is utilized.
- ❑ In accordance with medication preparation and administration safety practices:
  - Calculate correct dose.
  - Ensure medication packaging is intact.
  - Confirm the dosage for administration with a competent party, if available.
- ❑ Prime the pump by wasting a spray away from the patient until a full spray is released.
- ❑ Instruct the patient to lift their tongue to the roof of their mouth.
- ❑ Spray the medication underneath the tongue.
- ❑ Have patient close their mouth.
- ❑ Reassess patient continuously.
- ❑ Document.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Sublingual spray is a single patient use and should be disposed of appropriately.

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MEDICATION ADMINISTRATION: METERED DOSE INHALER (*MDI*)

INDICATIONS:
Confirm the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

- ❑ Appropriate PPE
- ❑ MDI
- ❑ Aerochamber
- ❑ Face mask *(if required)*
- ❑ Oxygen Source
- ❑ Stethoscope
- ❑ BVM with MDI adaptor
- ❑ Inhalation Aerosol Medication

EQUIPMENT REQUIRED:

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain procedure and expected outcome to patient/guardian.
- ❑ Obtain consent *(if possible).*
- ❑ Ensure safe practice of medication administration process is utilized.

To prime inhalation aerosol medication:

- ❑ Shake the inhaler well and discharge 4 sprays away from you and the patient, into the air.

Using an Aerochamber:

- ❑ As you insert the MDI of the inhaler into the Aerochamber, ask the patient to slowly breathe out as much as possible *(without inducing a coughing spell).*
- ❑ Bring the Aerochamber to the patient's mouth. Ask the patient to place the mouthpiece of the aerochamber in the mouth, between the teeth and seal with the lips. If the patient is unable to do this, use a face mask with the aerochamber.
- ❑ Instruct the patient to breathe in slowly and administer 1 puff of the medication into the aerochamber. Instruct the patient to continue to breath in/out and wait until at least 4 breaths have been taken prior to taking the aerochamber away for a break.
- ❑ Shake the inhaler for 30 - 60 seconds or follow manufactures direction prior to delivering another puff, in order to allow the MDI to properly recharge.
- ❑ Repeat the above steps for subsequent puffs until the appropriate full dose of the medication is delivered as per the Medical Directive.

Using a BVM:

- ❑ Attach MDI BVM adaptor to 15 mm connector of the BVM and then to the face mask.
- ❑ Prime inhaler as needed.
- ❑ Shake MDI canister well prior to the delivery of the first puff.
- ❑ Insert MDI canister into BVM adaptor and deliver 1 puff of medication.
- ❑ Remove MDI canister from BVM adaptor and shake (*or delegate shaking*) for 30 - 60 seconds or follow manufactures direction.
- ❑ Continue with Positive Pressure Ventilations (*PPV*).
- ❑ Repeat the above steps for subsequent puffs until the appropriate full dose of the medications is delivered as per the medical directive.

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COMPLICATIONS/CONSIDERATIONS:

- ❑ Consider administering supplemental O_2 via nasal cannula during medications administration.
- ❑ An inhaler is a single patient use device and should be left with hospital staff or discarded.

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MEDICATION ADMINISTRATION: NEBULIZED (*NEB*)

INDICATIONS:

Confirm the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

- ❑ Appropriate PPE
- ❑ O_2 Source
- ❑ Nebulizer Mask
- ❑ Medication *(nebule or ampule)*
- ❑ Syringe *(3 ml, 5 ml, 10 ml)*
- ❑ Blunt Tip Needle
- ❑ Gauze or Ampule Cracker
- ❑ Sharps Container

EQUIPMENT REQUIRED:

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain procedure and expected outcome to patient/guardian.
- ❑ Obtain consent *(if possible)*.
- ❑ Ensure safe practice of medication administration process is utilized.

For nebule medication:

- Remove the top of the nebule, using a twisting motion and dispose of the top appropriately.
- Remove nebulizer chamber from the nebulizer mask and open it.
- Empty the contents of the nebule(*s*) into the chamber. Close it and re-attach it to the nebulizer mask.
- Dispose of the nebule into the sharps container

For ampule medication:

- Use a gauze or an ampule cracker to safely crack the ampule(*s*) and dispose of the top(*s*) into a sharps container.
- Attach the blunt tip needle to the syringe and draw up the required dosage.
- Remove the blunt tip needle from the syringe and dispose into the sharps container.
- Remove the nebulizer chamber from the nebulizer mask.
- Empty the syringe into the nebulizer chamber and reattach it to the nebulizer mask.

❑ Attach oxygen tubing to oxygen source and select a flow rate of 6-8 liters per minute. When the mask begins to mist, apply to patient's face.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Recommended patient position is sitting.
- ❑ Nebulization is contraindicated in patients with a known or suspected fever or in the setting of a declared febrile respiratory illness break outbreak by the local medical officer of health.

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MODIFIED VALSALVA MANEUVER

INDICATIONS:

Confirm the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ 10 ml syringe
- ❑ Cardiac Monitor
- ❑ IV Catheter(s)
- ❑ IV Fluid NaCl
- ❑ IV Flow set (*macro drip*)
- ❑ IV tape
- ❑ Tegaderm
- ❑ Sharps container
- ❑ Stretcher (*preferred*)

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain procedure and expected outcome to the patient/guardian *(if possible).*
- ❑ Gain consent *(if possible).*
- ❑ Obtain a baseline 12 lead ECG *(if not already done).*
- ❑ Obtain IV access.
- ❑ Position patient into semi-recumbent position.
- ❑ Instruct the patient to perform a forced expiration into a 10 ml syringe for about 15 seconds.
- ❑ At the end of the forced expiration put the syringe aside and lay the patient supine. Elevate the patient's straight legs to a 45-degree angle for about 30 seconds.
- ❑ Return patient to a sitting position for about 45 seconds.
- ❑ Confirm that the maneuver was successful. If patient still presenting in SVT repeat the procedure one more time (*maximum of 2 attempts per patient*).
- ❑ If patient still presents in SVT, continue on with the Medical Directive as written.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Tachydysrhythmias may take up to 1 minute to convert, allow a reasonable amount of time between Modified Valsalva attempts.
- ❑ The Modified Valsalva maneuver has been shown to be significantly more effective in resolving SVT within one minute when compared to the standard Valsalva maneuver *(43% vs 17%)*. This maneuver has also significantly reduced the need for Adenosine use as well *(50% vs. 69%) (Appelboam, 2015)*.

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NASOTRACHEAL INTUBATION (*NTI*)

INDICATIONS:

Confirm the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

EQUIPMENT REQUIRED:

- ❑ PPE
- ❑ Nasotracheal tubes
- ❑ 10 ml syringe
- ❑ Method to secure the tube (*mechanical device, tape*)
- ❑ Tube extender
- ❑ Water-based Lubricant
- ❑ Suctioning equipment
- ❑ Lidocaine Spray
- ❑ Xylometazoline Spray
- ❑ Bag-Valve Mask with Barrier Filter
- ❑ ETCO2 Device (*quantitative or qualitative*)
- ❑ Stethoscope
- ❑ Cardiac Monitor

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Assess the patient's airway to determine the ease of intubation *(i.e. LEMON*).
- ❑ Assemble equipment.
- ❑ Prepare all intubation equipment, including back up airway management options, in the event that the intubation is unsuccessful.
- ❑ Prepare suctioning equipment.
- ❑ Prepare and test suctioning device.
- ❑ Pre-oxygenate the patient using Positive Pressure Ventilation (*PPV*) with high flow O2.
- ❑ Position the patient appropriately (*external meatus of the ear aligned with the sternal notch*) with the head of the bed elevated, if no contraindications exist.
- ❑ Administer 2 sprays of Xylometazoline into each nare.
- ❑ Administer topical Lidocaine (*maximum 5 mg/kg*) into the nares and hypopharynx.
- ❑ Choose the appropriate size NTT and test the cuff for integrity. Make sure cuff is fully deflated prior to procedure.
- ❑ Lubricate the distal end of the NTT.
- ❑ Visually inspect and select the nare that looks to have the biggest diameter pathway into the pharynx. Inspect for septal deviation at the same time.
- ❑ Insert the NTT directly backward, over the superior surface of the hard palate.
- ❑ Once the NTT enters the posterior nasopharynx, pull the trigger of the NTT to avoid damaging the adenoids located in the rear of the pharynx.
- ❑ Advance the NTT until the patient's breath sounds can be heard through the NTT.
- ❑ During inhalation, advance the NTT into the larynx and trachea. If unable to pass the tube into the trachea, pull back until breath sounds are heard again.
- ❑ If the patient is maintaining an adequate SPO2 level, and you have not exceeded the 30 seconds time frame, attempt to pass the NTT into the trachea again. Upon successful intubation of the trachea, the patient will likely cough.
- ❑ Inflate the cuff of the NTT with approximately 6-8 ml of air, using a 10 ml syringe.
- ❑ Confirm the placement of the NTT using a 5-point auscultation, look for chest rise and attach $ETCO_2$.
- ❑ Secure the NTT with tape or an approved mechanical device.
- ❑ If unsuccessful after 30 seconds, stop and re-oxygenate the patient.

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- ❑ The maximum number of intubation attempts is 2 per patient.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Failed intubation (*inability to pass NTT into trachea*).
- ❑ Epistaxis.
- ❑ Bronchial intubation.
- ❑ Esophageal intubation.
- ❑ Hypoxia, hypercarbia.
- ❑ Noxious autonomic reflexes (*hyper/hypotension, brady/tachycardia, arrhythmias*).
- ❑ Laryngospasm, bronchospasm.
- ❑ Raised intracranial pressure.
- ❑ Trauma to the oro/hypopharyngeal and laryngeal structures.
- ❑ Spinal cord and/or vertebral column injury.

Reasons for Acute Deterioration of an Intubated Patient: DOPE

D: Displacement of Tube.
O: Obstruction of Tube *(mucous plug, biting).*
P: Pneumothorax, PE, Pulseless *(cardiac arrest or shock).*
E: Equipment Failure *(No oxygen, failure to ventilate, disconnected tubing).*

APPENDIX A

NEEDLE THORACOSTOMY

Equipment
Set up equipment and ensure provider safety by applying appropriate PPE

- ❑ Syringe
- ❑ 0.9% Normal saline (*optional*)
- ❑ Needle (*12G or 14G*) minimum 2.5”
- ❑ Vented chest seal
- ❑ Alcohol/Betadine swab
- ❑ Blunt tip needle for saline (*optional*)
- ❑ Sharps container

Preparation
Stop all non-essential activity, establish provider roles, patient care goals and obtain consent

- ❑ Perform appropriate oxygenation and ventilation during preparation.
- ❑ Partially fill a syringe with saline (*optional*) and attach the syringe to the needle.
- ❑ Landmark point of insertion:
  - Primary site - 4th intercostal space anterior axillary line, superior aspect of the 5th rib
  - Secondary site - 2nd intercostal space, midclavicular line, superior aspect of the 3rd rib
- ❑ Swab site with alcohol.

Procedure

- ❑ Insert a 12G or 14G needle with a syringe attached at a 90-degree angle.
- ❑ Aspirate for air while advancing the catheter.
- ❑ When free air is obtained, advance the needle about 2 mm further to ensure the bevel is through the chest wall.
- ❑ Slide catheter off needle into chest.
- ❑ Remove the needle and syringe and place them immediately into a sharps container.
- ❑ Secure the catheter in place with tape cravats.

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NEEDLE THORACOSTOMY - TURKEL DEVICE

Equipment
Set up equipment and ensure provider safety by applying appropriate PPE

- ❑ Alcohol/Betadine swab
- ❑ Turkel
- ❑ #10/11 scalpel (*if available and authorized*)
- ❑ One-way valve attachment (*optional*)
- ❑ Sharps container
- ❑ 4 x 6 inch gauze rolls
- ❑ Tape

Preparation
Stop all non-essential activity, establish provider roles, patient care goals and obtain consent

- ❑ Perform appropriate oxygenation and ventilation during preparation.
- ❑ Landmark point of insertion:
  - Primary site - 4th intercostal space anterior axillary line, superior aspect of the 5th rib
  - Secondary site - 2nd intercostal space, midclavicular line, superior aspect of the 3rd rib
- ❑ Prepare site with an alcohol swab.
- ❑ Holding the scalpel vertically, create a dermal puncture where the Turkel will be inserted. (*if available and authorized*)

Procedure

- ❑ Using a 90-degree angle, insert the Turkel at the landmark point and/or through the scalpel incision. Keep advancing until you get a colour change on the indicator from red to green. Advance 1 cm more to ensure placement in the pleural space.
- ❑ Stabilize the needle with one hand and advance the catheter into the pleural space completely.
- ❑ Withdraw the needle and dispose of it in the sharps container.
- ❑ Ensure the one-way valve is open to allow air to release.
- ❑ Secure system for transport with gauze rolls and tape.

APPENDIX A

OROTRACHEAL INTUBATION

INDICATIONS:

Confirm that the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ Endotracheal tubes (various sizes)
- ❑ 10 ml syringe
- ❑ A method to secure the ETT (*i.e Mechanical device or tape*)
- ❑ Tube extender
- ❑ Water-based lubricant
- ❑ Lidocaine Spray
- ❑ Laryngoscope with blade
- ❑ Endotracheal Tube Introducer (*i.e. Bougie*)
- ❑ Pillow +/- blankets (*for positioning*)
- ❑ Bag-Valve Mask with Barrier Filter
- ❑ $ETCO_2$ Device (*quantitative or qualitative*)
- ❑ Stethoscope
- ❑ Suctioning equipment
- ❑ Stylet (if required)

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Assess the patient's airway to determine the ease of intubation (*i.e. LEMON*).
- ❑ Assemble equipment.
- ❑ Prepare and test all intubation equipment, including back up airway management options, in the event that the intubation is unsuccessful.
- ❑ Prepare and test suctioning equipment.
- ❑ Pre-oxygenate the patient using Positive Pressure Ventilation (*PPV*) with high flow O_2.
- ❑ Position the patient appropriately (*external meatus of the ear aligned with the sternal notch*) with the head of the bed elevated, if no contraindications exist.
- ❑ Choose the appropriate size laryngoscope blade and test light for luminance.
- ❑ Choose appropriate ETT size and test cuff for integrity.
- ❑ Optional: Insert lubricated stylet into ETT to no more than 2.5cm from the tip of the ETT.
- ❑ Lubricate the distal end of the ETT.
- ❑ Consider topical Lidocaine administration for the 'awake' (*responsive*) patient.
- ❑ Remove the patient's dentures prior to performing laryngoscopy.

If Utilizing Curved Blade (Macintosh) Technique:

- ❑ Remove the patient's dentures prior to performing laryngoscopy.
- ❑ Open the patient's mouth with the right hand.
- ❑ Grasp the laryngoscope with the left hand.
- ❑ Insert the blade between the teeth, being careful not to come in contact with the teeth.
- ❑ Pass the blade to the right of the tongue, advancing the blade into the hypopharynx, pushing the tongue to the left of the patient's mouth.
- ❑ Advance the blade, watching for the epiglottis to appear. Position the tip of the blade in the vallecula.
- ❑ Lift the laryngoscope upward and forward and slightly to the left, avoiding using the patient's teeth as a fulcrum.
- ❑ Insert the ETT to the right of the blade, through the vocal cords.
- ❑ If a stylet was used, remove the stylet while manually holding the ETT in place.

If Utilizing Straight Blade Technique:

- ❑ Follow the steps outlined above, but advance the blade down the hypopharynx, and lift the epiglottitis with

the tip of the blade to expose the vocal cords.

Complete Insertion:

- ❑ Inflate the cuff of the ETT with approximately 6-8 ml of air.
- ❑ Attach BVM and begin PPV with high concentration O_2.
- ❑ Confirm placement of the ETT via 5-point auscultation, chest rise and $ETCO_2$.
- ❑ Secure the ETT with tape or an approved tube holder device, as per manufacturer's recommendations.
- ❑ If ETT is unsuccessful after 30 seconds, stop, re-oxygenate patient and consider repeating the procedure to a maximum of 2 attempts per patient.

If Utilizing an Introducer Device (Bougie):

Method #1

- ❑ Open the mouth and with the laryngoscope in the left hand and gently insert the blade into the patient's mouth.
- ❑ Attempt to displace the mandible and hypopharyngeal structures to reveal the glottis opening, without using the patient's teeth as a fulcrum.
- ❑ Hold the introducer with your right hand and insert it from the right corner through the vocal cords.
- ❑ Advance the introducer to an average depth of 25-30 cm, no more than the 40 cm mark or until you feel resistance (*carina*).
- ❑ Ask your partner to place the ETT over the introducer and to slide the ETT to the lip line.
- ❑ While the partner holds the introducer in place, advance the ETT until it reaches the appropriate depth.
- ❑ If resistance is met above the glottis opening, rotate the ETT counter-clockwise a ¼ turn to minimize damage to the soft tissues (a*rytenoids*).
- ❑ Ask your partner to remove the introducer while you holding the ETT in place.
- ❑ Inflate the cuff of the ETT with approximately 6-8 ml of air.
- ❑ Confirm placement of the ETT via 5-point auscultation, chest rise and/or $ETCO_2$.
- ❑ Secure the ETT with tape or an approved mechanical device.
- ❑ If unsuccessful after 30 seconds, stop and re-oxygenate the patient.
- ❑ The maximum number of intubation attempts is 2 per patient.
- ❑ Document the procedure and results on the patient care record.

Method #2:

- ❑ "Load" the introducer into the ETT tube; making sure to insert it past the end.
- ❑ Open the mouth and with the laryngoscope in the left hand, gently insert the blade into the patient's mouth.
- ❑ Attempt to displace the mandible and hypopharyngeal structures to reveal the glottis opening, without using the patient's teeth as a fulcrum.
- ❑ Hold the introducer and ETT with your right hand and insert the introducer from the right corner through the vocal cords.
- ❑ Ask your partner to hold the end of the introducer.
- ❑ While the partner holds the inducer in place, advance the ETT until it reaches the appropriate depth.
- ❑ If resistance is met above the glottis opening, rotate the ETT counter-clockwise a ¼ turn to minimize damage to the soft tissues.
- ❑ Inflate the cuff of the ETT with approximately 6-8 ml of air.
- ❑ Confirm placement of the ETT via 5-point auscultation, chest rise and/or $ETCO_2$.
- ❑ Secure the ETT with tape or an approved mechanical device.
- ❑ If unsuccessful after 30 seconds, stop and re-oxygenate the patient.
- ❑ The maximum number of intubation attempts is 2 per patient.
- ❑ Document the procedure and results on the patient care record.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Failed intubation (*inability to pass the ETT into the trachea*).

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- ❑ Bronchial intubation.
- ❑ Esophageal Intubation.
- ❑ Hypoxia/Hypercarbia.
- ❑ Noxious autonomic reflexes (*hyper/hypotension, brady/tachycardia, arrhythmias*).
- ❑ Laryngospasm, bronchospasm.
- ❑ Increased intracranial pressure.
- ❑ Trauma to the oropharyngeal, hypopharyngeal, laryngeal structures.
- ❑ Spinal cord and/or vertebral column injuries.

Reasons for Acute Deterioration of an Intubated Patient: DOPE

D: Displacement of Tube
O: Obstruction of Tube *(mucous plug, biting)*
P: Pneumothorax, PE, Pulseless *(cardiac arrest or shock)*
E: Equipment Failure *(No oxygen, failure to ventilate, disconnected tubing)*

APPENDIX A

PEDIATRIC INTRAOSSEOUS (*MANUAL TECHNIQUE*)

INDICATIONS:

Confirm the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization is obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ IO needle 16g or 18g
- ❑ 10 ml syringe filled with normal saline
- ❑ Alcohol swabs
- ❑ IV administration set and solution
- ❑ Blunt cannula
- ❑ Pressure infuser
- ❑ 30-60 ml syringe for fluid bolus
- ❑ Dressing x2, tape, splint and gauze if no securing device
- ❑ Sharps Container

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain procedure and expected outcome to patient/guardian.
- ❑ Obtain consent (*if possible*).
- ❑ Locate the appropriate site: Proximal tibia site- located proximately 2 cm below the tibial tuberosity on the anteromedial aspect of the leg along the flat aspect of the tibia.
- ❑ Prepare site.
- ❑ Select appropriate gauge needle:
  - *A.* < 1 year *(appropriate gauge as per manufacturer)* 18g.
  - *B.* > 1 year *(appropriate gauge as per manufacturer)*16g.
- ❑ Stabilize the bone with non-dominant hand-index finger and thumb on either side of tibia.
- ❑ As a safety precaution, do not place hand under the leg to stabilize.
- ❑ Insert IO at about 90 degrees through the skin.
- ❑ Direct caudally away from the epiphyseal plate, begin a twisting motion with medium pressure.
- ❑ Stop insertion once a loss of resistance is felt (*tactile pop*); this signifies the needle is within the marrow.
- ❑ Remove the stylet and twist down stabilizer (*if needed*). Catheter should feel firmly seated in the bone (*1st confirmation of proper placement*).
- ❑ Aspirate for bone marrow.
- ❑ If bone marrow is not aspirated then attempt confirmation of intraosseous insertion by other means (*flushes with no extravasation, IO needle at appropriate depth, site and inserted well into bone*). Flush with 8-10 ml NS in a syringe.
- ❑ Assess for infiltration around the insertion site PLUS the underside of the leg.
- ❑ Assess for adequate flow via predetermined syringe volume IVP.
- ❑ Secure I.O. catheter in place.
- ❑ Connect IV set and pressure infuser.
- ❑ Infuse fluids under pressure at 300 mmHg or use a syringe to bolus for a more accurate method.
- ❑ Continue to assess for Infiltration throughout.

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COMPLICATIONS/CONSIDERATIONS:

- ❑ Difficulty penetrating periosteum.
- ❑ Slow infusion rates (*even under pressure)*.
- ❑ Displacement after insertion.
- ❑ Difficulty injecting fluids/drugs.
- ❑ Tissue necrosis.
- ❑ Bending/breaking of needle.
- ❑ Extravasation.
- ❑ Compartment syndrome.
- ❑ Osteomyelitis.
- ❑ Sub-periosteal infusion.

APPENDIX A

SUPRAGLOTTIC AIRWAY (*SGA*)

INDICATIONS:

Confirm that the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization is obtained as per directive or verbal order.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ SGA (*appropriately sized*)
- ❑ 60 ml syringe (*or appropriate as per SGA size*)
- ❑ A method to secure the SGA (*i.e Mechanical device or tape*)
- ❑ Pillow +/- blankets (*for positioning*)
- ❑ Bag-Valve Mask with Barrier Filter
- ❑ $ETCO_2$ Device
- ❑ Stethoscope
- ❑ Water-based lubricant
- ❑ O_2 source

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Choose correct size based on height of patient and test cuff with recommended volume of air.
- ❑ Apply lubricate to distal tip and posterior aspect of tube, avoid placing lubricant near ventilation aperture.
- ❑ Position patient appropriately (*sniffing or neutral*).
- ❑ With non-dominant hand, hold mouth open and apply chin lift.
- ❑ Hold SGA with dominant hand and introduce tip into corner of mouth.
- ❑ Advance tip behind base of tongue, rotating tube to midline as it reaches posterior pharynx.
- ❑ Advance tube until base of connector aligned with teeth or gums.
- ❑ Inflate cuff with sufficient air to seal the airway (*as indicated on SGA device*).
- ❑ Attach BVM with filter and assess ventilation.
- ❑ If necessary, while ventilating the patient, gently withdraw the tube until ventilation becomes easy and free flowing (*large tidal volume with minimal airway pressure*).
- ❑ Secure tube. Place bite block to protect SGA.
- ❑ Confirm placement of the SGA via 5-point auscultation, chest rise and $ETCO_2$.

COMPLICATIONS/CONSIDERATIONS:

- ❑ In the event that a SGA is placed in cardiac arrest and the patient sustains a ROSC, the airway should only be removed as the gag reflex becomes stimulated, but expect to remove it as the level of awareness increases.
- ❑ Wrong size of King LT:
  - ○ Too small of a device: distal balloon can obstruct the larynx.
  - ○ Too large of a device: distal balloon could rupture the esophagus and/or the ventilation opening could be placed too low (*in the esophagus*).
- ❑ Improper volume inflation can cause:
  - ○ Ischemia of the soft tissue.
  - ○ Over inflation of the balloon causing rupture.

APPENDIX A

SUPRAGLOTTIC AIRWAY: I-GEL

INDICATIONS:

Confirm that the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization is obtained as per directive or verbal order.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ i-gel SGA (*appropriately sized*)
- ❑ A method to secure the i-gel SGA (*i.e. Mechanical device or tape*)
- ❑ Water-based lubricant
- ❑ Suction equipment
- ❑ Pillow +/- blankets (*for positioning*)
- ❑ Bag-valve mask with barrier filter
- ❑ $ETCO_2$ device
- ❑ Stethoscope
- ❑ O_2 source

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Choose the appropriate size i-gel based on assessment and weight.
- ❑ Add lubrication to the cradle channel.
- ❑ Apply lubrication from the cradle to the back, tip, sides and spine of the device.
- ❑ Position patient to facilitate insertion *(sniffing position).*
- ❑ Position the device so that the i-gel cuff outlet is facing towards the chin of the patient.
- ❑ With non-dominant hand, gently push the chin down before insertion.
- ❑ Introduce the leading soft tip into the mouth towards the hard palate.
- ❑ Glide the device downwards and backwards along the hard palate with a continuous but gentle push until definitive resistance is felt (*teeth resting on integral bite block)*.
- ❑ Attach BVM with filter and assess ventilation.
- ❑ Confirm placement via $ETCO_2$ (waveform capnography if available), 5-point auscultation and chest rise.
- ❑ Secure the i-gel SGA with a mechanical device or tape from maxilla to maxilla.

COMPLICATIONS/CONSIDERATIONS:

- ❑ The i-gel cradle can be used to hold the i-gel after lubrication until placement *(ensure aseptic technique)*.
- ❑ Immediately before introducing the i-gel, ensure there is no bolus of lubricant obstructing the distal end.
- ❑ While initially advancing through the faucial pillars *(pharyngo-epiglottic folds),* minor resistance may occur. Continue advancing until definitive resistance is met and the i-gel is resting on the laryngeal framework. Do not apply excessive force to insert i-gel.
- ❑ An SGA may need to be removed once a gag reflex is stimulated or the level of awareness improves. To avoid aspiration, the patient may require suctioning or proper positioning.

APPENDIX A

SURGICAL AIRWAY: PORTEX® CRICOTHYROTOMY

INDICATIONS:

Confirm that the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization is obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ $ETCO_2$ Device
- ❑ PORTEX Kit
- ❑ Bag Valve Mask with filter
- ❑ O_2 source
- ❑ Sharps container
- ❑ Stethoscope

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Prepare equipment (*including; inflating the bulb and lubricating the introducer*)
- ❑ Pre-oxygenate the patient.
- ❑ Hyperextend the neck, (*if not contraindicated*) and locate the cricothyroid membrane by palpating the depression immediately below the prominence of the thyroid cartilage. Find the cricothyroid ligament; (*in the midline between the thyroid cartilage and the cricoid cartilage*) this is the puncture site.
- ❑ Prep the site with an alcohol wipe.
- ❑ Stabilize the trachea between the thumb and the forefinger and locate the cricothyroid membrane by palpation of the depression immediately below the prominence of the thyroid cartilage.
- ❑ Make a 2 cm long horizontal incision through the skin only, over the cricothyroid membrane.
- ❑ Hold the device with the thumb on the needle hub and forefingers under the tube flange.
- ❑ Position the needle tip above the cricoid membrane perpendicular to the incision.
- ❑ Insert the device while constantly observing the red indicator flag in the needle hub. *(This indicates* contact of the needle *tip* with tissue*).*
- ❑ Advance the device until the red indicator flag in the needle hub disappears, confirming entry into the trachea.
- ❑ Carefully continue insertion until the red indictor is seen again, indicating contact with the posterior cartilage.
- ❑ Angle the device towards the patient legs and advance another 1-2 cm.
- ❑ Remove the needle from the tube.
- ❑ While holding the dilator stationary slide the cricothyrotomy tube off the dilator and into the trachea until it is flush with the skin. *(A slight twist* of the dilator may assist *removal.)*
- ❑ Inflate the cricothyrotomy tube cuff with the minimum volume of air to form a seal.
- ❑ Secure the cricothyrotomy tube with the available tube holder.
- ❑ Attach to a 15 mm extension tube, filter and Bag Mask Valve.
- ❑ Initiate PPV via BVM with O_2
- ❑ Confirm placement by auscultation and $ETCO_2$ monitoring.
- ❑ Monitor/Revaluate.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Bleeding.
- ❑ Air Trapping.
- ❑ Tracheal Trauma.

APPENDIX A

SURGICAL AIRWAY: QUICKTRACH® CRICOTHYROTOMY

INDICATIONS:

Confirm that the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization is obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ QuickTrach® Kit
- ❑ Sharps container
- ❑ Alcohol swabs/wipes
- ❑ Tape
- ❑ $ETCO_2$ Device
- ❑ Bag Mask Valve with filter
- ❑ Stethoscope
- ❑ 10 ml Syringe
- ❑ O_2 source

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Prepare equipment.
- ❑ Pre-oxygenate the patient.
- ❑ Hyperextend the neck, *(if not contraindicated)* and locate the cricothyroid membrane by palpating the depression immediately below the prominence of the thyroid cartilage.
- ❑ Find the cricothyroid ligament; *(in the midline between the thyroid cartilage and the cricoid cartilage)* this is the puncture site.
- ❑ Cleanse the site with an alcohol wipe.
- ❑ Firmly hold device and puncture the cricoid membrane at a 90-degree angle.
- ❑ After puncturing skin, continue advancing the needle and catheter into the cricothyroid space while applying negative pressure on the syringe.
- ❑ Change the angle of insertion to 45 degrees *(from the head)* and advance the device slowly forward into the trachea to the level of the stopper. *(Should no aspiration of air be possible because of an extremely thick neck, it is possible to remove the stopper and carefully insert the needle further until entrance into the trachea is made.)*
- ❑ Remove stopper, hold the needle and syringe firmly and slide only the plastic cannula along the needle into the trachea until the flange rests on the neck. Carefully remove the needle and syringe and discard into sharps container.
- ❑ Attach the extension tube to the Cannula.
- ❑ Attach a bag Mask Valve and filter to the extension and initiate ventilations.
- ❑ Secure Tube using the provided neck strap.
- ❑ Confirm Tube placement by auscultation and $ETCO_2$ monitoring.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Bleeding.
- ❑ Air Trapping.
- ❑ Tracheal Trauma.

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SURGICAL AIRWAY: NEEDLE CRICOTHYROTOMY

INDICATIONS:

Confirm that the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization is obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ 14 G catheter over needle
- ❑ Tape
- ❑ 10 ml Syringe
- ❑ Sharps container
- ❑ 0.9% Normal saline (optional)
- ❑ Stethoscope
- ❑ $ETCO_2$ Device
- ❑ Bag Valve Mask with filter
- ❑ ETT # 3 and # 7 adapter NaCl 10 ml
- ❑ O_2 source

PROCEDURE:

- ❑ Don appropriate PPE
- ❑ Gather all required equipment.
- ❑ Prepare the 14 G 1-1/4" catheter by attaching a 10 ml syringe (partially filled with saline – optional).
- ❑ Pre-oxygenate the patient.
- ❑ Hyperextend the neck, (*if not contraindicated*) and locate the cricothyroid membrane by palpating the depression immediately below the prominence of the thyroid cartilage.
- ❑ Find the cricothyroid ligament; (*in the midline between the thyroid cartilage and the cricoid cartilage*) this is the puncture site.
- ❑ Prepare site with alcohol wipe.
- ❑ Obtain the 14 G 1-1/4" catheter with partially filled (*NaCl*) 10 ml syringe attached.
- ❑ Stabilize the trachea between thumb and forefinger.
- ❑ With the trachea stabilized, place the needle tip central to cricothyroid ligament.
- ❑ Introduce the needle through the middle of the cricothyroid membrane, caudally at 45 degrees.
- ❑ Maintain negative pressure on the syringe while it is advanced until the trachea is penetrated (*air or blood bubbles seen in partially filled syringe*).
- ❑ Advance the needle and catheter an additional 1-2 mm, then advance only the catheter to the hub.
- ❑ Remove and dispose of the needle and connect the hub to a #3 ETT adapter and attach the BVM with filter. **OR** attach the barrel of a 3 ml syringe with a #7 ETT adapter inserted into the syringe barrel and attach to a BVM with filter.
- ❑ Ventilate and allow for passive exhalation, while confirming placement *($ETCO_2$ waveform, chest expansion and auscultation*).
- ❑ Secure catheter with tape.
- ❑ Revaluate patient.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Bleeding.
- ❑ Air trapping, allow time for passive exhalation.
- ❑ Tracheal Trauma.

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SYNCHRONIZED CARDIOVERSION

INDICATIONS:

Confirm the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ Airway Equipment
- ❑ IV/Fluid Therapy Equipment
- ❑ Towel
- ❑ O_2 source
- ❑ Cardiac Monitor with therapy pads and 12-lead cable
- ❑ Sedation Therapy equipment
- ❑ Razor

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain procedure and expected outcome to the patient/guardian.
- ❑ Obtain consent *(if possible)*.
- ❑ Consider obtaining 12 lead acquisition *(if this won't delay therapy)*.
- ❑ Gain IV/IO access *(if possible/warranted)*.
- ❑ Patch BHP for cardioversion.
- ❑ Prepare the chest for application of defibrillation pads *(shave and/or dry if required).*
- ❑ Apply electrodes and defibrillation pads as per manufacturer recommendation.
- ❑ Activate synchronization by pressing the "SYNC" button.
- ❑ Confirm SYNC markers appear above each QRS complex.
- ❑ Select joule setting order by BHP/manufacturer settings.
- ❑ Ensure no one is touching the patient and press the "Charge" button.
- ❑ Re-confirm no one is touching the patient before discharging energy.
- ❑ **Press AND HOLD** "shock" button until energy is delivered.
- ❑ If successful, reassess the patient and treat as per BLS/ALS Standards.
- ❑ If unsuccessful, continue to treat the patient as per BHP order/manufacturer settings, being sure re-SYNC prior to each cardioversion.
- ❑ If cardiac arrest occurs and the patient is in a shockable rhythm, immediately defibrillate at recommended Joule settings.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Consider printing the rhythm throughout the procedure *(if cardiac monitor not automatically doing it)*.
- ❑ Arrhythmias may occur post cardioversion attempt *(asystole, V-Tach, Pulseless V-Tach, V-Fib)*.
- ❑ Ensure defibrillation pads are adhered to skin on all sides.
    - o If the pads are not properly placed on the chest, electrical arcing may occur.
- ❑ Soft tissue thermal burns/inflammation may occur.
- ❑ Electrical shock to the rescuer/bystander may occur if they are touching the patient when TCP is taking place.
- ❑ Defibrillation pads should be placed at least 12 cm from ICD/pacemaker *(anterior/posterior placement preferred).*

APPENDIX A

TRANSCUTANEOUS PACING (*TCP*)

INDICATIONS:

Confirm the requirements of the specific medical directive are met prior to initiating the procedure or that BHP authorization has been obtained.

EQUIPMENT REQUIRED:

- ❑ Appropriate PPE
- ❑ Airway Equipment
- ❑ IV/Fluid Therapy Equipment
- ❑ Towel
- ❑ O_2 source
- ❑ Cardiac Monitor with therapy pads and 12-lead cable
- ❑ Sedation Therapy equipment
- ❑ Razor

PROCEDURE:

- ❑ Don appropriate PPE.
- ❑ Gather all required equipment.
- ❑ Explain procedure and expected outcome to patient/guardian.
- ❑ Obtain consent *(if possible)*.
- ❑ Consider obtaining 12-lead *(if this won't delay therapy)*.
- ❑ Gain IV/IO access *(if possible and warranted)*.
- ❑ Prepare the chest for application of defibrillation pads *(shave and/or dry if required)*.
- ❑ Apply electrodes and defibrillator pads as per manufacturer recommendation.
- ❑ Enter pacing mode *(as per manufacturer recommendation)*.
- ❑ Set pacing rate to 80 bpm or as per BHP order.
- ❑ Gradually increase output (*mA*) until electrical capture or maximum mA setting is reached.
- ❑ Confirm correlating mechanical capture *(palpable pulse + pulse oximetry at pacing rate)*.
- ❑ Increase output (*mA*) by 5-10 mA above the initial threshold capture to ensure mechanical capture is maintained.
- ❑ Continuously monitor patient for maintenance of electrical/mechanical synchrony.
- ❑ Consider preparing/administering sedation as per BHP order.

COMPLICATIONS/CONSIDERATIONS:

- ❑ Arrhythmias may occur post TCP attempt *(asystole, V-Tach, Pulseless V-Tach, V-Fib)*.
- ❑ Ensure defibrillation pads are adhered to skin on all sides.
  - If the pads are not properly placed on the chest, electrical arcing may occur.
- ❑ Soft tissue thermal burns/inflammation may occur.
- ❑ Electrical shock to the rescuer/bystander may occur if they are touching the patient when TCP is taking place.
- ❑ Failure to capture:
  - Increase mA until maximum reached and/or
  - Consider changing pad placement.
  - Consider DOPamine administration.
  - Troubleshooting as per manufacturer recommendation.

APPENDIX B – MEDICAL DIRECTIVE REFERENCES

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Table of Contents:

ACUTE CARDIOGENIC PULMONARY EDEMEA

Ezekowitz, Justin A. et al. 2017 Comprehensive Update of the CCS Guidelines for the Management of Heart Failure

Can J Cardiol 2017;33:1342-1433. (Level II)

Intravenous nesiritide vs nitroglycerin for treatment of decompensated congestive heart failure: a randomized controlled trial. JAMA 2002;287:1531-40. (Level II)

O'Connor CM, Starling RC, Hernandez AF, et al. Effect of nesiritide in patients with acute decompensated heart failure. N Engl J Med 2011;365:32-43. (Level II)

Stiell, IG, et al (2007). Advanced Life Support for Out-of-Hospital Respiratory Distress. NEJM 356: 2156-64. (Level II)

Gardtman M, Waagstein L, Karlsson T, Herlitz J. Has an intensified treatment in the ambulance of patients with acute severe left heart failure improved the outcomes? European Journal of Emer Med 2000, 7:15-24. (Level II)

Time course of the interaction between tadalafil and nitrates. J Am Coll Cardiol. 2003;42(10):1855. (Level I)

Cardiovascular effects of the 3 phosphodiesterase-5 inhibitors approved for the treatment of erectile dysfunction.
Circulation. 2004;110(19):3149. (Level I)

Impact of a high-dose nitrate strategy on cardiac stress in acute heart failure: a pilot study. J Intern Med. 2010 Mar;267(3):322-30 (Level II)

ADULT INTRAOSSEOUS

Fowler R., Gallagher J.V., Isaacs S.M., Ossman E., Pepe P., and Wayne M.: The role of intraosseous vascular access in the out-of-hospital environment (resource document to NAEMSP position statement). Prehosp
Emerg Care 2007; 11: pp. 63-66

Deakin, Charles D., et al. "European resuscitation council guidelines for resuscitation 2010 section 4. Adult advanced life support." Resuscitation 81.10 (2010): 1305.

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Johnson, M., Inaba, K., Byerly, S., Falsgraf, E., Lam, L., Benjamin, E., ... & Demetriades, D. (2016). Intraosseous infusion as a bridge to definitive access. The American Surgeon, 82(10), 876-880.

Lewis, Philippa, and Chris Wright. "Saving the critically injured trauma patient: a retrospective analysis of 1000 uses of intraosseous access." Emerg Med J 32.6 (2015): 463-467.

Neumar, Robert W., et al. "Part 8: adult advanced cardiovascular life support: 2010 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care." Circulation 122.18 suppl 3 (2010): S729-S767.

Schwartz D, Amir L, Dichter R, et al. The use of a powered device for intraosseous drug and fluid administration in a national EMS: a 4-year experience. J Trauma. 2008;64(3):650-5.

Von Hoff D.D., Kuhn J.G., Burris H.A., and Miller L.J.: Does intraosseous equal intravenous? A pharmacokinetic study. Am J Emerg Med 2008; 26: pp. 31-38

ANALGESIA

ACP:
Lee EN, Lee JH. The Effects of Low-Dose Ketamine on Acute Pain in an Emergency Setting: A Systematic Review and Meta-Analysis. PLoS One. 2016;11(10):e0165461. Published 2016 Oct 27. doi:10.1371/journal.pone.0165461

Schwenk ES, Viscusi ER, Buvanendran A, et al. Consensus Guidelines on the Use of Intravenous Ketamine Infusions for Acute Pain Management From the American Society of Regional Anesthesia and Pain Medicine, the American Academy of Pain Medicine, and the American Society of Anesthesiologists. Reg Anesth Pain Med. 2018;43(5):456-466.

Jonkman K, Dahan A, van de Donk T, Aarts L, Niesters M, van Velzen M. Ketamine for pain. F1000Res. 2017;6:F1000 Faculty Rev-1711. Published 2017 Sep 20. doi:10.12688/f1000research.11372.1

PCP:
No references provided.

BRONCHOCONSTRICTION

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2866213/ Admissions to Canadian hospitals for acute asthma: A prospective, multicenter study

https://www.asthma.ca/wp-content/uploads/2017/06/SAstudy.pdf Severe Asthma, the Canadian patient journey.

Management of Acute Exacerbations of COPD in the Elderly

https://www.canada.ca/en/public-health/services/reports-publications/2007/life-breath- respiratory-disease-canada-2007.html Life and Breath: Respiratory Disease in Canada (2007)

https://www.canada.ca/en/public-health/services/chronic-diseases/reports-publications/fast- facts-about-chronic-obstructive-pulmonary-disease-copd-2011.html

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Fast facts about Chronic Obstructive Pulmonary Disease (COPD): Data compiled from the 2011 Survey on Living with Chronic Diseases in Canada

https://www.ncbi.nlm.nih.gov/pubmed/24648134 Estimating the prevalence of COPD in Canada: Reported diagnosis versus measured airflow obstruction

https://www.ncbi.nlm.nih.gov/pubmed/11360046/ Control of asthma in Canada: failure to achieve guideline targets.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2683303/Asthma control in Canada remains suboptimal: The Reality of Asthma Control (TRAC) study

https://www.ncbi.nlm.nih.gov/pubmed/11279756 Early emergency department treatment of acute asthma with systemic corticosteroids.

http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD000195.pub2/full Corticosteroids for preventing relapse following acute exacerbations of asthma

http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD001288.pub4/abstract Systemic Corticosteroids for acute exacerbations of chronic obstructive pulmonary disease

http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD002178/full Early emergency department treatment of acute asthma with systemic corticosteroids

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2866213/#b5-crj17025 Admissions to Canadian hospitals for acute asthma: A prospective, multicenter study

https://www.ncbi.nlm.nih.gov/pubmed/23344101 Efficacy of corticosteroid therapy in severe decompensation of COPD requiring mechanical ventilation

https://www.ncbi.nlm.nih.gov/pubmed/18321904 Contemporary management of acute exacerbations of COPD: a systematic review and metaanalysis

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4442800/#BX4 International Consensus On (ICON) Pediatric Asthma

https://www.nhlbi.nih.gov/health-pro/guidelines/current/asthma-guidelines/full-report National Heart Blood and Lung Institute

https://www.ncbi.nlm.nih.gov/pubmed/14582090 The prehospital administration of intravenous methylprednisolone lowers hospital admission rates for moderate to severe asthma

https://www.ncbi.nlm.nih.gov/pubmed/10534036 Evaluation of a new EMS asthma protocol in New York City: a preliminary report.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4527232/ Canadian Thoracic Society 2012 guideline update: Diagnosis and management of asthma in preschoolers, children and adults: Executive summary

http://goldcopd.org/wp-content/uploads/2016/12/wms-GOLD-2017-Pocket-Guide.pdf Gold Standard

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https://pathways.nice.org.uk/pathways/chronic-obstructive-pulmonary-disease#path=view%3A/pathways/chronic-obstructive-pulmonary-disease/managing- exacerbations-of-copd.xml&content=view-node%3Anodes-corticosteroids
NICE Guideline for Corticosteroid

http://www.ers-education.org/guidelines.aspx

Management of COPD exacerbations: a European Respiratory Society/American Thoracic Society guideline

https://www.ncbi.nlm.nih.gov/pubmed/10465169 Oral corticosteroids in patients admitted to hospital with exacerbations of chronic obstructive pulmonary disease: a prospective randomized controlled trial.

https://www.atsjournals.org/doi/full/10.1164/ajrccm.165.5.2109093 Comparison of Nebulized Budesonide and Oral Prednisolone with Placebo in the Treatment of
Acute Exacerbations of Chronic Obstructive Pulmonary Disease

http://www.nejm.org/doi/full/10.1056/NEJM199906243402502 Effect of Systemic Glucocorticoids on Exacerbations of Chronic Obstructive Pulmonary Disease

https://www.ncbi.nlm.nih.gov/pubmed/8756814 Controlled trial of oral prednisone in outpatients with acute COPD exacerbation.

https://www.thoracic.org/statements/resources/copd/mgmt-of-COPD-exacerbations.pdf Management of COPD exacerbations: a European Respiratory Society/American Thoracic Society guideline

A Model Protocol for Emergency Medical Services Management of Asthma Exacerbations Workgroup.

CARDIAC ISCHEMIA

National Model EMS Clinical Guidelines V 2.0

Prehospital Evidence Bases Practice (PEP)

ILCOR ACS CoSTR 2005, 2015

Freimark D, Matetzky S, Leor J, Boyko V, Barbash IM, Behar S, Hod H. Timing of aspirin administration as a determinant of survival of patients with acute myocardial infarction treated with thrombolysis. Am J Cardiol. 2002;89:381–385.

Randomised trial of intravenous streptokinase, oral aspirin, both, or neither among 17,187 cases of suspected acute myocardial infarction: ISIS-2. ISIS-2 (Second International Study of Infarct Survival) Collaborative Group. Lancet. 1988;2:349–360.

Collaborative overview of randomised trials of antiplatelet therapy–I: prevention of death, myocardial infarction, and stroke by prolonged antiplatelet therapy in various categories of patients. Antiplatelet Trialists' Collaboration [published correction appears in BMJ. 1994;308: 1540]. BMJ. 1994;308:81–106.

APPENDIX B

Proulx M-H, de Montigny L, Ross D, Vacon C, Juste LE, Segal E. Prehospital Nitroglycerin in Tachycardic Chest Pain Patients: A Risk for Hypotension or Not? Prehosp Emerg Care. 2017 Jan;21(1):68–73.

Robichaud L, Ross D, Proulx M-H, Légaré S, Vacon C, Xue X, et al. Prehospital Nitroglycerin Safety in Inferior ST Elevation Myocardial Infarction. Prehosp Emerg Care. 2016;20(1):76–81.

CCS STEMI Guidelines 2018/2019 suggest avoidance of routine intravenous opioid analgesic administration for STEMI-related discomfort. However, selective use of opioid analgesic medications may be considered for severe pain with the goal of relieving pain and reducing anxiety.

Bonin M, Mewton N, Roubille F, Morel O, Cayla G, Angoulvant D, et al. Effect and Safety of Morphine Use in Acute Anterior ST-Segment Elevation Myocardial Infarction. J Am Heart Assoc. 2018 Feb 10;7(4):1-8.

McEvoy JW, Ibrahim K, Kickler TS, Clarke WA, Hasan RK, Czarny MJ, et al. Effect of Intravenous Fentanyl on Ticagrelor Absorption and Platelet Inhibition Among Patients Undergoing Percutaneous Coronary Intervention. circulation. 2018 Jan 15;137(3):307–9.

Gwag HB, Park TK, Song YB, Kim EK, Jang WJ, Yang JH, et al. Morphine Does Not Affect Myocardial Salvage in ST-Segment Elevation Myocardial Infarction. PLoS ONE. 2017;12(1):e0170115.

Kubica J, Adamski P, Ostrowska M, Sikora J, Kubica JM, Sroka WD, et al. Morphine delays and attenuates ticagrelor exposure and action in patients with myocardial infarction: the randomized, double-blind, placebo-controlled IMPRESSION trial. Eur Heart J. 2016 Jan 14;37(3):245–52.

Weldon ER, Ariano RE, Grierson RA. Comparison of Fentanyl and Morphine in the Prehospital Treatment of Ischemic Type Chest Pain. Prehosp Emerg Care. 2016;20(1):45–51.

Parodi G, Bellandi B, Xanthopoulou I, Capranzano P, Capodanno D, Valenti R, et al. Morphine is associated with a delayed activity of oral antiplatelet agents in patients with ST-elevation acute myocardial infarction undergoing primary percutaneous coronary intervention. Circ Cardiovasc Interv. 2015 Jan;8(1):1–6.

Zedigh C, Alho A, Hammar E, Karlsson T, Kellerth T, Svensson L, et al. Aspects on the intensity and the relief of pain in the prehospital phase of acute coronary syndrome: experiences from a randomized clinical trial. Coron Artery Dis. 2010 Mar;21(2):113–20.

Meine TJ, Roe MT, Chen AY, Patel MR, Washam JB, Ohman EM, et al. Association of intravenous morphine use and outcomes in acute coronary syndromes: results from the CRUSADE Quality Improvement Initiative. American Heart Journal. 2005 Jun;149(6):1043–9.

Nam J, Caners K, Bowen JM, Welsford M, O'Reilly D. Systematic review and meta-analysis of the benefits of out-of-hospital 12-lead ECG and advance notification in ST-segment elevation myocardial infarction patients. Ann Emerg Med. 2014 Aug;64(2):176–86–186.e1–9.

Welsford M, Nikolaou NI, Beygui F, Bossaert L, Ghaemmaghami C, Nonogi H, et al. Part 5: Acute Coronary Syndromes: 2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations. circulation. 2015 Oct 20;132(16 Suppl

1):S146–76.

O'Connor RE, Ali Al AS, Brady WJ, Ghaemmaghami CA, Menon V, Welsford M, et al. Part 9: Acute Coronary Syndromes: 2015 American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. circulation. 2015 Nov 3;132(18 Suppl 2):S483–500.

Verbeek PR, Ryan D, Turner L, Craig AM. Serial prehospital 12-lead electrocardiograms increase identification of ST-segment elevation myocardial infarction. Prehosp Emerg Care. 2012;16(1):109-14.

Sepehrvand N, James SK, Stub D, Khoshnood A, Ezekowitz JA, Hofmann R. Effects of supplemental oxygen therapy in patients with suspected acute myocardial infarction: a meta-analysis of randomised clinical trials. Heart. 2018 Oct;104(20):1691–8.

Hofmann R, James SK, Jernberg T, Lindahl B, Erlinge D, Witt N, Arefalk G, Frick M, Alfredsson J, Nilsson L, Ravn-Fischer A, Omerovic E, Kellerth T, Sparv D, Ekelund U, Linder R, Ekstrom M, Lauermann J, Haaga U, Pernow J, Ostlund O, Herlitz J, Svensson L and Investigators DXS. Oxygen Therapy in Suspected Acute Myocardial Infarction. N Engl J Med. 2017;377:1240-1249.

Heidari F, Rahzani K, Iranpoor D, Rezaee K. The effect of oxygen on the outcomes of non-ST-segment elevation acute coronary syndromes. IJC Metabolic & Endocrine. The Authors; 2017 Mar 1;14(C):67–71.

Khoshnood A, Akbarzadeh M, Roijer A, Meurling C, Carlsson M, Bhiladvala P, Hoglund P, Sparv D, Todorova L, Mokhtari A, Erlinge D and Ekelund U. Effects of oxygen therapy on wall-motion score index in patients with ST elevation myocardial infarction-the randomized SOCCER trial. Echocardiography. 2017;34:1130-1137.

Stub D, Smith K, Bernard S, Nehme Z, Stephenson M, Bray JE, Cameron P, Barger B, Ellims AH, Taylor AJ, Meredith IT, Kaye DM and Investigators A. Air Versus Oxygen in ST-Segment-Elevation Myocardial Infarction. Circulation. 2015;131:2143-50.

Ranchord AM, Argyle R, Beynon R, Perrin K, Sharma V, Weatherall M, et al. High-concentration versus titrated oxygen therapy in ST-elevation myocardial infarction: a pilot randomized controlled trial. American Heart Journal. 2012 Feb;163(2):168–75

CARDIOGENIC SHOCK

Agrawal, A., Shastri, P., Gupta, A., & Consul, S. (2011). Comparative study of dopamine and norepinephrine in the management of septic shock. Saudi Journal of Anaesthesia, 5(2), 162. doi:10.4103/1658-354x.82784

Avni, T., Lador, A., Lev, S., Leibovici, L., Paul, M., & Grossman, A. (2015). Vasopressors for the Treatment of Septic Shock: Systematic Review and Meta-Analysis. Plos One, 10(8). doi:10.1371/journal.pone.0129305

Chakraborty, A., Mathur, S., & Dhunna, R. (2007). Comparison of norepinephrine and dopamine in the management of septic shock using impedance cardiography. Indian Journal of Critical Care Medicine, 11(4), 186. doi:10.4103/0972-5229.37713

APPENDIX B

Coxford, N., Lang, E., & Dowling, S. (2010). Dopamine versus norepinephrine in the treatment of shock [Review]. Comparison of Dopamine and Norepinephrine in the Treatment of Shock, 362, 779-789.

De Backer, D., Aldecoa, C., Njimi, H., & Vincent, J. (2012). Dopamine versus norepinephrine in the treatment of septic shock. Critical Care Medicine, 40(3), 725-730. doi:10.1097/ccm.0b013e31823778ee

De Backer, D., Biston, P., Devriendt, J., Madl, C., Chochrad, D., Aldecoa, C., . . . Vincent, J. (2010). Comparison of Dopamine and Norepinephrine in the Treatment of Shock. The New England Journal of Medicine, 362(9), 779-789.

Du, Y., Wang, L., Shi, H., Gao, M (2015). Comparison of clinical effect of dopamine and norepinephrine in the treatment of septic shock. Pakistan Journal of Pharmaceutical Sciences, 28(4), 1461-4.

Léopold V, Gayat E, Pirracchio R, Spinar J, Parenica J, Tarvasmäki T, et al. Epinephrine and short-term survival in cardiogenic shock: an individual data meta-analysis of 2583 patients. Intensive Care Med. 2018 Jun;44(6):847–56.

Levy B, Clere-Jehl R, Legras A, Morichau-Beauchant T, Leone M, Frederique G, et al. Epinephrine Versus Norepinephrine for Cardiogenic Shock After Acute Myocardial Infarction. J Am Coll Cardiol. 2018 Jul 10;72(2):173–82.

Martin, C., Papazian, L., Perrin, G., Saux, P., & Gouin, F. (1993). Norepinephrine or Dopamine for the Treatment of Hyperdynamic Septic Shock? Chest, 103(6), 1826-1831. doi:10.1378/chest.103.6.1826

Patel, G. P., Grahe, J. S., Sperry, M., Singla, S., Elpern, E., Lateef, O., & Balk, R. A. (2010). Efficacy And Safety Of Dopamine Versus Norepinephrine In The Management Of Septic Shock. Shock, 33(4), 375-380. doi:10.1097/shk.0b013e3181c6ba6f

Vasu, T. S., Cavallazzi, R., Hirani, A., Kaplan, G., Leiby, B., & Marik, P. E. (2011). Norepinephrine or Dopamine for Septic Shock: A Systematic Review of Randomized Clinical Trials. Journal of Intensive Care Medicine, 27(3), 172-178. doi:10.1177/0885066610396312

Wu, Y., Zhang, N., Wu, Y., Zheng, Y., You, X., Cao, Z., & Xu, Y. (2016). Effects of dopamine, norepinephrine and dobutamine on gastric mucosal pH of septic shock patients. Experimental and Therapeutic Medicine, 12(2), 975-978. doi:10.3892/etm.2016.3362

Zhou, F., Mao, Z., Zeng, X., Kang, H., Liu, H., Pan, L., & Hou, P. C. (2015). Vasopressors in septic shock: A systematic review and network meta-analysis. Therapeutics and Clinical Risk Management, 1047-1059. doi:10.2147/tcrm.s80060

CENTRAL VENOUS ACCESS DEVICE

Canadian Agency for Drugs and Technologies in Health, Peripherally Inserted Central Catheters (PICCs) for adult and pediatric patients: a review of clinical evidence. Rapid Response Summary with Critical Appraisal, 2013.

Leroyer C, Lasheras A, Marie V, et al (2013) Prospective follow-up of complications related to peripherally

inserted central catheters. Medecine at Maladies Infectuses, 43(8): 350-355

Potelli F, Coccino C, Monolo D (2018) Efficacy and safety of peripherally inserted central venous catheters in acute cardiac care management. J. Vasc. Access, 19(5):455-560

Vidal V, Muller C, Jacquier A, et al. (2008) Evaluation prospective des complications des PICC, Journal De Radiologie, 89(4):495-498

COMBATIVE PATIENT

Cole JB., Klein LR., Nystrom PC. Et al. A prospective study of ketamine as primary therapy for prehospital profound agitation. Am J Emerg Med 2018; 36:789-96.

Linder LM., Ross CA., Weant KA. Prehospital ketamine for excited delirium. Pharmacotherapy 2018;38(1):139-151.

Cole JB., Moor JC., Nystrom PC., et al. A prospective study of ketamine versus haloperidol for severe prehospital agitation. Clin Toxicol 2016;54(7)556-62.

Olives TD, Nystrom PC., Cole JB., Dodd KW., Ho JD. Intubation of profoundly agitated patients treated with prehospital ketamine. Prehosp disaster Med 2016;31(6)593-602.

Hopper AB., Vilke GM., Castillo EM., et al., Ketamine use for acute agitation in the emergency department. J Emerg Med. 2015;48(6):712-19.

Scheppke KA., Braghiroli J., Shalaby M., Chait R., Prehospital use of IM ketamine for sedation of violent and agitated patients. W J Emerg Med 2014;15(7)736-41.

Keseg D., Cortez E., Rund D., Caterino J., The use of prehospital ketamine for control of agitation in a metropolitan fire-fighter based EMS system. Prehosp Emerg Care 2015;19:110-5.

Riddel J., Tran A., Bengiamin R., Hendey GW, Armenian P. Ketamine as first line treatment for severely agitated emergency department patients. Am J Emerg Med. 2017; 35:1000-4

Korczak V, Kirby A, Gunja N. Chemical agents for the sedation of agitated patients in the ED: a systematic review. Am J Emerg Med. 2016;34:2426-2431.

Gonin P, Beysard N, Yersin B, Pierre-Nicolas C. Excited Delirium: A Systematic Review. Acad. Emerg Med. 2018;25:552-565

Scaggs TR, Glass DM, Hutchcraft MG, Weir WB. Prehospital ketamine is a safe and effective treatment for excited delirium in a community hospital based EMS system. Prehosp Disaster Med. 2016;31(5):563-569.

O'Connor L, Rebesco M, Robinson C, Gross K, Castellana A, O'Connor MJ, Restuccia M., Outcomes of Prehospital Chemical Sedation With Ketamine Versus Haloperidol and Benzodiazepine or Physical Restraint Only. Prehosp Emerg Care. 2018 Aug 27:1-9

APPENDIX B

Bailey, A., Baum, R., Horn, K. et al. Review of intranasally administered medications for use in the Emergency Department. The Journal of Emergency Medicine. 2017;53(1):38-48

Shrestha, G., Joshi, P., Bhattarai, K. et al. Intranasal Midazolam for rapid sedation of an agitated patient. Indian J Crit Care Med. 2015;19(6):356-358

Isbister, G., Calver, L., Page, C., et al. Randomized controlled trial of intramuscular droperidol versus midazolam for violence and acute behavioural disturbance: The DORM study. Annals of Emergency Medicine. 2010;56(4): 392-401 *Midazolam 10 mg IM in agitated patient population, higher oversedation, more AEs

Isenberg, D., & Jacobs, D. Prehospital agitation and sedation trial (PhAST): A randomized controlled trial of intramuscular haloperidol versus intramuscular midazolam for the sedation of the agitated or violent patient in the prehospital environment. Prehospital and Disaster Medicine. 2015;30(5):491-495 * Midazolam 5 mg IM in agitated patient population

Martel, M., Sterzinger, A., Miner, J. et al. Management of acute undifferentiated agitation in the Emergency Department: A randomized double-blind trial of droperidol, ziprasidone, and midazolam. Acad Emerg Med. 2005;12(12):1167-1172

Vilke, G., Bozeman, W., Dawes, D. et al. Excited delirium syndrome (ExDS): Treatment options and considerations. Journal of Forensic and Legal Medicine. 2012;19:117-121

Mankowitz, S., Regenberg, P., Kaldan, J. et al. Ketamine for rapid sedation of agitated patients in the prehospital and Emergency Department settings: A systematic review and proportional meta-analysis. The Journal of Emergency Medicine. 2018;55(5): 670-681

Green, S., Roback, M., Kennedy, R. et al. Clinical practice guideline for Emergency Department Ketamine dissociative sedation: 2011 update. Annals of Emergency Medicine. 2011;57(5):449-461

Goyal, S. & Agrawal, A. Ketamine in status asthmaticus: A review. Indian Journal of Critical Care Medicine. 2013;17(3):154-165

Riddel, J., Tran, A., Bengiamin, R., et al. Ketamine as a first-line treatment for severely agitated emergency department patients. American Journal of Emergency Medicine. 2017;35:1000-1004

Scheppke, K., Braghiroli, J., Shalaby, M. et al. Prehospital use of IM ketamine for sedation of violent and agitated patients. Western Journal of Emergency Medicine. 2014;15(7):736-741

Vilke, G., Bozeman, W., Dawes, D. et al. Excited delirium syndrome (ExDS): Treatment options and considerations. Journal of Forensic and Legal Medicine. 2012;19:117-121

Vilke, G., DeBard, M., Chan, T. et al. Excited delirium syndrome (ExDS): Defining based on a review of the literature. The Journal of Emergency Medicine. 2012;43(5):897-905

Shrestha, G., Joshi, P., Bhattarai, K. et al. Intranasal Midazolam for rapid sedation of an agitated patient. Indian J Crit Care Med. 2015;19(6):356-358

APPENDIX B

Bailey, A., Baum, R., Horn, K. et al. Review of intranasally administered medications for use in the Emergency Department. The Journal of Emergency Medicine. 2017;53(1):38-48

Isenberg, D., & Jacobs, D. Prehospital agitation and sedation trial (PhAST): A randomized controlled trial of intramuscular haloperidol versus intramuscular midazolam for the sedation of the agitated or violent patient in the prehospital environment. Prehospital and Disaster Medicine. 2015;30(5):491-495 * Midazolam 5 mg IM in agitated patient population

Martel, M., Sterzinger, A., Miner, J. et al. Management of acute undifferentiated agitation in the Emergency Department: A randomized double-blind trial of droperidol, ziprasidone, and midazolam. Acad Emerg Med. 2005;12(12):1167-1172

CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP)

Ann Emerg Med. 2014 May;63(5):600-607. Effect of out-of-hospital noninvasive positive-pressure support ventilation in adult patients with severe respiratory distress: a systematic review and meta-analysis. Mal S, McLeod S, Iansavichene A, Dukelow A, Lewell M.

Aust Crit Care. 2017 Nov; 30(6):289-297. Noninvasive ventilation for acute exacerbations of asthma: A systematic review of the literature. Green E, Jain P, Bernoth M

Cochrane Database Syst Rev. 2012;12:CD004360. Epub 2012 Dec 12. Lim WJ, Mohammed Akram R, Carson KV, Mysore S, Labiszewski NA, Wedzicha JA, Rowe BH, Smith BJ.

Agarwal R, Malhotra P, Gupta D. Failure of NIV in acute asthma: case report and a word of caution. Emerg Med J. 2006 Feb;23(2):e9. [pubmed] [article]

Gupta D, Nath A, Agarwal R, Behera D. A prospective randomized controlled trial on the efficacy of noninvasive ventilation in severe acute asthma. Respir Care. 2010;55(5):536-43. [pubmed]

Landry A, Foran M, Koyfman A. Does Noninvasive Positive-Pressure Ventilation Improve Outcomes in Severe Asthma Exacerbations? Ann Emerg Med 2013;62(6):594-596 [pubmed]

Lim WJ, Mohammed Akram R, Carson KV, Mysore S, Labiszewski NA, Wedzicha JA, Rowe BH, Smith BJ. Non-invasive positive pressure ventilation for treatment of respiratory failure due to severe acute exacerbations of asthma. Cochrane Database Syst Rev. 2012 Dec 12;12:CD004360. [pubmed]

Murase K, Tomii K, Chin K, Niimi A, Ishihara K, Mishima M. Non-invasive ventilation in severe asthma attack, its possibilities and problems. Panminerva Med. 2011 Jun;53(2):87-96. [pubmed]

Soroksky A, Klinowski E, Ilgyev E, Mizrachi A, Miller A, Ben Yehuda TM, Shpirer I, Leonov Y. Noninvasive positive pressure ventilation in acute asthmatic attack. Eur Respir Rev. 2010 Mar;19(115):39-45. doi: 10.1183/09059180.00006109. Review. [pubmed]

Stefan MS, Nathanson BH, Lagu T, et al. Outcomes of Noninvasive and Invasive Ventilation in Patients Hospitalized with Asthma Exacerbation. Ann Am Thorac Soc. 2016;13(7):1096-104. [pubmed]

APPENDIX B

Stefan MS, Nathanson BH, Priya A, et al. Hospitals' Patterns of Use of Noninvasive Ventilation in Patients With Asthma Exacerbation. Chest. 2016;149(3):729-36. [pubmed]

CRICOTHYROTOMY

Braude D., Webb H., Stafford J., et al. The bougie-aided cricothyrotomy. Air Med J 2009; 28(4):191-4.

Morris A., Lockey D., Coats T. Fat necks: Modification of a standard surgical airway protocol in the pre-hospital environmental. Resuscitation 1997; 35(3):253-4.

Michael W. Hubble, Denise A. Wilfong, Lawrence H. Brown, Attila Hertelendy & Randall W. Benner(2010) A Meta-Analysis of Prehospital Airway Control Techniques Part II: Alternative Airway Devices and Cricothyrotomy Success Rates, Prehospital Emergency Care, 14:4, 515-530

Sofie et al, Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine2013, 21:43

CROUP

Rosen's Emergency Medicine 'most common infectious cause of upper airway distress obstruction in children (DeSoto H. Epiglottitis and croup in airway obstruction in children. Anesthesiol Clin North Am. 1998;16:853–68....)

Rittichier KK, Ledwith CA. Outpatient treatment of moderate croup with dexamethasone: intramuscular versus oral dosing. Pediatrics. 2000;106:1344–8.)
http://www.cmaj.ca/content/185/15/1317.long

Viral Croup https://www.ncbi.nlm.nih.gov/pubmed/?term=viral+croup%2C+knutson

Acute management of croup in the emergency department https://academic.oup.com/pch/article-lookup/doi/10.1093/pch/pxx019

A randomized trial of a single dose of oral dexamethasone for mild croup
https://www.ncbi.nlm.nih.gov/pubmed/15385657?dopt=Abstract

A comparison of nebulized budesonide, intramuscular dexamethasone, and placebo for moderately severe croup. https://www.ncbi.nlm.nih.gov/pubmed/9709042?dopt=Abstract

Oral and inhaled steroids in croup: A randomized, placebo-controlled trial
http://onlinelibrary.wiley.com/doi/10.1002/ppul.1950200604/full

Steroid Treatment of Laryngotracheitis: A Meta-Analysis of the Evidence From Randomized Trials.http://pediatrics.aappublications.org/content/pediatrics/83/5/683.full.pdf

Glucocorticoids for croup http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD001955.pub3/full

P005: Pre-hospital dexamethasone administration in children with croup: the Edmonton experience https://www.cambridge.org/core/journals/canadian-journal-of-emergency-medicine/article/p005-pre-hospital-dexamethasone-administration-in-children-with-croup-the-edmonton-experience/A55C4B466DA2F1EA37AA2325788A9CD6

APPENDIX B

Croup in children http://www.cmaj.ca/content/185/15/1317.long

EMERGENCY CHILDBIRTH

Cunningham, F.G, et al. William's Obstetrics. 2018. 25th Edition.

Walls, R, et al. Rosen's Emergency Medicine. Concepts and Clinical Practice. 2017. 9th Edition.

Paramedic Emergency Skills Program (PESP). Association of Ontario Midwives. 2017.

Anderson, J.M and Etches, D. 1.

The Prevention and Management of Postpartum Hemorrhage: Report of Technical Working Group, Geneva 3-6 July
1989. Geneva: World Health Organization, 1990

Prendiville, W.J, et al. Active versus expectant management in the third stage of labour. Cochrane Database Syst Rev 2000;(3): CD000007.

Jackson K.W. et al. A randomized controlled trial comparing oxytocin administration before and after placental delivery in the prevention of postpartum hemorrhage. Am. J. Obstet. Gynecol 2001;185:873-7.

Prevention and Management of Postpartum Hemorrhage. American Family Physician. Volume 75 (6). 2007.

EMERGENCY TRACHEOSTOMY TUBE REINSERTION & SUCTIONING

Very little literature available, most is simply expert opinion.

HOME DIALYSIS EMERGENCY DISCONNECT

Literature search using PubMed revealed no references related to dialysis disconnect and EMS/PH providers.

HYPERKALEMIA

Ahee, P, Crowe, A (2000) The management of hyperkalemia in the emergency department, J. Accid Emerg Med, 17(3):188-91

Batterink J, Cessford TA, Taylor RAI. Pharmacological interventions for the acute management of hyperkalaemia in adults. Cochrane Database of Systematic Reviews, 2015;10. Art. No.: CD010344.

Guy J. Pharmacology for the Prehospital Professional. Mosby, St Louis; 2009

Hollander-Rodriquez J, Calvert J. Hyperkalemia. Am Fam Physician. 2006;73(2):283–90

Long,B, Warix, J.R., Koyfman, A. Controversies in Management of Hyperkalemia. J Emerg Med 2018; 55(2):192-205

Mahoney BA, Smith WAD, Lo D, Tsoi K, Tonelli M, Clase C. Emergency interventions for

hyperkalaemia. Cochrane Database of Systematic Reviews 2005; 2. Art. No.: CD003235.

Strange, B. Prehospital treatment of hyperkalaemia. Journal of Paramedic Practice. 2010;2(5):194-199.

Weisberg LS. Management of severe hyperkalemia. Crit Care Med, 2008;36: 3246-3251

Levine M, Nikkanen H, Pallin DJ. The effects of intravenous calcium in patients with digoxin toxicity. J Emerg Med. 2001;40(1):41-6

Erickson CP, Olson KR. Case files of the medical toxicology fellowship of the California poison control system-San Francisco: calcium plus digoxin-more taboo than toxic? J Med Toxicol. 2008;4(1):33-9.

Hack JB, Woody JH, Lewis DE, Brewer K, Meggs WJ. The effect of calcium chloride in treating hyperkalemia due to acute digoxin toxicity in a porcine model. J Toxicol Clin Toxicol. 2004;42(4):337-42.

HYPOGLYCEMIA

Boido A, Ceriani V, Pontiroli AE. Glucagon for hypoglycemic episodes in insulin-treated diabetic patients: a systematic review and meta-analysis with a comparison of glucagon with dextrose and of different glucagon formulations. Acta Diabetol. 2015;52(2):405-412.

Carlson JN, Schunder-Tatzber S, Neilson CJ, Hood N. Dietary sugars versus glucose tablets for first-aid treatment of symptomatic hypoglycaemia in awake patients with diabetes: a systematic review and meta-analysis. Emerg Med J. 2017;34(2):100-106.

Cryer PE, Axelrod L, Grossman AB, et al. Evaluation and Management of Adult Hypoglycemic Disorders: An Endocrine Society Clinical Practice Guideline Summary of Recommendations. J Clin Endocrinol Metab. 2009;94:709-728

Merlin MA, Carluccio A, Raswant N, DosSantos F, Ohman-Strickland P, Lehrfeld DP. Comparison of Prehospital Glucose with or without IV Thiamine. West J Emerg Med. 2012;406(5). doi:10.5811/westjem.2012.1.6760

Rostykus P, Kennel J, Adair K, et al. Variability in the Treatment of Prehospital Hypoglycemia: A Structured Review of EMS Protocols in the United States. Prehospital Emerg Care. 2016;20(4):524-530.

Rozance P. Management and outcome of neonatal hypoglycemia - UpToDate. UpToDate. https://www.uptodate.com/contents/management-and-outcome-of-neonatal-hypoglycemia?csi=0b0a967e-682b-46c9-bfdc-d625c6ad0f46&source=contentShare. Published 2018.

Schabelman E, Kuo D. Glucose before Thiamine for Wernicke Encephalopathy: A Literature Review. J Emerg Med. 2012;42(4):488-494.

Sibley T, Jacobsen R, Salomone J. Successful Administration of Intranasal Glucagon in the Out-of-Hospital Environment. Prehospital Emerg Care. 2013;17(1):98-102.

APPENDIX B

Sunehag A, Haymond M. Approach to hypoglycemia in infants and children - UpToDate. UpToDate. https://www.uptodate.com/contents/approach-to-hypoglycemia-in-infants- and-children?csi=8ffc5f20-a6ea-4aa6-b427-1582a5345fc0&source=contentShare. Published 2017.

Thornton PS, Stanley CA, De Leon DD, et al. Recommendations from the Pediatric Endocrine Society for Evaluation and Management of Persistent Hypoglycemia in Neonates, Infants, and Children. 2015.

Villani M, de Courten B, Zoungas S. Emergency treatment of hypoglycaemia: a guideline and evidence review. Diabet Med. 2017;34(9):1205-1211.

Weston PJ, Harris DL, Battin M, Brown J, Hegarty JE, Harding JE. Oral dextrose gel for the treatment of hypoglycaemia in newborn infants. Cochrane Database Syst Rev. 2016;(5).

Yale J-F, Paty B, Senior Mbbs PA. 2018 Clinical Practice Guidelines Hypoglycemia Diabetes Canada Clinical Practice Guidelines Expert Committee. 2018.

Intramuscular Glucagon Versus Intravenous Glucose for Severe Hypoglycemic Symptoms: Clinical Effectiveness and Guidelines.; 2010. http://www.bbdc.org/diabetesmanagement/files/ATTMODM-2009.pdf.

CADTH RAPID RESPONSE REPORT: SUMMARY WITH CRITICAL APPRAISAL Oral Glucose Gel for Neonatal Hypoglycemia: A Review of Clinical Effectiveness, Cost-Effectiveness and Guidelines.; 2018. https://cadth.ca/sites/default/files/pdf/htis/2018/RC0998 Oral Glucose Gel for Neonatal Hypoglycemia Final.pdf.

The Hospital Management of Hypoglycaemia in Adults with Diabetes Mellitus 3rd Edition This Document Is Coded JBDS 01 in the Series of JBDS Documents: Other JBDS Documents: The Management of Diabetes in Adults and Children with Psychiatric Disorders in Inp.; 2018. https://abcd.care/joint-british-diabetes-societies-jbds-inpatient-care-group.

INTRAVENOUS AND FLUID THERAPY

Dretzke J, Sandercock J, Bayliss S, Burls A. Clinical effectiveness and cost-effectiveness of prehospital IV fluids in trauma patients. Health Technology Assessment 2004; 8:23.

Bickell WH., Wall MJ., Pepe PE., et al. Immediate versus delayed fluid resuscitation for hypotensive patients with penetrating torso injuries. New Eng J Med 1994; 331(17):1105-9.

Schreiber MA, Meier EN, Tisherman SA, et al. A controlled resuscitation strategy is feasible and safe in hypotensive trauma patients: Results of a prospective randomized pilot trial. J Trauma Acute Care Surg. 2015;78(4):687-95; discussion 695-7.

Hampton DA, Fabricant LJ, Differding J, Diggs B, Underwood S, De La Cruz D, et al. Prehospital intravenous fluid is associated with increased survival in trauma patients. J Trauma Acute Care Surg 2013; 75(1S1):S9-15

Kuppermann et al. Clinical Trial of Fluid Infusion Rates for Pediatric Diabetic Ketoacidosis. N Engl J Med

2018. PMID: 29897851

Glaser N, et al. Risk Factors for Cerebral Edema in Children with Diabetic Ketoacidosis. N Engl J Med. 2001. PMID: 11172153

MEDICAL CARDIAC ARREST

Kim et al. The Scene time interval and BLS TOR in OHCA. J Korean Med Sci 2015;30:104-9.

Nehme Z. Andrew E, Bernard S. Smith K. Impact of cardiopulmonary resuscitation duration on survival from paramedic witnessed out-of-hospital cardiac arrests: An observational study. Resuscitation. 2016 Mar;100:25-31. doi: 10.1016/j.resuscitation.2015.12.011.

Xiong et al. OHCA with ROSC in the field: Who are the survivors? Resuscitation 112 (2017) 28-33.

Grunau B et al. External validation of the universal TOR rule for OHCA in British Columbia. Ann Emerg Med 70 (2017) 374-81.

Jabre P, Penaloza A, Pinero D, Duchateau FX, Borron SW, Javaudin F, Richard O, de Longueville D, Bouilleau G, Devaud ML, Heidet M, Lejeune C, Fauroux S, Greingor JL, Manara A, Hubert JC, Guihard B, Vermylen O, Lievens P, Auffret Y, Maisondieu C, Huet S, Claessens B, Lapostolle F, Javaud N, Reuter PG, Baker E, Vicaut E and Adnet F. Effect of Bag-Mask Ventilation vs Endotracheal Intubation During Cardiopulmonary Resuscitation on Neurological Outcome After Out-of-Hospital Cardiorespiratory Arrest: A Randomized Clinical Trial. JAMA. 2018;319:779-787.

Soar J, Nicholson TC, Parr MJ, Berg KM, Böttiger BW, Callaway CW, Deakin CD, Drennan I, Neumar RW, O'Neil BJ, Paiva EF, Reynolds JC, Sandroni C, Wang TL, Welsford M, Nolan JP, Nation K, Donnino M, Morley PT, Andersen LW. Advanced Airway Management During Adult Cardiac Arrest Consensus on Science with Treatment Recommendations [Internet] Brussels, Belgium: International Liaison Committee on Resuscitation (ILCOR) Advanced Life Support Task Force, 2019 March 18. *https://costr.ilcor.org/document/advanced-airway-management-during-adult-cardiac-arrest*

Wang HE, Schmicker RH, Daya MR, Stephens SW, Idris AH, Carlson JN, Colella MR, Herren H, Hansen M, Richmond NJ, Puyana JCJ, Aufderheide TP, Gray RE, Gray PC, Verkest M, Owens PC, Brienza AM, Sternig KJ, May SJ, Sopko GR, Weisfeldt ML and Nichol G. Effect of a Strategy of Initial Laryngeal Tube Insertion vs Endotracheal Intubation on 72-Hour Survival in Adults With Out-of-Hospital Cardiac Arrest: A Randomized Clinical Trial. JAMA. 2018;320:769-778

MODERATE TO SEVERE ALLERGIC REACTION

Cheng, A. Emergency treatment of anaphylaxis in infants and children. Paediatr Child Health. 2011; 16(1): 35-40 (Indications; Epinephrine dose, route, contraindications; Diphenhydramine dose, route)

Simons, F.E., Ebisawa, M., Sanches-Borges, M. et al. 2015 update of the evidence base: World Allergy

APPENDIX B

Organization anaphylaxis guidelines. World Allergy Organization Journal. 2015; 8(32) (Epinephrine dose, route, contraindications; Diphenhydramine)

Kawano, T., Scheuermeyer, F., Gibo, K. et al. H1-Antihistamines reduce progression to anaphylaxis among Emergency Department patients with allergic reactions. Academic Emergency Medicine. 2017;24(6): 733-741 (Diphenhydramine)

Lammers, R., Willoughby-Byrwa, M., Fales, W. Medication errors in prehospital management of simulated pediatric anaphylaxis. Prehospital and Emergency Care. 2014; 18(2): 295-304 (Clinical consideration)

Kawano T, Scheuermeyer FX, Gibo K, Stenstrom R, Rowe B, Grafstein E, Grunau B. H1-antihistamines Reduce Progression to Anaphylaxis Among Emergency Department Patients With Allergic Reactions. Acad Emerg Med. 2017 Jun;24(6):733-741. doi: 10.1111/acem.1314

Lammers, R., Willoughby-Byrwa, M., Fales, W. Medication errors in prehospital management of simulated pediatric anaphylaxis. Prehospital and Emergency Care. 2014; 18(2): 295-304

Chung, T., Gaudet, L, Vandenberghe, C. et al. Pre-hospital management of anaphylaxis in one Canadian Urban Centre. Resuscitation. 2014; 85: 1077-1082

Cheng, A. Emergency treatment of anaphylaxis in infants and children. Paediatr Child Health. 2011; 16(1): 35-40

Abrams, E., Chan, E. Stinging insect hypersensitivity: Evaluation and management in children and youth. Canadian Pediatric Society Practice Point. 2018. Downloaded from https://www.cps.ca/en/documents/position/stinging-insect-hypersensitivity

Kawano, T., Scheuermeyer, F., Gibo, K. et al. H1-Antihistamines reduce progression to anaphylaxis among Emergency Department patients with allergic reactions. Academic Emergency Medicine. 2017;24(6): 733-741

Abrams, E., Sicherer, S. Diagnosis and management of food allergy. CMAJ. 2016;188(15);1087-1093

AHFS drug information 2004. McEvoy GK ed. Diphenhydrinate. American Society of Health System of Pharmacists; 2004:2786-7

Dimenhydrinate; mechanism of toxicity. Lexi-Drugs. Lexicomp. Wolters Kluwer Health, Inc. Riverwoods, IL. Available at: https://online.lexi.com/lco/action/doc/retrieve/docid/lexier/1186679?hl=dimenhydrinate. Accessed August 24, 2018.

NASOTRACHEAL INTUBATION

NAUSEA AND VOMITING

American Geriatric Society Beers Criteria for Potentially Inappropriate Medication Use in Older Adults, JAGS, Nov 2015- vol 63

APPENDIX B

Salvucci AA, Squire B, Burdick M, Luoto M, Brazzel D, Vaezazizi R. Ondansetron is safe and effective for prehospital treatment of nausea and vomiting by paramedics. Prehosp Emerg Care 2011; 15(1):34-8

Barrett TW, DiPersio DM, Jenkins CA, Jack M, McCoin NS, Storrow AB, et al. A randomized, placebo-controlled trial of ondansetron, metoclopramide, and promethazine in adults. Am J Emerg Med 2011; 29(3):247-55.

Fullerton L, Weiss SJ, Froman P, Oglesbee S, Cheney P. Ondansetron oral dissolving tablets are superior to normal saline alone for prehospital nausea. Prehosp Emerg Care 2012; 16(4):463-8

Warden CR, Moreno R, Daya M (2008). Prospective evaluation of Ondansetron for undifferentiated nausea & vomiting in the prehospital setting. PEC 12; 87-91

Piwko,c et al .Economic evaluation of ondansetron vs dimenhydrinate for prevention of postoperative vomiting in children undergoing strabismus surgery. Paedeatr Anasth Sept 2005:15(9) 755-61

NEWBORN RESUSCITATION

American Heart Associated, American Academy of Pediatrics. Textbook of Neonatal Resuscitation. 7th Edition. 2016 [general resuscitation algorithm]

Perlman JM, Wyllie J, Kattwinkel J, Wyckoff MH, Aziz K, Guinsburg R, Kim HS, Liley HG, Mildenhall L, Simon WM, Szyld E, Tamura M, Velaphi S; on behalf of the Neonatal Resuscitation Chapter Collaborators. Part 7: neonatal resuscitation: 2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science S204 288 WYCKOFF et al Downloaded from by guest on March 14, 2016 With Treatment Recommendations. Circulation. 2015;132(suppl 1):S204–S24 [general resuscitation algorithm, initiation of cardiac heart rate monitors and peripheral pre-ductal pulse oximetry]

Dawson JA, Schmozer GM, Wyllie J. Monitoring heart rate in the delivery room. Semin Fetal Neonatal Med. 2018 Oct 23(5):327-332.

AAP Committee on Fetus and Newborn. The Apgar Score. 2015. Pediatrics. Oct; 136(4)819-22. [support for Apgar scoring].

Rohana J. Khairina W. Boo NY. Shareen I. Reducing Hypothermia in preterm infants with polyethylene wrap. 2011. Pediatr Int Aug; 53(4):468-74. [support for temperature regulation in pre-term neonatal resusucitation].

Mariani G, Dik PB, Ezquer A, Aguirre A, Esteban ML, Perez C, Fernandez Jonusas S, Fustiñana C. Pre-ductal and post-ductal O2 saturation in healthy term neonates after birth. J Pediatr. 2007;150:418–421. doi: 10.1016/j.jpeds.2006.12.015 [pre-ductal oxygenation level saturations]

Houri P, Frank L, Menegazzi J et al. A randomized controlled trial of two-thumb vs two-finger chest compression in a swine infant model of cardiac arrest. Prehosp Emerg Care 1997; 1:65-7 [asynchronous chest compressions 3:1 ratio]

APPENDIX B

Smereka J, Szarpak L, Ladny JR, Rodriguez-Nunez A, Ruetzler K. A Novel Method of Newborn Chest Compression: A Randomized Crossover Simulation Study. Front Pediatr. 2018 May 29;6:159 [chest compression technique preference, thumbs]

Baik N. O'Reilly M. Fray C. van Os S. Cheung PY. Schmolzer GM. Ventilation Strategies during neonatal cardiopulmonary resuscitation. Front Pediatr 2018. Feb 12;6:18. [support for ventilation in directive]

Kapadia VS, Wyckoff MH. Epinephrine use during newborn resuscitation. Front Pediatr 2017. May 1:5:97 [epinephrine use during neonatal resuscitation]

Welsford M, Nishiyama C, Shortt C, Isayama T, Dawson JA, Weiner G, Roehr CC, Wyckoff MH, Rabi Y on behalf of the International Liaison Committee on Resuscitation Neonatal Life Support Task Force. Room air for initiating term newborn resuscitation: A systematic review and meta-analysis. Pediatrics on-line Dec 21, 2018. DOI: 10.1542/peds.2018-1825. [appropriate oxygen use during newborn resuscitation]

Welsford M, Nishiyama C, Shortt C, Weiner G, Roehr CC, Isayama T, Dawson JA, Wyckoff MH, Rabi Y on behalf of the International Liaison Committee on Resuscitation Neonatal Life Support Task Force. Initial oxygen use for preterm newborn resuscitation: A systematic review and meta-analysis. Pediatrics on-line Dec 21, 2018. DOI: 10.1542/peds.2018-1828. [appropriate oxygen use during newborn resuscitation]

Roehr CC, Weiner GM, Isayama T, Dawson JA, Rabi Y, Kapadia VS, de Almeida MF, Trevisanuto D, Mildenhall L, Liley HG, Hosono S, Kim HS, Szyld E, Perlman JM, Aziz K, Velaphi S, Guinsburg R, Welsford M, Nishiyama C, Wyllie JP and Wyckoff MH. Initial oxygen concentration for preterm neonatal resuscitation [Internet] Brussels, Belgium: International Liaison Committee on Resuscitation (ILCOR) Neonatal Life Support Task Force, November 16, 2018. [appropriate oxygen use during newborn resuscitation]

Isayama T, Dawson JA, Roehr CC, Rabi Y, Weiner GM, Aziz K, Kapadia VS, de Almeida MF, Trevisanuto D, Mildenhall L, Liley HG, Hosono S, Kim HS, Szyld E, Perlman JM, Velaphi S, Guinsburg R, Welsford M, Nishiyama C, Wyllie JP and Wyckoff MH. Initial oxygen concentration for term neonatal resuscitation. [Internet] Brussels, Belgium: International Liaison Committee on Resuscitation (ILCOR) Neonatal Life Support Task Force, November 12, 2018.[appropriate oxygen use during newborn resuscitation]

Perlman JM, Wyllie J, Kattwinkel J, Wyckoff MH, Aziz K, Guinsburg R, Kim HS, Liley HG, Mildenhall L, Simon WM, Szyld E, Tamura M, Velaphi S; on behalf of the Neonatal Resuscitation Chapter Collaborators. Part 7: neonatal resuscitation: 2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science S204 288 WYCKOFF et al Downloaded from by guest on March 14, 2016 With Treatment Recommendations. Circulation. 2015;132(suppl 1):S204–S24 [general resuscitation algorithm]

OPIOID TOXICITY

Tadros A. et al, Emergency department visits by pediatric patients for poisoning by prescription opioids. Am J Drug Alcohol Abuse. 2016;42(5):550–555

Finkelstein Y, Macdonald EM, Gonzalez A, Sivilotti MLA, Mamdani MM, Juurlink DN; Canadian Drug

APPENDIX B

Safety and Effectiveness Research Network (CDSERN). Overdose risk in young children of women prescribed opioids. Pediatrics. 2017;139(3)

Chou R, Korthuis PT, McCarty D, Coffin PO, Griffin JC, Davis O'Reilly C, et al. Management of suspected opioid overdose with naloxone in out-of-hospital settings: a systematic review. Ann Intern Med. 2017;167(12):867–75.

Rachael Rzasa Lynn and JL Galinkin , Therapeutic Advances Drug Saf ety, 2018, Vol. 9(1) 63–8

OROTRACHEAL INTUBATION

Jabre P., Penaloza A., Pinero D. Effect of Bag-Mask Ventilation vs Endotracheal Intubation During Cardiopulmonary Resuscitation on Neurological Outcome After Out-of-Hospital Cardiorespiratory Arrest: A Randomized Clinical Trial. JAMA. 2018; 319(8):779-787

Wang H., Schmicker R., Daya M. Effect of a Strategy of Initial Laryngeal Tube Insertion vs Endotracheal Intubation on 72-Hour Survival in Adults With Out-of-Hospital Cardiac Arrest A Randomized Clinical Trial. JAMA 2018; 320(8):769-778.

Benger J., Kirby K., Black S., et al. Effect of a Strategy of a Supraglottic Airway Device vs Tracheal Intubation During Out-of-Hospital Cardiac Arrest on Functional Outcome The AIRWAYS-2 Randomized Clinical Trial. JAMA 2018; 320(8):779-791

PEDIATRIC INTRAOSSEOUS

Frascone, Ralph J., et al. "Use of the pediatric EZ-IO needle by emergency medical services providers." Pediatric emergency care 25.5 (2009): 329-332.

Fowler R., Gallagher J.V., Isaacs S.M., Ossman E., Pepe P., and Wayne M.: The role of intraosseous vascular access in the out-of-hospital environment (resource document to NAEMSP position statement). Prehosp

Emerg Care 2007; 11: pp. 63-66

Horton, Mark A., and Cynthia Beamer. "Powered intraosseous insertion provides safe and effective vascular access for pediatric emergency patients." Pediatric emergency care 24.6 (2008): 347-350.

Johnson, M., Inaba, K., Byerly, S., Falsgraf, E., Lam, L., Benjamin, E., ... & Demetriades, D. (2016). Intraosseous infusion as a bridge to definitive access. The American Surgeon, 82(10), 876-880.

Kleinman, Monica E., et al. "Part 10: Pediatric basic and advanced life support: 2010 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with treatment recommendations." Circulation 122.16_suppl_2 (2010): S466-S515.

Lewis, Philippa, and Chris Wright. "Saving the critically injured trauma patient: a retrospective analysis of 1000 uses of intraosseous access." Emerg Med J 32.6 (2015): 463-467.

Maconochie, Ian K., et al. "European Resuscitation Council guidelines for resuscitation 2015: section 6.

APPENDIX B

Paediatric life support." Resuscitation 95 (2015): 223-248.

Schwartz D, Amir L, Dichter R, et al. The use of a powered device for intraosseous drug and fluid administration in a national EMS: a 4-year experience. J Trauma. 2008;64(3):650-5.

Von Hoff D.D., Kuhn J.G., Burris H.A., and Miller L.J.: Does intraosseous equal intravenous? A pharmacokinetic study. Am J Emerg Med 2008; 26: pp. 31-38

PROCEDURAL SEDATION

The Ottawa Hospital Parenteral Drug Therapy Manual. 2014. Mario Bédard, Pharm.D., Nathalie Grégoire, B.Pharm, Anne Massicotte, BPharm. M.Sc.

AHFS: Drug Information. Bethesda, MD: American Society of. Health-System Pharmacists, 2012.

Lexicomp Online, Pediatric and Neonatal Lexi-Drugs Online, Hudson, Ohio: Lexi-Comp, Inc.; 2013; Accessed Oct 6, 2014.

Lexicomp Online, Lexi-Drugs Online, Hudson, Ohio: Lexi-Comp Inc.; 2013; Accessed Oct 6, 2014.

CHEO Pediatric and Neonatal Manual. 2014 Version. www.outreach.cheo.on.ca

Critical Care Medicine Drip Infusions and Tables. 4th Edition 2008. Medical Information Systems, Inc

Sick Kids IV Monograph. 2014 Version.

LactMed Drug and Lactation. The National Library of Medicines accessed via http://toxnet.nlm.nih.gov/cgibin/sis/htmlgen?LACT

LactMed Drug and Lactation. https://www.jems.com/articles/.../ketamine-considerations-for-prehospital-use.htm

Ketamine for pre-hospital trauma https://sjtrem.biomedcentral.com/articles/10.1186/s13049-015-0176-

https://www.tandfonline.com/doi/full/10.1080/10903127.2016.1263373

Ornge Air Ambulance MDSO 2016

RETURN OF SPONTANEOUS CIRCULATION

ACP:

Gamper G, Havel C, Arrich J, Losert H, Pace NL, Müllner M, Herkner H.

Vasopressors for hypotensive shock. Cochrane Database of Systematic Reviews 2016, Issue 2. Art. No.: CD003709. DOI: 10.1002/14651858.CD003709.pub4. www.cochranelibrary.com Callaway CW, Donnino MW, Fink EL, Geocadin RG, Golan E, Kern

KB, Leary M, Meurer WJ, Peberdy MA, Thompson TM, Zimmerman JL. Part 8: post–cardiac arrest care:

APPENDIX B

2015 American Heart Association Guidelines

Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2015;132(suppl 2):S465–S482.

VanDiepenContemporary Management of Caridogenic Shock. Circulation. 2017;136:e232–e268.

De Backer Comparison of Dopamine and Norepi in the Treatment of Shock. N Engl J Med 2010;362:779-89.

SEIZURE

Rech, M.A., Barbas, B., Chaney, W. et al. When to pick the nose: Out-of-hospital and Emergency Department intranasal administration of medications. *Annals of Emergency Medicine*. 2017;70: 203-2011 (Midazolam routes, IN dose)

Silverman, E., Sporer, K., Lemieux, J. et al. Prehospital care for the adult and pediatric seizure patient: Current evidence based recommendations. *Western Journal of Emergency Medicine*. 2017;18(3): 419 – 436 (Midazolam as preferred medication, routes, doses)

Zelcer, M., Goldman R. Intranasal midazolam for seizure cessation in the community setting. *Canadian Family Physician*. 2016;62: 559 – 561 (Midazolam IN route)

Beskind, D.L., Rhodes, S.M., Stolz, U. et al. When should you test for and treat hypoglycemia in prehospital seizure patients? *Prehospital and Emergency Care*. 2014;18(3): 433-441

Remick, K., Redgate, C., Ostermayer, D. et al. Prehospital glucose testing for children with seizures: A proposed change in management. *Prehospital and Emergency Care*. 2017; 21(2): 216-221

Silverman, E., Sporer, K., Lemieux, J. et al. Prehospital care for the adult and pediatric seizure patient: Current evidence based recommendations. *Western Journal of Emergency Medicine*. 2017;18(3): 419 – 436

SUPRAGLOTTIC AIRWAY

ACP:

Authors:Erik G Laurin, MD, FAAEMAaron E Bair, MD, MSc, FAAEM, FACEP. Section Editor:Allan B Wolfson, MD. Deputy Editor:Jonathan Grayzel, MD, FAAEM

Benger JR, Kirby K, Black S, et al. Effect of a Strategy of a Supraglottic Airway Device vs Tracheal Intubation During Out-of-Hospital Cardiac Arrest on Functional Outcome: The AIRWAYS-2 Randomized Clinical Trial. JAMA 2018; 320:779.

Roth D, Hafner C, Aufmesser W, et al. Safety and feasibility of the laryngeal tube when used by EMTs during out-of-hospital cardiac arrest. Am J Emerg Med 2015; 33:1050.

Boyle M, Flavelle E. Which is more effective for ventilation in the prehospital setting during

APPENDIX B

cardiopulmonary resuscitation, the laryngeal mask airway or the bagvalve- mask? - A review of the literature. Australasian J Paramed 2012; 8:1. http://ro.ecu.edu.au/jephc/vol8/iss3/2/ (Accessed on November 29, 2015).

Stone BJ, Chantler PJ, Baskett PJ. The incidence of regurgitation during cardiopulmonary resuscitation: a comparison between the bag valve mask and laryngeal mask airway. Resuscitation 1998; 38:3.

Murray MJ, Vermeulen MJ, Morrison LJ, Waite T. Evaluation of prehospital insertion of the laryngeal mask airway by primary care paramedics with only classroom mannequin training. CJEM 2002; 4:338.

Genzwuerker HV, Fritz A, Hinkelbein J, et al. Prospective, randomized comparison of laryngeal tube and laryngeal mask airway in pediatric patients. Paediatr Anaesth 2006; 16:1251.

Klaver NS, Kuizenga K, Ballast A, Fidler V. A comparison of the clinical use of the Laryngeal Tube S and the ProSeal Laryngeal Mask Airway by first-month anaesthesia residents in anaesthetised patients. Anaesthesia 2007; 62:723.

Yildiz TS, Solak M, Toker K. Comparison of laryngeal tube with laryngeal mask airway in anaesthetized and paralysed patients. Eur J Anaesthesiol 2007; 24:620.

Russi CS, Miller L, Hartley MJ. A comparison of the King-LT to endotracheal intubation and Combitube in a simulated difficult airway. Prehosp Emerg Care 2008; 12:35.

Guyette FX, Wang H, Cole JS. King airway use by air medical providers. Prehosp Emerg Care 2007; 11:473.

Wang HE, Schmicker RH, Daya MR, et al. Effect of a Strategy of Initial Laryngeal Tube Insertion vs Endotracheal Intubation on 72-Hour Survival in Adults With Out-of-Hospital Cardiac Arrest: A Randomized Clinical Trial. JAMA 2018; 320:769.

Länkimäki S, Alahuhta S, Kurola J. Feasibility of a laryngeal tube for airway management during cardiac arrest by first responders. Resuscitation 2013; 84:446.

Paal, P., Neurauter, A., Loedl, M., Pehböck, D., Herff, H., von Goedecke, A., . . . Wenzel, V. (2009). Effects of stomach inflation on haemodynamic and pulmonary function during cardiopulmonary resuscitation in pigs doi://doi-org.myaccess.library.utoronto.ca/10.1016/j.resuscitation.2008.12.001

Spoormans, I., Van Hoorenbeeck, K., Balliu, L., & Jorens, P. G. (2010). Gastric perforation after cardiopulmonary resuscitation: Review of the literature doi://doi-org.myaccess.library.utoronto.ca/10.1016/j.resuscitation.2009.11.023

Wenzel, V., Idris, A. H., Banner, M. J., Kubilis, P. S., Band, R., Williams, J. L., & Lindner, K. H. (1998). Respiratory system compliance decreases after cardiopulmonary resuscitation and stomach inflation: Impact of large and small tidal volumes on calculated peak airway pressure1Presented, in part, at the 71st scientific sessions of the american heart association, dallas, TX, november, 1998.1 doi://doi-org.myaccess.library.utoronto.ca/10.1016/S0300-9572(98)00095-1

APPENDIX B

Wenzel, V., Idris, A. H., Dörges, V., Nolan, J. P., Parr, M. J., Gabrielli, A., . . . Baskett, P. J. F. (2001). The respiratory system during resuscitation: A review of the history, risk of infection during assisted ventilation, respiratory mechanics, and ventilation strategies for patients with an unprotected airway doi://doi-org.myaccess.library.utoronto.ca/10.1016/S0300-9572(00)00349-X

PCP:

A good review of the topic in UpToDate Extraglottic devices for emergency airway management in adults

Authors:Erik G Laurin, MD, FAAEMAaron E Bair, MD, MSc, FAAEM, FACEP. Section Editor:Allan B Wolfson, MD. Deputy Editor:Jonathan Grayzel, MD, FAAEM

Benger JR, Kirby K, Black S, et al. Effect of a Strategy of a Supraglottic Airway Device vs Tracheal Intubation During Out-of-Hospital Cardiac Arrest on Functional Outcome: The AIRWAYS-2 Randomized Clinical Trial. JAMA 2018; 320:779.

Roth D, Hafner C, Aufmesser W, et al. Safety and feasibility of the laryngeal tube when used by EMTs during out-of-hospital cardiac arrest. Am J Emerg Med 2015; 33:1050.

Boyle M, Flavelle E. Which is more effective for ventilation in the prehospital setting during cardiopulmonary resuscitation, the laryngeal mask airway or the bagvalve- mask? - A review of the literature. Australasian J Paramed 2012; 8:1. http://ro.ecu.edu.au/jephc/vol8/iss3/2/ (Accessed on November 29, 2015).

Stone BJ, Chantler PJ, Baskett PJ. The incidence of regurgitation during cardiopulmonary resuscitation: a comparison between the bag valve mask and laryngeal mask airway. Resuscitation 1998; 38:3.

Murray MJ, Vermeulen MJ, Morrison LJ, Waite T. Evaluation of prehospital insertion of the laryngeal mask airway by primary care paramedics with only classroom mannequin training. CJEM 2002; 4:338.

Genzwuerker HV, Fritz A, Hinkelbein J, et al. Prospective, randomized comparison of laryngeal tube and laryngeal mask airway in pediatric patients. Paediatr Anaesth 2006; 16:1251.

Klaver NS, Kuizenga K, Ballast A, Fidler V. A comparison of the clinical use of the Laryngeal Tube S and the ProSeal Laryngeal Mask Airway by first-month anaesthesia residents in anaesthetised patients. Anaesthesia 2007; 62:723.

Yildiz TS, Solak M, Toker K. Comparison of laryngeal tube with laryngeal mask airway in anaesthetized and paralysed patients. Eur J Anaesthesiol 2007; 24:620.

Russi CS, Miller L, Hartley MJ. A comparison of the King-LT to endotracheal intubation and Combitube in a simulated difficult airway. Prehosp Emerg Care 2008; 12:35.

Guyette FX, Wang H, Cole JS. King airway use by air medical providers. Prehosp Emerg Care 2007; 11:473.

Wang HE, Schmicker RH, Daya MR, et al. Effect of a Strategy of Initial Laryngeal Tube Insertion vs

APPENDIX B

Endotracheal Intubation on 72-Hour Survival in Adults With Out-of-Hospital Cardiac Arrest: A Randomized Clinical Trial. JAMA 2018; 320:769.

Länkimäki S, Alahuhta S, Kurola J. Feasibility of a laryngeal tube for airway management during cardiac arrest by first responders. Resuscitation 2013; 84:446.

Paal, P., Neurauter, A., Loedl, M., Pehböck, D., Herff, H., von Goedecke, A., . . . Wenzel, V. (2009). Effects of stomach inflation on haemodynamic and pulmonary function during cardiopulmonary resuscitation in pigs doi://doi-org.myaccess.library.utoronto.ca/10.1016/j.resuscitation.2008.12.001

Spoormans, I., Van Hoorenbeeck, K., Balliu, L., & Jorens, P. G. (2010). Gastric perforation after cardiopulmonary resuscitation: Review of the literature doi://doi-org.myaccess.library.utoronto.ca/10.1016/j.resuscitation.2009.11.023

Wenzel, V., Idris, A. H., Banner, M. J., Kubilis, P. S., Band, R., Williams, J. L., & Lindner, K. H. (1998). Respiratory system compliance decreases after cardiopulmonary resuscitation and stomach inflation: Impact of large and small tidal volumes on calculated peak airway pressure1Presented, in part, at the 71st scientific sessions of the american heart association, dallas, TX, november, 1998.1 doi://doi-org.myaccess.library.utoronto.ca/10.1016/S0300-9572(98)00095-1

Wenzel, V., Idris, A. H., Dörges, V., Nolan, J. P., Parr, M. J., Gabrielli, A., . . . Baskett, P. J. F. (2001). The respiratory system during resuscitation: A review of the history, risk of infection during assisted ventilation, respiratory mechanics, and ventilation strategies for patients with an unprotected airway doi://doi-org.myaccess.library.utoronto.ca/10.1016/S0300-9572(00)00349-X

SUSPECTED ADRENAL CRISIS

Hahner S. High incidence of adrenal crisis in educated patients with chronic adrenal insufficiency; A prospective study. The Journal of Clinical Endocrinology & Metabolism, Volume 100, Issue 2, 1 February 2015, Pages 407–416, https://doi.org/10.1210/jc.2014-3191

Peds Endo society (Shulman DI, Palmert MR, Kemp SF; Adrenal insufficiency: still a cause of morbidity and death in childhood. Pediatrics. 2007 Feb;119(2):e484PMID:17242136)

(https://academic.oup.com/jcem/article/101/2/364/2810222). Endocrine Society Guidelines on treatment of adrenal crisis.

Puar THK. Adrenal Crisis: Still a deadly event in the 21st century. The American Journal of Medicine (2016) 129, 339.e1-339.

SYMPTOMATIC BRADYCARDIA

Bektas, F., & Soyuncu, S. (2016). The efficacy of transcutaneous cardiac pacing in ED. The American Journal of Emergency Medicine, 34(11), 2090-2093. doi:S0735-6757(16)30416-8 [pii]

Brady, W. J., Swart, G., DeBehnke, D. J., Ma, O. J., & Aufderheide, T. P. (1999). The efficacy of atropine in the treatment of hemodynamically unstable bradycardia and atrioventricular block: Prehospital and

APPENDIX B

emergency department considerations. Resuscitation, 41(1), 47-55. doi:S0300957299000325 [pii]

Deal, N. (2013). Evaluation and management of bradydysrhythmias in the emergency department. Emergency Medicine Practice, 15(9), 6. doi:377 [pii]

Link, M. S., Berkow, L. C., Kudenchuk, P. J., Halperin, H. R., Hess, E. P., Moitra, V. K., . . . Donnino, M. W. (2015). Part 7: Adult advanced cardiovascular life support. Circulation, 132(18), S464. doi:10.1161/CIR.0000000000000261

Morrison, L. J., Long, J., Vermeulen, M., Schwartz, B., Sawadsky, B., Frank, J., . . . Dorian, P. (2008). A randomized controlled feasibility trial comparing safety and effectiveness of prehospital pacing versus conventional treatment: 'PrePACE'. Resuscitation, 76(3), 341-349. doi:S0300-9572(07)00441-8 [pii]

Sherbino, J., Verbeek, P. R., MacDonald, R. D., Sawadsky, B. V., McDonald, A. C., & Morrison, L. J. (2006). Prehospital transcutaneous cardiac pacing for symptomatic bradycardia or bradyasystolic cardiac arrest: A systematic review. Resuscitation, 70(2), 193-200. doi:S0300-9572(05)00555-1 [pii]

TACHYDYSRHYTHMIA

TENSION PNEUMOTHORAX

Akoglu, H., Akoglu, E. U., Evman, S., Akoglu, T., Altinok, A. D., Guneysel, O., . . . Eroglu, S. E. (2013). Determination of the appropriate catheter length and place for needle thoracostomy by using computed tomography scans of pneumothorax patients. Injury, 44(9), 1177-1182. doi://doi.org/10.1016/j.injury.2012.10.005

Butler, F. K., Holcomb, J. B., Shackelford, S., Montgomery, H. R., Anderson, S., Cain, J. S., . . . Zietlow, S. P. (2018). Management of suspected tension pneumothorax in tactical combat casualty care: TCCC guidelines change 17-02. Journal of Special Operations Medicine : A Peer Reviewed Journal for SOF Medical Professionals, 18(2), 19-35.

Inaba, K., Ives, C., McClure, K., & al, e. (2012). Radiologic evaluation of alternative sites for needle decompression of tension pneumothorax. Archives of Surgery, 147(9), 813-818. Retrieved from http://dx.doi.org.myaccess.library.utoronto.ca/10.1001/archsurg.2012.751

Kaserer, A., Stein, P., Simmen, H., Spahn, D. R., & Neuhaus, V. (2017). Failure rate of prehospital chest decompression after severe thoracic trauma. The American Journal of Emergency Medicine, 35(3), 469-474. doi://doi.org/10.1016/j.ajem.2016.11.057

Laan, D. V., Vu, T. D. N., Thiels, C. A., Pandian, T. K., Schiller, H. J., Murad, M. H., & Aho, J. M. (2016). Chest wall thickness and decompression failure: A systematic review and meta-analysis comparing anatomic locations in needle thoracostomy. Injury, 47(4), 797-804. doi://doi.org/10.1016/j.injury.2015.11.045

Leatherman, M. L., Held, J. M., Fluke, L. M., McEvoy, C. S., Inaba, K., Grabo, D., . . . Polk, T. M. (2017).

APPENDIX B

Relative device stability of anterior versus axillary needle decompression for tension pneumothorax during casualty movement: Preliminary analysis of a human cadaver model. Journal of Trauma and Acute Care Surgery, 83(1) Retrieved from https://journals-lww-com.myaccess.library.utoronto.ca/jtrauma/Fulltext/2017/07001/Relative_device_stability_of_anterior_versus.21.aspx

Weichenthal, L. A., Owen, S., Stroh, G., & Ramos, J. (2018). Needle thoracostomy: Does changing needle length and location change patient outcome? Prehospital and Disaster Medicine, 33(3), 237-244. doi:10.1017/S1049023X18000316

TRAUMATIC CARDIAC ARREST

Evans CC, Petersen A, Meier EN, et al. Prehospital traumatic cardiac arrest: Management and outcomes from the resuscitation outcomes consortium Epistry-Trauma and PROPHET registries. J Trauma Acute Care Surg 2016;81(2):285–93.

Huber-Wagner S, et al. Outcome of 757 severely injured patients with traumatic cardiorespiratory arrest. Resus 2007; 75:276-85

Lockey D, Crewdson K, Davies G. Traumatic cardiac arrest: who are the survivors? Ann Emerg Med 2006;48(3):240–4

National Association of EMS Physicians and American College of Surgeons Committee on Trauma. Termination of resuscitation for adult traumatic cardiopulmonary arrest. Prehosp Emerg Care 2012;16(4):571

Seamon MJ, Haut ER, Van Arendonk K, et al. An evidence-based approach to patient selection for emergency department thoracotomy: a practice management guideline from the Eastern Association for the Surgery of Trauma.J Trauma Acute Care Surg 2015;79(1):159–73

Tarmey NT, Park CL, Bartels OJ, et al. Outcomes following military traumatic cardiorespiratory arrest: a prospective observational study. Resuscitation 2011;82(9):1194–7.

Zwingmann J, Mehlhorn AT, Hammer T, et al. Survival and neurologic outcome after traumatic out-of-hospital cardiopulmonary arrest in a pediatric and adult population: a systematic review. Crit Care 2012;16(4):R117.

Huber-Wagner S, et al. Outcome of 757 severely injured patients with traumatic cardiorespiratory arrest. Resus 2007; 75:276-85

Konesky KL, Guo WA. Revisiting traumatic cardiac arrest: should CPR be initiated? European journal of trauma and emergency surgery 2017.

Millin MG, Galvagno SM, Khandker SR, Malki A, Bulger EM, Standards and Clinical Practice Committee of the National Association of EMS Physicians (NAEMSP)., Subcommittee on Emergency Services–Prehospital of the American College of Surgeons' Committee on Trauma (ACSCOT).

APPENDIX B

J Trauma Acute Care Surg. 2013 Sep; 75(3):459-67

Soar J, Nolan JP, Bo¨ ttiger BW, et al. European Resuscitation Council guidelines: adult advanced life support. Resuscitation 2015;95:100–47

Willis CD, Cameron PA, Bernard SA, Fitzgerald M (2006). CPR after traumatic cardiac arrest is not always futile. Injury Int J In 37:448-454

Evans CC, Petersen A, Meier EN, et al. Prehospital traumatic cardiac arrest: Management and outcomes from the resuscitation outcomes consortium Epistry-Trauma and PROPHET registries. J Trauma Acute Care Surg 2016;81(2):285–93.

Millin MG, Galvagno SM, Khandker SR, Malki A, Bulger EM, Standards and Clinical Practice Committee of the National Association of EMS Physicians (NAEMSP)., Subcommittee on Emergency Services–Prehospital of the American College of Surgeons' Committee on Trauma (ACSCOT).

J Trauma Acute Care Surg. 2013 Sep; 75(3):459-67

Neumar, Robert W., et al. "Part 1: executive summary: 2015 American Heart Association guidelines update for cardiopulmonary resuscitation and emergency cardiovascular care." Circulation 132.18 suppl 2 (2015): S315-S367.

Soar, Jasmeet, et al. "European resuscitation council guidelines for resuscitation 2015: section 3. Adult advanced life support." Re-suscitation 95 (2015): 100-147.

Millin MG, Galvagno SM, Khandker SR, et al. Withholding and termination of resuscitation of adult cardiopulmonary arrest secondary to trauma: resource document to the joint NAEMSP-ACSCOT position statements. J Trauma Acute Care Surg 2013;75(3):459–67

Truhla´r A, Deakin CD, Soar J, et al. European Resuscitation Council guidelines: cardiac arrest in special circumstances. Resuscitation 2015;95:148–201

Burlew CC, Moore EE, Moore FA, et al. Western Trauma Association critical decisions in trauma: resuscitative thoracotomy. J Trauma Acute Care Surg 2012;73(6): 1359–63

Evans, C, et al. "Reanimating Patients After Traumatic Cardiac Arrest: A Practical Approach Informed by Best Evidence." Emergency medicine clinics of North America 36.1 (2018): 19-40.

Smith JE, Rickard A, Wise D. Traumatic cardiac arrest. J R Soc Med 2015;108(1): 11–6

Lockey, David J., Richard M. Lyon, and Gareth E. Davies. "Development of a simple algorithm to guide the effective management of traumatic cardiac arrest." Resuscitation 84.6 (2013): 738-742.)