Pipestone County EMS
ALS/BLS Protocols
Pipestone, MN

EFFECTIVE: 02/01/2020

UPDATED March, 2021

REPLACES ANY PREVIOUS
Pipestone County EMS
PROTOCOLS

Medical Director:
Dr. Kathleen Savio, D.O.

Pipestone County Ambulance Protocols Table of Contents:

GENERAL GUIDELINE PROTOCOLS:

Pipestone County Ambulance Protocol Description

PROTOCOLS DESCRIPTION:

Optimal prehospital emergency medical care results from a combination of careful patient assessment, essential prehospital emergency medical services, and appropriate medical consultation. The purpose of the Pipestone County EMS protocols is to provide guidance for the Pipestone County EMS prehospital care providers and Emergency Department Physicians within the Pipestone County EMS System.

The goal of these Pipestone County EMS protocols is to standardize prehospital patient care in the Pipestone County EMS system. It is to be understood that these protocols are guidelines and should not be deviated from other than by contacting the receiving physician by the crew via on-line medical consultation.

NOTHING contained within these protocols is meant to delay rapid patient transport to a receiving facility. Patient care should be rendered time appropriately while in route to a definitive treatment facility.

To maintain the life of a specific patient, it may be necessary, in rare instances, for the physician providing online medical consultation, as part of the EMS consultation system, to direct a prehospital provider in rendering care that is not explicitly listed within these protocols, to include administering a patient's own medications which are not part of the approved formulary. To proceed with such an order both the physician and the provider must acknowledge and agree that the patient's condition and extraordinary care are not addressed elsewhere within these medical protocols, and that the order is in the best interest of patient. Additionally, the provider must feel capable, based on the instructions given by the physician, of correctly performing the directed care. Whenever such care is provided the provider must immediately notify EMS director of the extraordinary care situation via email and or conversation explaining the situation, any deviation/s from the Pipestone County EMS protocols and appropriate other call information. All such incidents will be entered into the Quality Improvement Review process.

Occasionally a situation may arise in which a physician's order cannot be carried out; e.g., the provider feels the administration of an ordered medication would endanger the patient, a medication is not available, or a physician's order is outside of protocol. If this occurs, the provider must immediately notify the physician as to the reason the order cannot be carried out, and indicate on the prehospital care record what was ordered, the time, and the reason the order could not be carried out. All such incidents will be entered into the Quality Improvement Review process.

QUALITY IMPROVEMENT PROCESS

The goal of the quality improvement processes is to improve all patient care. Any EMS provider that disregards a Pipestone County EMS protocol will be subject to the quality improvement process.

- The first violation of a Pipestone County Ambulance protocol will require an answer in writing which can be done via email to both EMS Director and to the medical director.
- For the second violation of Pipestone County EMS protocol the requirement is an answer in writing but also will require a personal conversation with both EMS manager and medical director.
- For the third violation of Pipestone County EMS protocol the requirement is an answer in writing but also will require a personal conversation with both EMS manager and the medical director, and will result in corrective actions at the discretion of the medical director.

MEDICAL DIRECTOR SIGNATURE

This signature certifies that all of the following standing orders and protocols have been reviewed by the Medical Director and are current:

Medical Director- Dr. Kathleen Savio — Date 3/2/21

EMS Director- Casey Sievert — Date 3/2/21

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EMS General Guidelines

1. In Cardiac Arrest Situation, after 2 minutes CPR may increase to 120 compressions per minute or 240 compressions each 2-minute cycle check rhythm, if rhythm change treat with appropriate protocol---**ONLY PERFORM 3-5 SECOND CHECK.**

2. Perform 3-5 sec check to see if rhythm change, if rhythm change, check for pulse and treat appropriately.

3. **ALS-** ETT administration of Cardiac resuscitation drugs requires 2-2 1/2 times IV dose, **EXCEPT** in the neonatal code where Epi is given at 0.01 mg/kg of 1mg/1ml dose both IV/ETT.

   Drugs that can be given ETT (Endotracheal)--**NAVEL:**

   Naloxone
   Atropine
   Valium
   Epi
   Lidocaine

   DO NOT GIVE ANY OTHER DRUGS BY ETT ROUTE, EVER.

6. C-A-B: Compressions, Airway, Breathing -Current AHA Guidelines

   children ***For Neonates, ABC's still recommended****.

7. **If 12 Lead EKG reveals ST ELEVATION 1 mm in 2 contiguous leads or more CONTACT MEDICAL CONTROL—Do not DELAY TRANSPORT AND FOLLOW STEMI PROTOCOL PAGES**

8. Oxygen therapy will be given in accordance with standard precautions regarding its use. The AHA Guidelines defined an arterial oxygen saturation (SaO2) of less than 94% as hypoxemia, and there were no new data to suggest modifying this threshold in the AHA Guidelines. Minimizing risk of hyperoxia must be weighed against the need to avoid hypoxia, which has a well-established detrimental effect. Preventing hypoxic episodes is considered more important than avoiding any potential risk of hyperoxia.

9. Saline locks-- Any IV access line may be started as a saline lock. If continuous drug administration or need for volumes of IV fluid are anticipated, start NS at proper rate.

10. Treat the patient, not the monitor.

11. All of the following protocols assume the continuous monitoring of patient status, as well as evaluation for other co-existing medical conditions.

12. Algorithms for cardiac arrest assume that the condition under discussion continually persists, that the patient remains in cardiac arrest, and that CPR is always performed.

13. CPR compressions should be interrupted as infrequently as possible and as briefly as possible.

14. Air transport should be considered and launched when long transport times, multiple patients, injuries requiring specialized care unavailable or any other extenuating circumstances are encountered.

15. Goal of any trauma patient is to start transport of the patient within 10 minutes or less to the closest capable trauma center.
16. Medical Control may be contacted at any point in the protocols at the discretion of EMS crews.
17. Remember Scene Safety first, for you and your partner, even before ABC's.
18. Note appendix for additional drug information and flow sheets for medication drips.
19. If any questions with a protocol or a patient always contact medical control for guidance.

PREHOSPITAL DEATH DETERMINATION PROTOCOL

For all emergency scenes of one patient or more, or where patient needs exceed available EMS resources, initial assessment and treatment shall be in accordance with an approved triage methodology, ex: Start Triage

Patients who appear to have expired will not be resuscitated or transported by Pipestone County EMS personnel if any of the following obvious signs of death are present:

1. Body decomposition
2. Decapitation
3. Transection of thorax (hemicorporectomy)
4. Incineration

OR

If **ALL four (4) presumptive signs of death AND AT LEAST one (1) conclusive sign of death are identified.**

The four (4) presumptive signs of death include the following:

1. Unresponsiveness
2. Apnea
3. Pulselessness
4. Fixed dilated pupils or chest trauma with visible organ destruction

Conclusive signs of death include: death that MUST be present are: one (1)

1. Dependent lividity of any degree
2. Rigor mortis
3. Massive trauma to the head, neck, chest with visible organ destruction

If there is any question regarding patient viability, to include potential hypothermia, resuscitation will be initiated.

Once it has been determined that the patient has expired and resuscitation will not be attempted:

a) Immediately notify the appropriate authority.
b) DO NOT leave a body unattended. You may be excused once a responsible person (i.e. Coroner, Sheriff's Office, or Funeral home) is present.
c) DO NOT remove any property from the body or the scene for any purpose.
d) **NEVER** transport / move a body without permission from the Coroner's office except for assessment or its protection.

If the body is in the public view and cannot be isolated, screened, or blocked from view, and is creating an unsafe situation with citizens/family, the body can be covered with a clean, STERILE BURN SHEET or Appropriate Substitute Cover.

CARDIOPULMONARY/TRAUMA RESCUITATION/ TERMINATION OF RESCUITATION PROTOCOL

A victim of medical or trauma arrest may be pronounced dead in the prehospital setting by a paramedic only if all of the following criteria are met, **unless the patient first meets the Pipestone County EMS Prehospital Death Determination protocol.**

Resuscitation started in the field may be discontinued only by physician (MD, DO) order when the following conditions have been met:

I. For Medical Arrest:

The patient remains in persistent asystole or agonal rhythm after twenty (20) minutes of appropriate ALS resuscitation, to include:

1. CPR.
2. Effective ventilation with 100% oxygenation.
3. Administration of appropriate ACLS medications.
4. Patient is not hypothermic.
5. The patient is over 18 years of age.

II. For Traumatic Arrest:

1. Open airway with basic life support measures.
2. Provide effective ventilation with 100% oxygenation for two minutes.
3. Perform bilateral needle thoracentesis if tension pneumothorax suspected.

III. The patient develops or is found to have one of the following conclusive signs of death: At any point during the resuscitative effort:

1. Lividity of any degree
2. Rigor mortis of any degree

When resuscitation has been terminated in the field, all medical interventions shall be left in place and law enforcement shall be contacted if not already on scene.

If possible, do not leave a body unattended. Once a responsible person (i.e. coroner, Sheriff's Office, or Funeral home) is present at the scene, you may be excused, unless there is a safety concern for the EMS crew.

NEVER transport/move a body without permission from the coroner's office. If the EMS crew is asked to transport a dead body, that can only occur if approved by the coroner's office, there are no 911 emergency calls holding and the funeral home is not available to transport the body.

If the body is in the public view and cannot be isolated, screened, or blocked from view, and is creating an unsafe situation with citizens/family, the body can be covered with a clean, STERILE BURN SHEET or other appropriate sheet obtained from the EMS vehicle.

For a patient found unresponsive and no lifesaving intervention has been started OR lifesaving intervention has been started by family, bystanders, first responder unit or telephone CPR initiated by Emergency Medical Dispatchers, the Pipestone County EMS PREHOSPITAL DEATH DETERMINATION PROTOCOL will be followed.

DNR (Do not Resuscitate) PROTOCOL

DO NOT RESUSCITATE:

Indication(s):

1. All patients with absent vital signs who do not have conclusive signs of death (refer to Pipestone County EMS Prehospital Death Determination protocol) shall be treated with life-resuscitating measures unless EMS personnel are presented with a valid Do-Not Resuscitate (DNR) Identification or Order.

2. A valid DNR Order is a written and signed directive issued by a physician licensed in this state that life resuscitating treatment is not to be administered to a qualified patient. The term also includes a valid do-not-resuscitate order issued under the laws of another state.

3. Verbal instructions from friends or family members do **NOT** constitute a valid DNR.

4. In preparation for, or during an inter-facility transfer, a valid DNR Order in the qualified patient's medical record shall be honored in accordance with this protocol.

5. If the EMS provider is presented with a DNR Order or Identification, he shall attempt to verify the validity of the Order or Identification by confirming the patient's name, age, and condition of identification.

6. The DNR Order or Identification shall be determined invalid if at any time the patient indicates that he/she wishes to receive life-resuscitating treatment. The EMS provider shall document the presence of the DNR Order or Identification and how the patient indicated that he/she wanted the Order or Identification to be revoked.

7. EMS personnel shall relay this information to any subsequent medical providers including but not limited to flight crews and staff at the receiving medical facility.

8. Once the DNR Order or Identification is determined to be valid and has not been revoked by the patient, the emergency care provider shall provide ONLY supportive care and withhold life-resuscitating measures.

INTERFACILITY TRANSPORT PROTOCOL

1. Provide General Patient Care
2. Continue current medications and drips started by facility with appropriate personal.
3. May Administer appropriate medications not listed in the protocols with patient specific written orders during the transfer with the appropriate crew.
4. * May not give/take controlled substance provided by the hospital if supplied.
5. Prior to the transfer, the transferring physician is responsible for notifying the receiving physician of the following: Reason for transfer, Patient condition and estimated time of arrival.
6. Transferring physician must provide the crew with the name of the receiving facility and receiving physician, copies of any available diagnostic tests, X-rays, medical records, and the EMTALA form prior to releasing the patient. Crews should only transfer a patient whose therapy required during the transfer lies within their capabilities, unless capable personnel accompany the patient.
7. If during the transfer the patient becomes unstable, the patient may be transported to the closest facility, at the crew/paramedic's discretion, regardless of the pre-arranged destination.
8. Contact Medical Control if any concerns

SPECIAL CONSIDERATIONS FOR TRANSPORT PROTOCOL

Chest Tubes

1. Patients with chest tubes require special attention to prevent blockage or disconnection during transport. Patients being transported with chest tubes for pleural drainage of air or fluids must be protected from accidental disconnection of tubes from the drainage/suction device. Prior to transport ensure that the chest tubes are well secured to the patient with sutures and tape, that all connections are well secured, and that the drainage/suction device is operating correctly. It is important to maintain the drainage/suction device below the level of the chest tubes at all times to prevent reflux of drainage into the chest. It is important to maintain the device in an upright position to ensure delivery of appropriate suction or maintenance of water seal. If suction is ordered to be maintained for transport, ensure that the water level in the suction device is at the appropriate level for the ordered suction pressure, and that the suction chamber has continuous vacuum, indicated by light bubbling.

2. Portable battery powered suction devices are not designed to provide continuous high pressure suction and will tend to overheat if run continuously. They should be used for chest tube suction only as bridging devices between connection to the main suction in the ambulance. Ensure that the suction unit is functioning properly prior to transport.

Blood Pressure Monitor

1. Non-invasive Blood Pressure Monitoring (NIBP) may be utilized in situations in which manual BP's are not practical or when auscultation is impractical. Remember to treat the patient, not the machine. NIBP readings should always be correlated to the clinical presentation of the patient. If the machine reading does not correlate with the manual readings and cannot be corrected by repositioning the cuff or changing arms, the NIBP should not be used to guide patient care. Frequency of readings should be guided by patient condition. As with all BP measurements, be sure to use an appropriately sized cuff to obtain accurate readings.

Temporary Transvenous and External Pacemakers

1. Patients with transvenous pacemakers require special attention to ensure proper function and to prevent dislodgement of the pacing leads. Check equipment for proper function prior to transport. A spare fully charged battery should be available. Check that the device is properly functioning by observing appropriate sensing and capture. Avoid turning the patient to the side, as this places tension on the cardiac leads and may result in dislodgement.

TRANSPORTATION TO ANOTHER HOSPITAL THAN THE CLOSES HOSPITAL PROTOCOL

1. When a crew responds to a doctor's office or the clinic and if the crew deems the patient unstable, a determination for the patient to be transported to the closet hospital capable of stabilizing the patient must be made, before transportation elsewhere.

2. If the paramedic has any questions or concerns about the stability of the patient before transporting to the destination hospital, the paramedic should have direct contact with Physician Medical Control at the Pipestone County Medical Center ER.

3. When responding to a private residence, if the patient deems stable and the patient wishes to be transferred to a hospital which is not the closest facility. Patient must be advised of the addition cost and crew should contact EMS Director.

4. When responding to a private residence and the patient is not stable, and the patient wishes to be transferred to a different hospital, patient should be brought to the closest facility.

TRAUMA FIELD TRIAGE PROTOCOL

Mechanism of Injury:

A trauma alert will be activated by in the following instances. In addition, mechanisms of injury not found below may be used to activate the trauma team at the discretion of the paramedic.

TRAUMA FIELD TRIAGE CRITERIA cont.

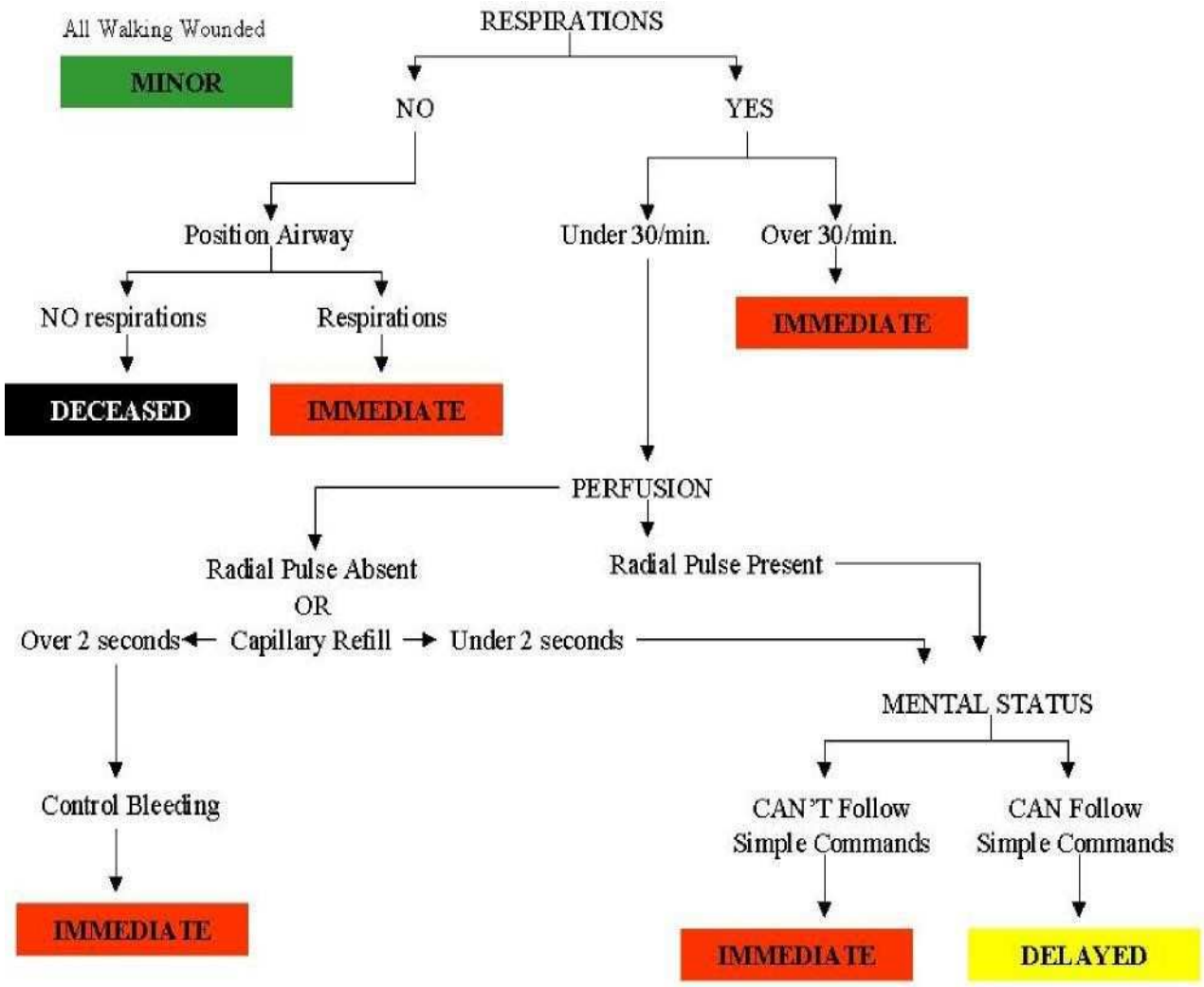
The EMS Crew, ED staff and Physician will consider the following criteria when determining the need for a Trauma Code. Mechanism alone is not a reason to call a Trauma Code, but should be considered in all situations

Refer to the Trauma team activation chart for adult and PEDS trauma team activation criteria.

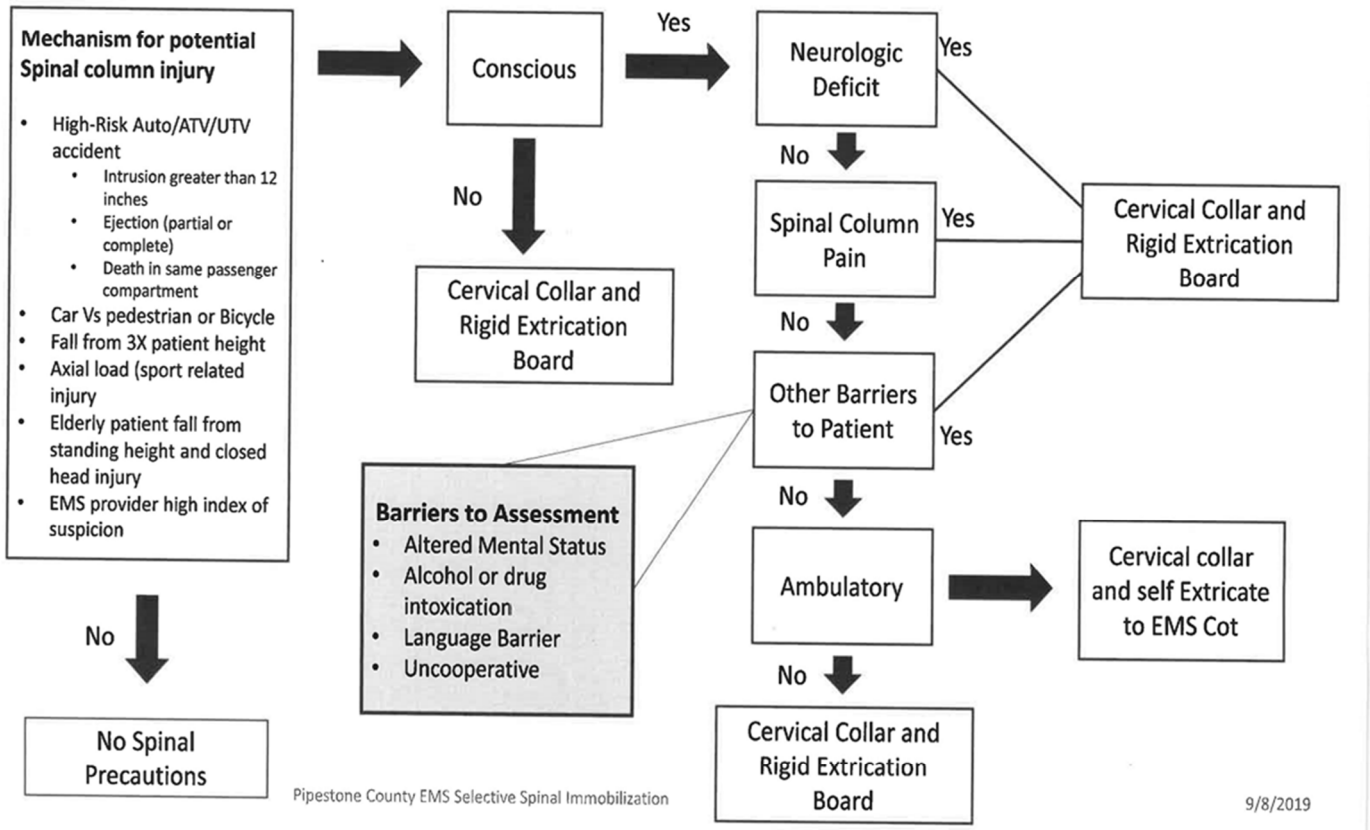
Trauma team activation criteria put in place by the Southern Minnesota Regional Trauma Advisory Committee (SMRTAC) along with the Pipestone County Medical Center. Approved by PCMC on 5/2017.

Goal of any trauma patient is to start transport of the patient within 10 minutes or less to the closest capable trauma center.

Triage Flow Chart Protocol



Selective Spinal Immobilization



Infections Disease Protocol

Follow this protocol for patients with known or suspected transmittable airborne respiratory illness/diseases (e.g. Severe Acute Respiratory Syndrome (SARS), tuberculosis, epidemic influenza, or others etc**.,** or suspected transmittable illness/diseases by body fluid such as Ebola, Marburg virus or others etc**.**). For a known outbreak, it is important to ask patient about recent travel, this protocol would include patients who have afebrile illness with cough.

It is important for all EMS personnel when they have a concern that the patient may have been exposed to or has a deadly virus or bacterial infection, to follow this protocol.

1. The Number one priority is to protect yourself and other crew members, wear gowns, gloves, N95 masks ETC to prevent the infections disease from spreading to crew members.

2. Contact receiving medical facility of your concern for patient condition if suspected infectious disease.

3. If a suspected and/or know infectious disease was transported in a Pipestone County Ambulance. Crew members should take proper precautions to prevent crews being contaminated by such disease/'s.

4. Crews should also take the proper steps to disinfect the ambulance and equipment to prevent the spread of the disease. (EG. Bleach wipes, moping floor, etc.). This shall be done every time a known or suspected patient with an infectious disease was transported in a Pipestone County ambulance or other vehicles used by the Pipestone County EMS.

Zoll Z Mechanical Ventilator (ALS)

Overview:

The ZOLL Z Vent ventilator is indicated for use in the management of infant through adult patients weighing greater than or equal to 5 kg with acute or chronic respiratory failure or during resuscitation by providing continuous positive-pressure ventilation. The ZOLL Z Vent ventilator is appropriate for use in hospitals, outside the hospital, during transport and in severe environments where they may be exposed to rain, dust, rough handling, and extremes in temperature and humidity.

Indications:

- Patients who have an invasive airway (endotracheal tube, supraglottic airway, cricothyrotomy tube, or tracheostomy tube) in place to maintain ventilation and oxygenation due to:
  - Respiratory failure or arrest
  - Medically assisted airway management
  - Dependence on the advanced airway for ventilation
  - Cardiac Arrest.
- Patients who need non-invasive CPAP or Bilevel ventilation

Contraindication:

- Patients with the ability to adequately ventilate and oxygenate spontaneously at the appropriate rate and quality.
- Not to be used near MRI machine as it is not rated to be used around an MRI.

Operation test

1. Operation test must be done prior to every use.
2. Test: (Preformed with circuit hooked up to vent, not on patient)
   a. Press and hold the manual breath button
      i. Gas should flow out of the patient connection every time the button is pressed
      ii. This will give you the plateau pressure.
   b. Close the patient port with a clean gloved hand
      i. The high airway pressure limit alarm should activate after 2 breaths
   c. After the two breaths, release your hand from the patient connection. The patient disconnect alarm should activate.
   d. Partially close the patient port to reset the patient disconnect alarm
   e. With no alarms occurring, unplug the external power from the ventilator
      i. The external power low/disconnect alarm should activate
      ii. Plug in external power source to ventilator and ensure ventilator is charging/charged.
   f. If the high-pressure alarms and/or patient disconnect alarms do not activate at the appropriate times, ensure test was completed properly. If test was completed properly, patient should be manually ventilated and mechanical ventilator should not be used.

Ventilator Modes:

1. SIMV (Synchronized intermittent mandatory Ventilation)
   a. The ventilator delivers a breath at a set volume/pressure at a set time to the patient. However, If the patient initiates a breath the breath will be under the power of the patient and may not get the full tidal volume set on the ventilator.
   b. Preset tidal volume and minimum rate are set. Ventilator does not assist with mandatory breaths triggered by the patient.

2. AC (Assist control)
    a. Assist control mode delivers a preset tidal volume, minimum rate, and inspiratory effort triggered by the patient for the ventilator to assist with breaths. This setting delivers a set volume or pressure for every trigger.
3. CPAP (Continuous Positive Airway Pressure)
    a. CPAP mode creates positive pressure in the airway at a fixed setting. Only one pressure setting that the patient inhales with and exhales against.
4. BL, BiPAP (Bi-Level positive airway pressure)
    a. Bipap created two levels of pressure, One set pressure that patient exhales against. The other set pressure is what the patient inhales with.

Prehospital Setting

1. Cardiac Arrest *with an advanced airway in place*

    a. Asses Lung Sounds (checking for airway placement confirmation)
    b. Apply cardiac monitor, SP02, NIBP, and ETCO2. ETCO2 (if not already done)
        i. Monitoring and documenting of these vitals should be documented continuously.
    c. A Bag-mask valve must be available at all times in case of ventilator failure
    d. Choose correct size circuit tubing for the patient
        i. Adult tubing fits 200ml and above
        ii. Infant Pediatric circuity are suitable for 50-300ml tidal volumes
            1. If pediatric patient has a tidal volume of 200-300ml, pediatric tubing is preferred to eliminate dead space in the tubing.
    e. Ventilator settings
        i. Select "**Custom**" setting in startup menu
        ii. Default settings:
            1. Mode: AC Volume control
            2. Tidal Volume:400ml
                a. Adjust tidal volume prior to putting on the patient if the patient is a pediatric patient to prevent barotrauma
            3. Adjust tidal volume to 6-8ml/kg of ideal body weight
            4. Peep:0 cm/h20
            5. FI02: 100%
            6. BPM: 10
            7. I:E ratio: 1:3.0
    f. Will provide asynchronous ventilations to patient.
    g. Ventilator may be used while compressions are being given
        i. Ventilator will alarm with high pressure settings.

Interfacility Transfers

1. Select appropriate patient setting (i.e. Adult, Pediatric, Mask CPAP settings)
    a. Selecting Adult or Pediatric are for patients with advanced airways in place.
    b. Mask CPAP is to be used when patient is being administered CPAP or Bi-Pap via mask.
2. Best Match hospital settings and parameters.
    a. May adjust setting if needed to settings below.
3. If patient is not on ventilator already for:
    a. CPAP

i. Select appropriate size mask for the patient. (Medium, large, Extra-Large)
ii. Begin PEEP at 5 and titrate up if needed.
iii. Begin FIO2 at 100% and titrate down as needed
    1. If possible do not keep patient at 100% FIO2 to avoid hyperoxia
iv. Pressure support (PS) should be 5cm h20, titrate to patients needs
    1. Communicating with patient will be key to knowing where to titrate it to
v. If ventilator shows an insufficient flow alarm adjust the following settings
    1. Trigger
        a. Trigger may be set to more sensitive setting
            i. -0.5 is the lightest trigger
    2. Decrease rise time.
        a. Default is set to 3
        b. May need to decrease to 1 or 2.
            i. If decreasing rise time is not sufficient
                1. Rise time may be increased to 3-5.
                2. Provided more air to the patient.

b. **BiPap (Bi-LeveL,BL**)
i. Select appropriate size mask for the patient. (Medium, large, Extra-Large)
ii. If patient is on 100% FI02, titrate as needed.
    1. If possible do not keep patient on 100% FI02.
iii. If patient is not on oxygen, begin at 50% FI02
iv. General procedure
    1. Begins at
        a. IPAP:9cm/h20
        b. EPAP: 5cm/h20
v. Patients with a primary goal of oxygenation,
    1. Keep Delta (difference between EPAP and IPAP close
    2. Begin at:
        a. IPAP: 8cm/h20
        b. EPAP: 5cm/h20
vi. Patients with a primary goal of ridding off excess CO2 via breathing
    1. Delta (difference between EPAP and IPAP father apart)
    2. Begin at:
        a. IPAP: 5cm/h20
        b. EPAP: 10cm/h20
vii. If ventilator shows an insufficient flow alarm adjust the following settings
    1. Trigger
        a. Trigger may be set to more sensitive setting
        b. -0.5 is the lightest trigger
    2. Decrease rise time.
        a. Default is set to 3
            i. May need to decrease to 1 or 2.
            ii. If decreasing does if not sufficient
            iii. Rise time may be increased to 3-5.
viii. *Note RT tells you that the BIPA is 21/8. This means that the EPAP is 8 and IPAP is set at 13. 21 is the sum of both numbers.
ix. Priority list of settings to change on patient
    1. IPAP

a. Inspiratory positive airway pressure, is how much pressure is provided to the patient on inhalation

2. EPAP
   a. Expiratory positive airway pressure, is how much resistance the patient has to breath against while exhaling.
3. Trigger settings
   a. Trigger is how much effort the patient has to inhale before ventilator is triggered. -0.5 is very little effort. -6.0 will take more effort to trigger ventilator.
4. Rise Time
   a. Rise time is set from 1-10. 1 will be a fast breath given over a short time. A setting of 10 is much slower breath but typically provides greater volumes to patient.

c. **Advanced airway** *ET tube, King airway, I-Gel*

i. Select appropriate Mode in startup; Adult or Pediatric patient.
ii. Choose correct size circuit tubing for the patient
   1. Adult tubing fits 200ml and above
   2. Infant Pediatric circuity are suitable for 50-300ml tidal volume.
      a. If pediatric patient has a tidal volume of 200-300, pediatric tubing is preferred to eliminate dead space in the tubing.
iii. Default Ventilator settings are:
   1. Tidal volume: 450
   2. I:E 1:3.0
   3. BPM: 12
   4. Peep: 5
   5. FIO2: 21%
ii. Input tidal volume of 6-8ml/kg of preferred body weight. (see chart)
iii. Set appropriate rate
   1. Adults: 12-15 bpm
   2. Peds: 20bpm
iv. FI02 Settings
   1. If not already set, begin at 100% and titrate to effect
   2. If at 100% attempt to titrate FI02 settings down to a lower percentage
   3. Caution with COPD Patients
v. Maintain a SPO2 saturation between 94%-99%
   1. Do not over oxygenate patients.
vi. May adjust PEEP to increase oxygenation. Peep should not go less than 5cm/h20
vii. Maintain EtCO2 between 35-45mmHg. Caution with COPD patients
viii. Monitor peak airway pressure (PIP). Normal is less than 30cm/H20.
      a. COPD, asthma, ARDS may be higher.
iv. Attempt to maintain an ETCO2 reading between 35-45 (normal)
   1. May be higher or lower depending on patients' condition. Physician may request a specific level for the patient to be at.
v. May also monitor MAP (Mean airway Pressure)
   1. Ideally less than 12

vi. The physician, receiving or transferring facility, may request certain ventilator settings to provide adequate care for the patient. This is acceptable but must be followed with written ALS orders.
vii. Other considerations
    1. PEEP (Titrated per protocol)
        a. Benefits
            i. Improves V/Q mismatch
            ii. Decrease Shunt
            iii. Decrease atelectasis
            iv. Improves spontaneous breathing
        b. Adverse effects
            i. Increased intrathoracic pressure. Leading to decreased venous return. (should not be used in Cardiac arrest events)
            ii. May require treatment with additional fluids/pressors
            iii. Potential pneumothorax with auto PEEP
            iv. Potential for hypotension with certain levels of PEEP
viii. Provide appropriate pharmacological interventions per Invasive Airway Sedation and Analgesia protocol.
ix. Verify Tube placement, lung sounds, and oxygen saturation, after each patient transfer from hospital bed to cot, and cot to hospital bed.
x. If suspected airborne illness is suspected, use HEPA filter on the exhaust port on circuit exhaust and the circuit attachment on the ventilator. 2 In line HEPA filter must be used.
xi. Troubleshoot any alarms that may be activated according to the product manual.

Preferred Body Weight/Tidal Volume chart

Males								Females							
Height Feet		PBW	4 ml/kg	5 ml/kg	6 ml/kg	7 ml/kg	8 ml/kg	Height Feet		PBW	4 ml/kg	5 ml/kg	6 ml/kg	7 ml/kg	8 ml/kg
4' 10"	**58**	**45.4**	180	230	270	320	360	4' 7"	58	34	140	170	200	240	270
4' 11"	**59**	**47.7**	190	240	290	330	380	4' 8"	59	36.3	150	180	220	250	290
5' 0"	**60**	**50**	200	250	300	350	400	4' 9"	60	38.6	150	190	230	270	310
5' 1"	**61**	**52.3**	210	260	310	270	420	4' 10"	61	40.9	160	200	250	290	330
5' 2"	**62**	**54.6**	220	270	330	380	440	4' 11"	62	43.2	170	220	260	300	350
5' 3"	**63**	**56.9**	230	280	340	400	460	5' 0"	63	45.5	180	230	270	320	360
5' 4"	**64**	**59.2**	240	300	360	410	470	5' 1"	64	47.8	190	240	290	330	380
5' 5"	**65**	**61.5**	250	310	370	430	490	5' 2"	65	50.1	200	250	300	350	400
5' 6"	**66**	**63.8**	260	320	380	450	510	5' 3"	66	52.4	210	260	310	370	420
5' 7"	**67**	**66.1**	260	330	400	460	530	5' 4"	67	54.7	220	270	330	380	440
5' 8"	**68**	**68.4**	270	340	410	480	550	5' 5"	68	57	230	290	340	400	460
5' 9"	**69**	**70.7**	280	350	420	490	570	5' 6"	69	59.3	240	300	360	420	470
5' 10"	**70**	**73**	290	370	440	510	580	5' 7"	70	61.6	250	310	370	430	490
5' 11"	**71**	**75.3**	300	380	450	530	600	5' 8"	71	63.9	260	320	380	450	510
6' 0"	**72**	**77.6**	310	390	470	540	620	5' 9"	72	66.2	260	330	400	460	530
6' 1"	**73**	**79.9**	320	400	480	560	640	5' 10"	73	68.5	270	340	410	480	550
6' 2"	**74**	**82.2**	330	410	490	580	660	5' 11"	74	70.8	280	350	420	500	570
6' 3"	**75**	**84.5**	340	420	510	590	680	6' 0"	75	73.1	290	370	440	510	580
6' 4"	**76**	**86.8**	350	430	520	610	690	6' 1"	76	75.4	300	380	450	530	600
6' 5"	**77**	**89.1**	360	450	530	620	710	6' 2"	77	77.7	310	390	470	540	620
6' 6"	**78**	**91.4**	370	460	550	640	720	6' 3"	78	80	320	400	480	560	640

Lucas 2 Protocol

CPR ASSIST DEVICE LUCAS:

The Lucas 2 device shall be used when compressions are necessary in patients 12 years of age and older who have suffered non-traumatic cardiac arrest

Contraindication(s):

1. Patients suffering traumatic cardiac arrest
2. Patients with obvious signs of traumatic injury
3. Patients who do not fit within the device.
4. Patients who are too large and with whom you cannot press the pressure pad down 2 inches.
5. Patients who are too small and with whom you cannot pull the pressure pad down to touch the sternum

Placement:

1. All therapies related to the management of cardiopulmonary arrest should be continued as currently defined.
2. Initiate resuscitative measures.
3. Early defibrillation as indicated per protocol.
4. Manual chest compressions must be initiated immediately while the Lucas device is being placed on the patient.
5. Limit interruptions and chest compression to 10 seconds or less.
6. Do not delay manual CPR for the Lucas continue manual CPR until the device can be placed.
7. When resuscitative measures are initiated, the Lucas device should be removed from its carrying device and placed on the patient as listed below.

Back plate placement:

1. The back plate should be centered on the nipple line on the top and the back plate should be located just below the patient's armpits.
2. For patients already on the stretcher, place the back plate underneath the thorax. This can be accomplished by logrolling the patient or raising the torso. Lucas placement should occur during a scheduled change of compressions such as after two minutes of compression.

Position the compressor:

1. Turn the Lucas device on (the device will form a three second self-test).
2. Remove the Lucas device from securing case using the hands provided on each side.
3. With the index finger of each hand, pull the trigger to ensure the device is set to engage the back plate, following this remove your index finger from the trigger loop.
4. Approach the patient from the side opposite the person performing manual chest compressions.
5. Attach the claw to the back plate on the side of the patient opposite that were compressions are being performed.

6. Place the Lucas device across the patient, between the staff members who is performing manual CPR.
7. The staff member performing manual CPR stops and assist attaching the claw to the back plate on their side.
8. Pull up once to make sure the parts are securely attached

Adjust the height of the compressor arm:

1. Use two fingers (V pattern) to make sure that the lower edge of the suction cup is immediately above the end of the sternum. If necessary, remove the device by pulling the support legs to adjust the position.
2. Press the adjust mode button on the control pad labeled #1 (This will allow you to easily adjust the height of the compression arm).
3. To adjust the start position of the compression arm, manually push down the suction cup with two fingers onto the chest (without compressing the patient chest).
4. Once the position of the compression arm is satisfactory, push the green pause button labeled # 2 (this will lock the Arm into position), then remove your fingers from the suction cup.
5. If the position is incorrect press the adjust mode button and repeat the steps above.

Start compressions:

1. Press the continuous compression button. This will provide continuous compression and will needed to be paused every 2 minutes for rhythm checks/analyzing.

Patient Adjuncts:

1. Place the neck roll behind the patient's head and attach the strap to the Lucas device, this will prevent the Lucas for moving toward the patient's feet.
2. Place the patient's arms in the straps provided.

Using the Lucas device during resuscitation:

1. **Defibrillation can and should be performed with the Lucas device in place and in operation**.
2. Apply the defibrillator electrodes either before or after the Lucas device is to put in position.
3. The defibrillation pads and wire should NOT be underneath the suction cup.
4. If the electrodes are in an incorrect position when the Lucas is placed, you must apply new electrodes.
5. Defibrillation performed according to protocol.

6. If the rhythm strip cannot be assessed during compressions, stop the compressions for analysis by pushing a pause button. The duration of compressions should not be greater than **10 seconds**. There is no need to interrupt chest compressions other than to analyze the rhythm.

7. Once the rhythm is determined to require defibrillation, the appropriate active button should be pushed to resume compressions while the defibrillator's charges and the defibrillator should be discharged.

Pulse Check/Return of Spontaneous Circulation (ROSC):

1. Pulse checks should occur intermittently while compressions are occurring.
2. If the patient moves or is obviously responsive the Lucas device should be paused and the patient evaluated.
3. If there's a change in the rhythm, but no obvious indication of responsiveness or return of spontaneous circulation, immediately check for pulse while compressions are occurring. If the palpated pulse is the irregular, pause the Lucas device. If the pulse remains, reassess the patient. If the pulse disappears immediately restart the Lucas device. Treat the patient according to ALS protocols

Disruption or malfunctions of the Lucas device:

1. If disruption or malfunction of the Lucas occurs, immediately change to manual CPR.

Power supply:

1. A fully charged battery should allow 45 minutes of uninterrupted CPR.
2. An extra battery should be carried in the Lucas device bag.
3. The battery is automatically charged when the device is plugged into a wall outlet and not in operation.
4. When the orange battery LED shows an intermittent light, one should replace the battery or connect to a wall outlet.
5. Lucas may be connected to the wall power outlet in all operational modes. (Always keep the battery installed in order for the Lucas device to remain operational).

Maintenance of the Lucas device after use:

1. Remove the Suction cup and the stabilization strap.
2. Clean all surfaces and strap with appropriate cleaning agent.
3. Let the device and parts dry.
4. Replace the battery with a fully charged battery.
5. Remount or replace the straps and suction cup.
6. Repack the device into the carrying bag.

Alaris PC Pump and Module Protocol

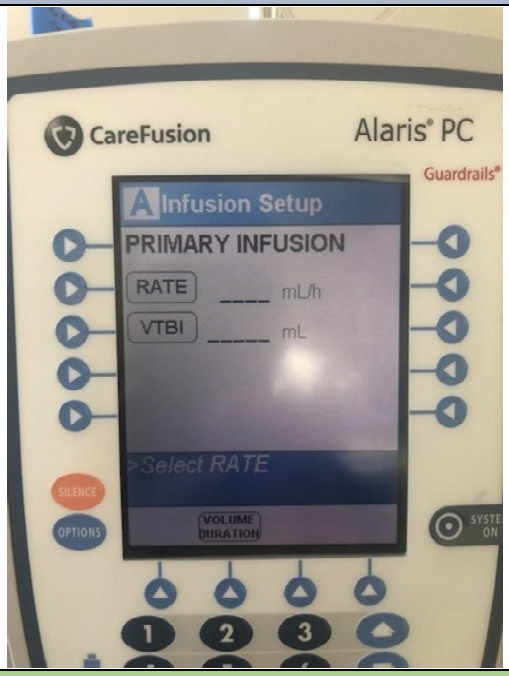
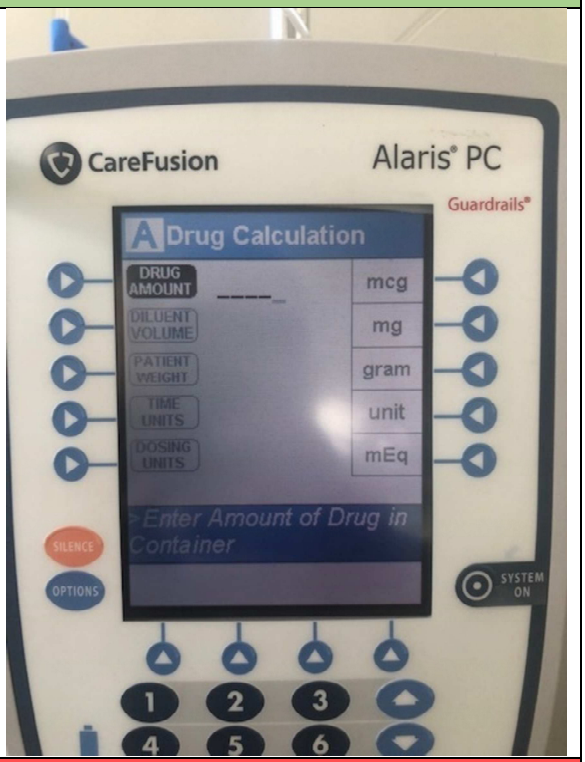
Overview/Indications:

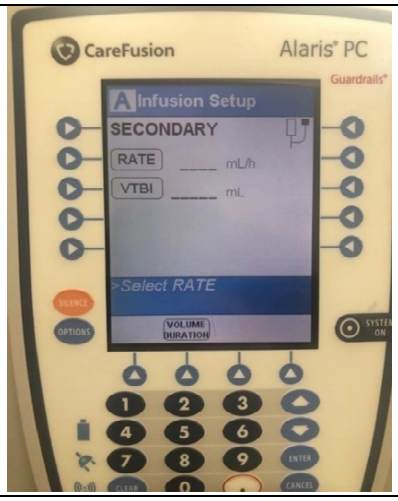
- The Alaris IV pump consists of two main parts, The PC unit and the pump modules
  - The PC unit controls the pump modules
  - Up to 4 pump modules may be used on PC unit.
- The Alaris PC Pump and modules may be used in interfacility transfers or whenever a specific measured rate is required to be administered to a patient.
  - **Note**: BLS crews may operate the Alaris PC pumps only for the administration of normal saline in basic mode

Precautions:

- Maintain IV sight awareness for potential IV site infiltration
- Use caution to avoid delivering air embolisms
  - Properly flush IV administration lines prior to using pump
  - Do not allow drip chamber to empty or allow to be turned upside down while pump or medication is being administered as it may draw air through the lines.
- Be observant between multiple IV lines; if used
- Avoid free flowing medication or rapid dosing of medication when placing IV tubing into the pump or removing the IV tubing from the IV pump
  - When initially setting the pump or stopping/removing IV tubing from the patient, **have at least one clamp set**, to prevent a bolus of mediation being administered to the patient.

Preparing the Tubing	
Spike fluid/medication source using an aseptic technique Note blue cap on fluid bag and cap over Iv tubing drip chamber is sterile. Keep them on until you are ready to spike	
Purge the air through the IV tubing ensuring no air is trapped in the Leur-lock IV sites along the tubing. • May need to hold the Leur-Lock sites upside down to have the air rise and exit the tubing	

Set a Clamp on the IV tubing and install the tubing into the pump	
IV Fluids with NO medication	
• Select Channel • Select rate to be administered • Select remaining volume to be given • Unclamp IV tubing, Begin infusion	
IV Fluids WITH Medication	
• Select Channel • Select the options key, select Drug calculation set up • Input the required field about concentrations asked in fields. This will determine your concentration • If medication is weight based select yes and enter the patient's weight (In Kg) • Input the time units (min,hour, day) • Input the dosing units (ex.mcg/min, mcg/kg/min, etc.) • Input the desired dose to be administered and volume to be administered. • Once IV tubing is in place, you may procced to infuse medication	
Secondary piggyback infusion ***Note drug calculations cannot be added to piggy back infusion. Only the primary infusion**	

• Prime piggyback tubing to remove any air bubbles • Primary bag must be at least 9 inches below the secondary infusion • Connect secondary piggyback to connection above the pump • Program primary infusion (if not already done so) • Select the channel you wish to have the piggyback administered through • Press the secondary soft key • Enter the rate and volume to be given • Open secondary clamp • Begin infusion • Once infusion is complete, Clamp secondary roller clamp.	

Troubleshooting PC Unit

Alarms:

Type	Sound	Note
Advisory/Message	One short beep every 2 seconds.	Variable volume; can be silenced for 2 minutes.
Alarm	Choice of three alarm audio Profiles, selectable in System Configuration.	Variable volume; can be silenced for 2 minutes.
Error (Hardware Detected)	Pairs of long beeps.	Fixed maximum decibel volume; cannot be silenced.
Error (Software Detected)	Pairs of long beeps.	Fixed maximum decibel volume; can be silenced for 2 minutes.
Illegal Key Press	Two short beeps.	Variable volume; cannot be silenced
Key Click	One short beep.	Fixed minimum volume; can be silenced and disabled in System Configuration.
Prompt	One short beep every 2 seconds	Variable volume; can be silenced.

Alarms:

Alarm	Meaning	Response
Battery Discharged	Operation of all modules stopped due to insufficient battery charge	Connect AC power cord to power source (alarm silenced). To continue operation of paused modules, press **RESTART** key on affected module.
Channel Disconnected	Module disconnected while in operation or have a	To silence alarm and clear message from screen, press

	communication problem.	**CONFIRM** soft key. Reattach module, if needed, ensuring it is securely "clicked" into place at Module Release Latch. If alarm is still present, replace module.
Very Low Battery <5 minutes to system shutdown	Battery has five minutes or less of power at current power consumption rate before operation stops.	Connect AC power cord to power source (alarm silenced). Very low battery will continue to display after AC is plugged in until the battery has built up enough of a charge to run Alaris System for 5 minutes. To verify AC is charging, look at the AC LED on front panel and verify that it is on.

Errors:

Error	Meaning	Response
Audio System Error	Main speaker failure.	Visually check alarm status to determine whether or not an operational alarm also needs to be addressed (red Alarm Status Indicator lit). Replace PC unit.
Channel Error	Error detected. Operation stops on affected module.	To silence alarm and continue operation of unaffected modules, press **CONFIRM** soft key. Replace module.
Defective Battery	Defective battery	To continue temporary operation, press **SILENCE** key. Replace PC unit
Hardware Detected Error	Error detected on PC unit.	Operation stops on all modules Replace PC unit.
Missing Battery	Battery not present or not connected.	To continue temporary operation, press **SILENCE** key. Replace PC unit.
Power Supply Error	Power supply system malfunction.	Disconnect AC power immediately. To continue operation under battery power, press **SILENCE** key. Replace PC unit.
System Error	Operation continues on all attached modules. Error detected on Alaris PC unit.	To continue temporary operation, press **SILENCE** key. Replace Unit

Troubleshooting Pump Module:

Alarm	Alarm	Response
Accumulated Air-in-Line	A large number of air bubbles smaller than current air in line limit has recently passed detector	Clear air from line. To continue infusion, press reset and restart key
Air-in-Line	Air has been detected in administration set during an infusion. Infusion stops on affected module.	Ensure that tubing is properly installed in the Air-in-Line detector. If air is present clear air from administration set. Press restart key.
Channel Disconnected	Module disconnected while in operation or have a communication problem.	To silence alarm and clear message from screen, press **CONFIRM** soft key. Reattach module, if needed, ensuring it is securely "clicked" into place at Module Release Latch. If alarm is still present, replace module.
Check IV set	Administration set is not properly installed. Infusion stops on affected module	Close roller clamp, remove and reinstall administration set, close door, open roller clamp, and then press restart key.
Checking Line	Patient side occlusion occurred; Auto-restart feature monitor downstream m pressure to determine if infusion can continue.	None
Close door	Door opened during an infusion. Infusion stops on affected module.	Close door. Press restart key
Occluded - Fluid Side/Empty Container	Indicates either upstream occlusion or empty container. Infusion stops on affected module. Clear occlusion on fluid side of instrument. If necessary, refill drip chamber.	Press **RESTART** key, or press **CHANNEL SELECT** key and then **START** soft key.
Occluded - Patient Side	Increased back pressure sensed while infusing in pump delivery mode. Infusion stops on affected module.	Clear occlusion. Press **RESTART** key, or press **CHANNEL SELECT** key and then **START** soft key.
Partial Occlusion - Patient Side	Partial occlusion of patient side of IV line detected by Auto-Restart feature.	Clear occlusion. Press **RESTART** key, or press **CHANNEL SELECT** key and then **START** soft key

Pump Chamber Blocked	Tubing blocked inside Pump module (in pump chamber).	1. Close roller clamp and open door. 2. Remove tubing. 3. Massage tubing from top to bottom to restore flow. 4. Reload set and close door. 5. Press **NEXT** soft key. 6. Press **CONFIRM** soft key. 7. Open roller clamp and press **RESTART** key. 8. Verify flow in drip chamber after restarting infusion. 9. Change set if not able to establish flow.
Restart Channel	Door opened and closed during an infusion. Infusion stops on affected module. Module paused for 2 minutes.	Close door. Press **RESTART** key, or press **CHANNEL SELECT** key and then **START** soft key. Press **RESTART** key, or press **CHANNEL SELECT** key and then **START** soft key.
Safety Clamp Open	Close Door Safety clamp device is in open position while door is open.	Close roller clamp on administration set or close door

Refusal Protocol

If the patient declines prehospital care and/or transport, the following criteria must be met for them to refuse transport and/or treatment from EMS:

1. Patient must be over the age of 18 years old.
2. Patient must be oriented to Person, place, time, and events
3. Patient must have sufficient emotion control, judgement, and discretion to manage their own affairs.
4. Person must not be ***Impaired*** by drugs or alcohol or by a mental illness such as dementia or developmental disorder
    - Intoxication and/or mental disorder due to conditions such as dementia by themselves do not constitute a lack of capacity to refuse. In addition to these conditions, EMS provider must also assess the person ability to comprehend the risks and benefits of refusing an intervention (including transport)
5. Talk with the patient: advised them of the risk and benefits of the intervention and alternative interventions.
6. Patient must demonstrate that he/she understands the risk and benefits
7. Talk with family/friends: Establish their relationship to the patient. They may be able to convince the patient to accept care.
8. If the patient agrees to treatment/transport at this time, initiate appropriate care and transport.
9. Patient must be left with a responsible adult, who is responsible to watch over them.
10. If the patient continues to decline treatment/transport and has met all criteria up to this point contact medical direction.
11. Ensure complete documentation on the trip report to include a minimum of a mental status exam, complete vital signs.
12. Complete waiver and have patient sign if patient continues to decline treatment/transport.
13. If patient refuses to sign, document refusal on PCR and waiver.
14. If possible, have patient's refusal witnessed by a third-party (friend, law enforcement, etc.).
15. Attach one copy of waiver to prehospital medical record and give one copy to patient.

Treatment Protocols

General Patient Care Protocol

A. Scene Safety:

1. SCENE ARRIVAL AND SIZE-UP SITUATION.
2. Proper Body Substance Isolation (BSI).
3. Consider Personal Protective Equipment (PPE).
4. Evaluate the scene safety.
5. Determine the number of patient.
6. Consider the need for additional resources.

B. Patient Approach:

1. Determine the Mechanism of Injury (MOI) / Nature of Illness (NOI).
2. For all emergency scenes where patient needs exceed available EMS resources, initial assessment and treatment shall be in accordance with an approved triage methodology.

C. Initial Assessment:

Correct life-threatening problems as identified.

Airway: (protect C-Spine if spinal injury suspected)

a. Open and ensure a patent airway.

a Head tilt — chin lift if no suspicion of cervical spine injury.

b Jaw thrust if evidence of potential cervical spine injury.

c Suction as necessary.

d If necessary, insert airway adjunct.

Breathing:

a. Breathing — Determine if breathing is adequate.

b. If patient's ventilations are not adequate, provide assistance using Bag-Valve-Mask (BVM).

c. Administer oxygen as appropriate oxygen saturation below 94%.

d. 12-15 Liters oxygen via NRB to all patients (including COPD if severe SOB) experiencing cardiovascular, respiratory, or neurological compromise.

e. 2-6 Liters oxygen via nasal cannula or 6-15 Liters 02 via oxygen mask delivery device to ALL other patients with no history of prescribed home oxygen.

f. Patients with a history of prescribed home oxygen for chronic conditions should receive their prescribed home dosage of oxygen using EMS oxygen tank.

g. Pulse oximetry, Normal oxygen saturation goal 94%- 99%

NEVER WITHOLD OXYGEN FROM A PATIENT IN RESPIRATORY DISTRESS:

Circulation:

a. Assess pulse.

b. **Infants and children less than 12 years of age:**

I. If patient is symptomatic with poor perfusion (unresponsive or only responds to painful stimuli) and pulse is less than 60 bpm or absent begin CPR.
II. If pulse is greater than 60 bpm, continue assessment.

b Patients 1 year of age or greater: If pulse is absent, begin CPR and attach AED.

c Assess for and manage profuse bleeding.

d Assess skin color, temperature, and capillary refill.

e All patients greater than 35 years of age complaining of chest pain or shortness of breath should have 12-Lead EKG performed, if equipment is available to search for cardiac ischemia.

Disability:

Assess mental status using AVPU Scale:

a. **A**lert

b. Responds to **V**erbal stimuli

c. Responds to **P**ainful stimuli

d. **U**nresponsive

Perform Mini-Neurologic Assessment (Pulse / Motor / Sensory).

Exposure: To assess patient's injuries, remove clothing as necessary, considering condition and environment.

D. HISTORY AND PHYSICAL EXAMINATION:

If able to:

1. Determine chief complaint
2. Perform focused examination of the injured site and areas compatible with given MCI
3. Obtain Baseline Vital Signs
4. Obtain SAMPLE History

Perform Detailed and Ongoing Assessments as dictated by patient condition.

1. Reassess unstable patients frequently (recommended every 5 minutes).
2. Reassess stable patients at a minimum of every 15 minutes.

3. Attempt to obtain two sets of vital signs for any patient contact.

E. TREATMENT PROTOCOLS:

1. Refer to ALL appropriate protocols.
2. For pediatric patients
   a. Equipment and medications must be appropriate for the size and weight of the patient. **Use of the Broselow tape or equivalent is encouraged.**
   b. The developmental age of the infant/child must be considered in the communication and evaluation for treatment.
   c. Treatment priorities are similar to the adult patient.
   d. When appropriate, family members should remain with pediatric patients.
   e. Infants and children must be properly restrained prior to and during transport.

F. COMMUNICATIONS:

1. Radio or phone contact shall be established with receiving facility prior to arrival to the facility.

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G. DISPOSITION:

1. Patients sustaining traumatic injuries shall be transported in accordance with the Trauma Field Triage Criteria protocol.

2. Patients sustaining burn injuries shall be transported in accordance with the Burns protocol.

3. Patients with evidence of an acute cerebrovascular accident shall be transported in accordance with the Acute Cerebrovascular Accident protocol.

4. All patients in cardiac arrest or in whom the ability to adequately ventilate cannot be established should be transported to the closest facility.

5. Stable patients should be transported to the hospital of their choice.

6. If the patient does not have a preference, the patient should be transported to the closest facility.

7. If a hospital declares an Internal Disaster, that facility is to be bypassed for ALL patients except patients in cardiac arrest or in whom the ability to adequately ventilate has not been established.

H. TRANSFER OF CARE:

Providers will relay assessment findings and treatment provided to the individual(s) assuming responsibility for the patient(s).

I. DOCUMENTATION:

A Patient Care Record (PCR) will be completed for each incident/patient encounter, in accordance with current EMS Regulations.

J. CONFIDENTIALITY:

Patient confidentiality must be maintained at all times.

K. PROFESSIONAL CONDUCT:

All patients should be treated with dignity and respect in a calm and reassuring manner.

Airway Management Protocol

Indications:

- If the patient's airway is compromised requiring management to ensure adequate oxygenation and ventilation.
- Pt present with hypoventilation from any non-reversible cause.
- Hypoxia with respiratory distress not corrected with oxygen.

BLS Care

1. Position the head to open airway to avoid from being obstructed.
2. Suction airway as needed to facilitate ventilation.
3. Apply oxygen if patient's oxygen saturation is below 94%
4. If no patent airway, Insert OPA if no gag reflex is present.
    A. If gag reflex is present insert 1 or 2 NPA to secure an airway.
5. Provide ventilatory support with BVM if patient's respirations are inadequate.
    A. Use BVM with 15lpm oxygen.
    B. Provide breaths at a rate of 8-10 breaths per minute, deliver each breath slowly over 1 second. Avoid hyperventilation and over ventilation.
6. In severe respiratory distress, CPAP may be used if the following conditions are suspected:
    A. CHF exacerbation/Pulmonary Edema
    B. Asthma with moderate to severe dyspnea
    C. Carbon monoxide poisoning
        i. DO Not use CPAP if patient is not breathing spontaneously, the patient cannot follow simple commands, the patient has apnea, or the patient has any trauma (EG. burns) to the face and mouth area.
        ii. If any of the follow are present CPAP should not be used.
    D. May administer Albuterol via in line Neb with CPAP.
7. If patient is apneic/ unconscious and has no gag reflex, an appropriately sized supraglottic airway may be placed.

ALS Care

1. Apply ETCO2 Nasal Cannula (if available) for moderate to severe respiratory distress and or an in-line ETCO2 if BVM is already in use.
    A. Max flow rate of 6 lpm through ETCO2 nasal cannula.
2. If patient is a candidate for CPAP, but does tolerate it due to anxiety, agitation, or claustrophobia, reassure the patient and coaching the patient through the treatment. If this does not work, you may administer one of the follow medications to tolerate CPAP:
    A. **Ketamine**: 0.25 mg/kg IV
        i. Max single dose of 25mg.
        ii. May repeat every 5-10 min Max total dose of 150mg.
    B. **Midazolam**: 1-2 mg IV
        i. Caution when using sedative: CPAP is contraindicated for patient who cannot follow simple commands.
3. If patient has no gag reflex, has a GSC less than 9 and is in respiratory or cardiac arrest:
    A. May intubate patient with appropriately sized ET tube.
4. Consider PEEP 5-20 cmH20 if patient is not in cardiac arrest.

Invasive Airway Sedation and Analgesia (ALS)

Indications:

- All patients who have an invasive airway (Endotracheal tube and supraglottic airway)

Exclusions:

- Patients who do not have an advanced airway
- Patients in cardiac arrest
- Patients who have a tracheotomy dome.

ALS:

1. Routinely assess pain and sedation at appropriate intervals using appropriate non-communitive pain assessment scales, such as the CPOT scale (Critical Care Observation Tool) or the Nonverbal Pain Scale (NVPS).
2. Vitals should be taken at least every 15 minutes. May be taken more frequently if necessary

3. **Analgesia:** should be administered first to every patient with an advanced airway in place. Adult and pediatric dosing.
    - **A. Fentanyl**:
        - I. Bolus
            - a. 1-5 mcg/kg every 5-15min, repeat every 5-15minutes as needed for analgesia
                - a. Typically, 50-200mcg bolus for adults
        - II. Infusion (mix fentanyl 250mcg in 100 ml normal saline)
            - a. Administered bolus then begin infusion
            - b. 1-5 mcg/kg/hr, titrated to patient comfort and tolerance of invasive airway
    - **B. Hydromorphone**
        - I. Bolus
            - a. 0.015mg/kg, repeated every 15-20 minutes as needed for analgesia
            - b. Typically, 0.5-2mg bolus for adults.
        - II. Infusion (mix 2mg hydromorphone in 100ml normal saline)
            - a. 2mcg/kg/hr, titrated to patient comfort and tolerance of invasive airway
    - **C. Ketamine** (sedation and analgesic)
        - I. Bolus
            - a. 0.5 -2mg/kg IV/IO, diluted in 10ml of normal saline. Given over1 1-2 minutes. Repeat every 10 minutes as necessary.
        - II. Infusion (Mix Ketamine 500mg in 100ml normal saline
            - a. Administer bolus, then begin infusion
            - b. 0.5mg-5mg kg/hr, reassess and titrated to patient comfort and tolerance of advanced airway.
        - III. Used as both analgesic and sedative.

4. **Sedation:** may be administered with analgesics to achieve comfort and compliance. Adult and pediatric dosing.
    - **A. Midazolam** (sedation)
        - I. Bolus
            - a. Adult: 2-5mg slow IV bolus initial dose. Subsequent at half of initial dose and given every 10 minutes as needed.
            - b. Pediatric: 0.1mg/kg slow IV bolus, repeated every 10 minutes as needed.

II. Infusion (mix 2.5 mg in 100ml normal saline)
    a. Administer bolus, then begin infusion.
    b. 50-100mcg/kg/hr, reassess and titrate every 5 minutes to patient comfort and tolerance of advance airway.

B. Propofol

I. 20-80mcg/kg/min
    a. Begin at 20mcg/kg/min, reassess and titrate up to 5-10 mcg/kg/min every 5 minutes to patient comfort and tolerance of advanced airway
    b. Max dose of 80 mcg/kg/min
II. Does not have any analgesic properties and must be used with analgesic.

C. Ketamine: (preferred for hemodynamically unstable patients)

I. Bolus
    a. 1-2mg/kg IV/IO, Max single dose of 250mg, diluted in 10ml of normal saline. Given over1 1-2 minutes. Repeat every 10 minutes as necessary.
II. Infusion (Mix Ketamine 500mg in 100ml normal saline
    a. Administer bolus, then begin infusion
    b. 0.5mg-5mg kg/hr, titrated to patient comfort and tolerance of advanced airway.
    c. Ketamine act both as an analgesic and sedative.

5. **Paralytics** (Adult and Pediatric dosing)

A. Should be used only as a last resort intervention, unless:
    I. Patient or crew safety cannot be achieved with analgesic and sedatives
    II. A specific patient condition indication paralysis immediately necessary.
        a. In both cases above. Proper dose of analgesic and sedation must be given prior to paralytic administration.

B. Rocuronium

I. 1mg/kg (max 50mg per dose) IV/IO every 30 minutes as needed to maintain paralysis

Or

C. Vecuronium

I. 0.1mg/kg initial bolus
II. 0.01 mg/kg maintenance dose, every 30 minutes following initial dose.

6. Paralytic considerations
    A. Paralytics make it impossible to see physical effects of pain and discomfort. If used you must give proper sedation and analgesic, preferably and continuous maintenance infusion.

7. Documentation key elements
    - Dose, route, time of analgesics and sedatives given
    - Decision to use analgesic and sedative on the patient
    - Rationale for use of paralytics, if used
    - Factors complications adequate sedation and/or analgesic for transports greater that 15 minutes.

Trauma Protocol

Indications:

- Any patient that has experienced blunt or penetrating trauma.
- Any patient that has external bleeding due to a traumatic injury.

BLS:

1. Provide general patient care.
2. Identify and treat any life threats identified on the patient.
    A. Conduct Rapid Trauma Assessment, assessing for DCAP-BTLS: (Deformities, Contusions, Abrasions, Punctures/Penetrations, Burns, Tenderness, Lacerations, Swelling).
        I. Head
            a. Raccoon eyes
            b. Pupil size and reactivity
            c. Drainage from ears
            d. Assess inside of mouth
        II. Neck
            a. Crepitation in neck
            b. Throat
            c. JVD
            d. Tracheal Deviation
        III. Chest
            a. Crepitation in ribs
            b. Respirations
            c. Paradoxical Motion
            d. Breath Sounds
        IV. Abdomen
            a. Rigidity
            b. Distention
        V. Pelvis / GU
            a. Stable?
            b. Pain on Motion
            c. Blood/ Urine/ Feces?
        VI. Extremities
            a. Pulse / Motor / Sensory
            b. Deformities
        VII. Posterior/Back
            a. Assess spine for any deformity
            b. Check for bleeding
            c. Medication patches?

3. Use selective spinal immobilization protocol as needed.
4. For isolated extremity injuries:
    A. Apply splints to joint above and below injury, if possible.
        I. Lower extremity:
            a. Knee, tibia/fibula, ankle, or foot injury: use foam or board splint
            b. Femur fracture: use traction splint
            c. Hip fracture: use pillow or blankets to support injured extremity

d. Pelvis: if patient has unstable pelvis and/or a blood pressure less than 90mmHg or lower age appropriate systolic blood pressure.
    i. Adult: use pelvic binder
    ii. Pediatric: use draw sheet to splint pelvis

II. Upper extremity:
    a. Secure extremity to immobilize movement using:
        i. Sling splint
        ii. Pro splints
        iii. Back board
        iv. Tap/coban

B. Complete amputation:
    I. Cover remaining stump/open area with sterile dressing saturated in normal saline.
    II. Wrap amputated part in moist sterile gauze.
    III. Put on ice/cold pack. (DO NOT FREEZE)

C. Incomplete amputation:
    I. Cover open wounds with sterile sheet.
    II. Stabilize injury and attempt to bring it back to anatomical position.
    III. Cool partially amputated part with ice/cold pack.

5. Penetrating trauma:
    A. Do not remove impaled object, unless it if feasibly impossible to transport the patient with the object in place.
    B. Stabilize patient and object.

6. Always check CMS before and after any interventions.
7. Obtain vascular access.
8. If shock present treat per shock protocol.

ALS:

1. Treat pain and shock per protocol

Pain Management (Adult)

Indications:

- Patient greater than 13 years of age experiencing pain from traumatic injury.
- Patient greater than 13 years old experiencing non-traumatic pain not felt to be cardiac in nature.
- Patient greater than 13 years of age with active cancer or who is receiving analgesia as part as palliative care.

BLS:

1. Assist patient with positions of comfort during patient packaging and transport. This includes splinting/immobilizing injured extremities.
2. Apply ice packs or hot packs to traumatic sights unless frostbite or hypothermia is present.

ALS:

1. If BLS methods have not reduced pain to an acceptable level, then these pain medications may be given if appropriate:

A. Traumatic Pain:

I. Fentanyl:
- **a.** 1-3mcg/kg IN/IM/IV/IO, max single dose of 200mcg.
- **b.** Re-dose Every 5 min
- **c.** Typical dose 50-200mcg
- **d.** Max total dose of 500mcg

II. Ketamine:
- **a.** 0.25mg/kg IM/IV/IO,
- **b.** Max single dose of 25mg diluted in 10ml normal saline.
- **c.** Re-dose every 10 min if needed
- **d.** Max total dose 100mg

III. Hydromorphone:
- **a.** 0.25-2mg IM/IV/IO.
- **b.** Max Single dose 2mg.
- **c.** Re-dose every 15 min if needed
- **d.** Max total dose of 4mg.

IV. Morphine:
- **a.** 0.1-0.2mg/kg IM/IV/IO
- **b.** Max single dose of 10mg
- **c.** Re-dose every 15 min if needed
- **d.** Max total dose of 20mg.

B. Non-traumatic Pain:

I. **Fentanyl:**
   a. 1-3mcg/kg IN/IM/IV/IO
   b. Max single dose of 200mcg
   c. Can redoes every 5 min if needed
   d. Typical dose 50-200mcg
   e. Max total dose of 500mcg

II. **Hydromorphone:**
   a. 0.25-2mg IM/IV/IO
   b. Max Single dose 2mg
   c. Redoes every 15 min if needed
   d. Max total dose of 4mg.

III. **Morphine:**
   a. 0.1-0.2mg/kg IM/IV/IO
   b. Max single dose of 10mg
   c. Re-dose every 15 min if needed
   d. Max total dose of 20mg

2. Secondary Pharmacologic interventions: if non-pharmacologic interventions and primary pharmacologic interventions have not reduced the pain to an acceptable level, consider the following:

A. Traumatic pain

I. **Ketamine:**
   a. 0.25mg/kg IM/IV/IO
   b. Max single dose of 25mg diluted in 10ml normal saline
   c. Re-dose every 10 min if needed
   d. Max total dose 100mg

II. **Midazolam:**
   a. 0.5-1mg IM/IV/IO every 10 minutes
   b. Max total dose of 3mg

B. Non traumatic pain

I. **Midazolam:**
   a. 0.5-1mg IM/IV/IO every 10 minutes.
   b. Max total dose of 3mg

Pain Management (Pediatric)

Indications:

- Patient less than 13 years of age experiencing pain from traumatic injury
- Patient less than 13 years old experiencing non-traumatic pain not felt to be cardiac in nature

BLS:

1. Assist patient with positions of comfort during patient packaging and transport. This includes splinting/immobilizing injured extremities
2. Apply ice packs or hot packs to traumatic sites unless frostbite or hypothermia is present.

ALS:

1. If BLS methods have not reduces pain to an acceptable level, then these pain medications may be given if appropriate:

A. Traumatic Pain:

I. **Fentanyl**
   a. 1-3 years old: 2-3mcg/kg IN/IM/IV/IO
      i. Max single dose of 100mcg
      ii. Re-dose every 5-15 min if needed.
   b. 4-13 years old 1-2mcg/kg
      i. Max single dose of 100mcg.
      ii. Re-dose every 5-15 min if needed

II. **Ketamine**:
   a. 0.25mg/kg IM/IV/IO
   b. Max single dose of 25mg diluted in 10ml normal saline
   c. Redoes every 5-15 min if needed
   d. Max total dose 100mg

III. **Hydromorphone**:
   a. 0.015mg/kg IM/IV/IO
   b. Max Single dose 2mg
   c. Redoes every 15 min if needed
   d. Max total dose of 4mg

IV. **Morphine**
   1. 0.1-0.2mg/kg IM/IV/IO
   2. Max single dose of 10mg
   3. Redose every 15 min if needed
   4. Max total dose of 20mg

B. Non-traumatic Pain:

1. **Fentanyl**
   a. 1-3 years old: 2-3mcg/kg IN/IM/IV/IO
      i. Max single dose of 100mcg
      ii. Re-Dose every 5-15 min if needed.
   b. 4-13 years old: 1-2mcg/kg

c. Max single dose of 100mcg
d. Re-dose every 5-15 min if needed

2. **Hydromorphone**:
    1. 0.015 mg/kg IM/IV/IO.
    2. Max Single dose 2mg.
    3. Redoes every 15 min if needed
    4. Max total dose of 4mg.

3. **Morphine**:
    1. 0.1-0.2mg/kg IM/IV/IO
    2. Max single dose of 10mg
    3. Re-dose every 15 min if needed
    4. Max total dose of 20mg.

2. Secondary Pharmacologic interventions: if non-pharmacologic interventions and primary pharmacologic interventions have not reduced the pain to an acceptable level, consider the following:

A. Traumatic pain

I. **Ketamine**:
    a. 0.25mg/kg IM/IV/IO,
    b. Max single dose of 25mg diluted in 10ml normal saline.
    c. Re-dose every 10 min if needed
    d. Max total dose 100mg

II. **Midazolam**:
    a. 0.1mg IM/IV/IO every 10 minutes.
    b. Max total dose of 2mg

B. Non traumatic pain

I. **Midazolam**:
    a. 0.1mg IM/IV/IO every 10 minutes.
    b. Max total dose of 2mg

Asthma

Indication:

- Patient with asthma, wheezing, or has a family history of asthma.

Exclusion:

- Patient with respiratory distress caused by a cardiac issue, such as CHF, pulmonary edema, or suspected myocardial infarction.

BLS:

1. Provide General patient care
2. Place patient on ETCO2 monitoring
3. Obtain vitals and ECG
4. Perform manual exhalation
5. Administer:
    - **A. Albuterol**
        - I. 2.5mg via nebulizer.
        - II. May repeat every 5 minutes as necessary
6. Place on CPAP if patient will tolerate.
7. If patient is experiencing severe dyspnea or no improvement after the previous interventions administer:
    - **A. Epinephrine:**
        - I. Adult: 0.5 mg IM (1mg/ml) via pre-measured syringe, or 0.3mg auto-injector IM
        - II. Pediatric: 0.3mg IM (1mg/ml) via pre-measured syringe, or 0.3 mg auto-injector IM
8. If patient goes into respiratory arrest:
    - A. Begin manual ventilations at a rate of 8-10 breaths per minutes with ETCO2. *Must allow time for exhalation*
    - B. Attempt a supraglottic airway if the patient allows.
9. If patient goes into cardiac arrest
    - A. Follow appropriate cardiac arrest protocol
    - B. Administer
        - **I. Albuterol**
            - a. 2.5 mg via in line nebulizer during manual ventilation.

ALS:

1. Apply ETCO2 if not already in place
2. If time allows obtain 12 lead ECG and interpret
3. If BLS intervention is ineffective administer:
    - **A. Duo Neb (Ipratropium and Albuterol Sulfate)**
        - I. 0.5mg/3mg one-time dose via nebulizer.
4. If no improvements administer:
    - **A. Epinephrine:**
        - I. Adult: 0.5mg IM (1mg/ml)
        - II. Pediatric: 0.01mg/kg IM (1mg/ml), with max dose of 0.3 mg.
5. If still no improvement, administer continuous albuterol nebulizer treatments while in route and administer:
    - **A. Magnesium Sulfate:**
        - I. Adult 1-2g IVP over 2 minutes
        - II. Pediatric: 25-100 mg/kg IVP over 2 minutes

Pulmonary Edema/Congestive Heart Failure

Indications:

- Patient with acute respiratory distress due to pulmonary edema from a cardiac pump insufficiency, flash pulmonary edema, or a STEMI
- Patient with a history of CHF
- Any patients in respiratory distress with new onset of Atrial Fibrillation, Atrial Flutter, or Ventricular Tachycardia

BLS:

1. Provide general patient care
2. Provide oxygen to patient if necessary
3. Take vitals and obtain a 12 lead ECG
4. **If systolic blood pressure is at or *greater than 120mmHg*** administer:
    - **A. Nitroglycerin**
        - I. 0.8mg (2 tablets) sublingually
        - II. After 2 min administer 0.4 mg (1 tablet) unless blood pressure is less than 120mmHg systolic
        - III. Can re-administer 0.4mg Nitroglycerin every 5 minutes unless blood pressure is less than 120mmHg
5. Provide CPAP, beginning at 5 cmH20 and increasing from there
6. Transport

ALS:

1. Interpret 12 lead and treat any rhythms according to protocol.
2. If transport time is greater than 10 minutes, may initiate:
    - A. **Nitroglycerin:**
        - I. IV infusion if Systolic blood pressure is greater than 120mmHg.
        - II. Initial starting rate of 80 mcg/min, Titrate by 5-10 mcg/min
        - III. Maintain a systolic blood pressure greater than 120mmHg

COPD Exacerbation Protocol

Indications:

- Patients with a history of COPD or Emphysema who are experiencing respiratory distress

Exclusion:

- Patients with respiratory distress with a cause that is cardiac related
- Patient who are experiencing respiratory distress due to asthma
- Patient without a history of COPD.

BLS:

1. Provide general patient care
2. Administer Oxygen via nasal cannula:
    A. For patient with home oxygen, match flow rate
    B. If patient's normal SP02 is known, titrate to obtain the patient normal oxygen saturation.
    C. If normal SPO2 is not known titrate SPO2 for at least 93%
3. Administer:
    A. Albuterol Sulfate
        I. 2.5mg via nebulizer
        II. Contraindication: may not give if heart rate if greater than 150
        III. may repeat every 3 minutes, if not improved
4. If signs have improved may repeat every 15 minutes
5. If severe respiratory distress shows no improvement with previous interventions, may place the patient on CPAP with continuous albuterol nebulizer treatments
6. Obtain vitals and ECG
7. Transport

ALS:

1. Interpret 12 lead ECG
2. If BLS intervention is ineffective administer:
    A. **Duo Neb**
        I. 0.5mg/3mg (Ipratropium / Albuterol Sulfate) via nebulizer
        II. One-time dose
    B. Albuterol Sulfate
        I. 2.5 mg via nebulizer
        II. Can give continuously.

3. May need to use sedation for patient to tolerate CPAP if not tolerated.

Abdominal Pain, Back pain, and Flank Pain (Non-Traumatic)

Indications:

- Patient experiencing abdominal pain or discomfort related to non-traumatic cause.

Exclusions:

- Abdominal pain due to trauma
- Abdominal pain related to pregnancy or labor

BLS:

1. Provide General Patient Care.
2. Follow Airway Management protocol if needed.
3. EKG monitor, CO_2 monitor, and pulse oximeter.
4. Assess for life threatening causes:
    A. Unstable vital signs that indicate shock indicating hypo-perfusion administer:
        I. Normal Saline:
            a. Adult:
                i. 500 ml NS.
                ii. If patient's condition does not improve, administer additional bolus.
                iii. Max total dose of 2000cc
            b. Pediatric:
                i. Fluid bolus is 20 ml/kg.
                ii. May repeat as clinically indicated with 20 ml/kg boluses
                iii. Maximum total dose of 60 ml/kg.
    B. Rigid Abdomen
    C. Pulsating masses
    D. Grossly distended or “inflated” abdomen
5. Obtain vascular access
6. Continue General Patient Care.
7. Contact Medical Control if any questions.
8. Transport

ALS:

1. Assess for life threatening causes:
    a. Ischemic, necrotic, or perforated bowel
    b. Dissected or Ruptured Aortic Aneurysm
    c. Ectopic Pregnancy
    d. Appendicitis or Peritonitis.
2. If patient complains of nausea/vomiting, follow nausea/vomiting/diarrhea protocol.
3. For adults with severe pain follow Pain Management Protocol.

Acute Cerebral Vascular Attack (CVA)

Indications:

- Patient suffering from an acute neurological deficit indicating possible cerebral vascular accident or transient ischemic attack.

Exclusions:

- Traumatic brain injury
- Known drug overdose
- Confirmed Hypoglycemia
- Status epilepticus
- Postictal phase of seizure

BLS:

1. Initiate General Patient Care.
2. Position patient with head and chest elevated or position of comfort.
3. Administer:
    A. **Oxygen**
        I. If oxygen saturations are below 94%
        II. Maintain normal oxygen saturation between 94-99%.
4. Complete Cincinnati Stroke Scale (Appendix B) or FASTED scale
5. If positive stroke scale, notify receiving facility to activate stroke team
6. Attempt vascular access.
7. Obtain glucose reading: treat hypoglycemia per hypoglycemia protocol.
8. Place patient on cardiac monitor.
9. Obtain 12 lead if time allows (do not delay)
10. Obtain medical history of medications the patient is on
11. Notify receiving facility as soon as possible to get them prepared.
12. TRANSPORT IMMEDIATELY TO CLOSET APPRORIATE EMERGENCY DEPARTMENT.

ALS:

1. Treat any underlying cardiac rhythms if indicated.

*Scene time should be less than 10 minutes and it is imperative that EMS personnel attempt to document the contact information from someone who can provide a history of the illness.

Adult Chest Pain/ Suspected Acute Coronary Syndrome

Indications:

- Any patient over the age of 25 experiencing or complaining of chest pain, pressure, or discomfort.
- Any patient over the age of 25 with syncopal episode.
- Atypical cardiac symptoms in the absence of chest pain.
- Any patient with a new onset of fatigue, dizziness, weakness, respiratory distress, diaphoresis, or any unexplained circumstances.

Exclusions:

- Any recent trauma to chest area.

BLS:

1. Provide General Patient Care
2. Routine supplementary oxygen therapy in patients suspected of ACS, keeping oxygen saturations between 94 and 99%
3. Administer:
    - **A. Aspirin**
        - I. 324mg (4-81mg aspirin) chewable tablets PO, if no allergy
4. Obtain vitals and at least one 12 lead EKG
5. If blood pressure is greater than 90 mm/hg systolic, administer:
    - **A. Nitroglycerin:**
        - I. 0.4mg SL every 5 min,
            - a. Until chest pain is relieved or systolic blood pressure is at or below 90.
6. Check blood pressure every 5 minutes prior to administration of nitroglycerin
7. If monitor interprets Acute MI or STEMI, notify receiving facility. Activate STEMI alert at the Pipestone County Medical Center if transporting to ER
8. Transmit 12 lead to ER if possible
9. May establish vascular access and administer normal saline
10. Continue general Patient Care
11. Transport

ALS:

1. Manually interpret 12 lead ECG as soon as possible
2. Notify receiving facility of the monitor and provider interpretation of the ECG
3. Note the following for STEMI Criteria:
    - ST segment elevation of 2mm (2 small boxes) or greater in two or more continuous V-leads
    - ST segment depression of 1mm (1 small box) or greater in reciprocal leads
    - Rate of less than 140 bpm
    - QRS less than 120 milliseconds (3 small boxes) in affected lead.
    - Consider posterior 12 lead if indicated
4. If after three nitroglycerin tabs 0.4 mg SL every 5 minutes for chest pain, and cardiac chest pain still present, consider
    - **A. Nitroglycerin drip.**
        - I. initiated at 10 mcg/minute but only initiated if systolic > 90 mm hg.
        - II. Titrate nitroglycerin drip by 5 mcg/minute to max dose of 50 mcg/min per minute,
        - III. any further increase must contact medical control. Note appendix for nitroglycerin drip.

5. If no Nitroglycerin drip is available and chest pain is still present with a systolic blood pressure greater than 90 mm/hg, you may administer **ONE** of the following pain medications:

A. Fentanyl:

I. 1-2 mcg/kg IN/IM/IO
II. Re-dose every 5 minutes as needed
III. Max single dose of 200mcg

Or

B. Hydromorphone:

I. 0.25-2mg IM/IV/IO
II. Redoes every 15 minutes
III. Max single dose of 2mg
IV. Max total dose of 4 mg.

Or

C. Morphine Sulfate:

I. 01-0.2mg/kg IM/IV/IO, every 15 minutes
II. Max single dose 10mg
III. Max total dose of 20mg

Altered Mental Status

Indications:

- Patient who present with an altered mental status or unconscious for an unknown reason.

Exclusions:

- Cardiac arrest
- Patients with identifiable cardiovascular, endocrine, neurologic, respiratory, toxicity, or traumatic cause.

BLS:

1. Provide General Patient Care
2. Manage airway first according to the airway management protocol
3. Identify any life threats
4. Manage any trauma, including selective spinal immobilization protocol
5. Evaluate blood glucose reading. If blood glucose is less than 60, treat per hypoglycemia protocol
6. evaluate specific causes of altered mental status
7. Apply appropriate medical and trauma protocols with the patient signs and symptoms
8. Perform stroke scale on any patient over 30
9. Perform continuous cardiac monitoring
10. Obtain a 12 led ECG
11. Obtain vascular access
12. Determine duration of the time the patient has been unconscious and consider initiating entrapment, entanglement, crush injuries and rhabdomyolysis protocol.
13. Continue general patient care
14. Transport

ALS

1. Apply noninvasive ETCO2 monitoring
2. Perform and interpret 12 lead ECG
3. Perform other condition specific evaluation interventions as necessary based on patient's clinical condition.

Allergic reaction Protocol (Not Anaphylaxis)

Indications:

- Known or suspected reaction to an allergen.
- Hypotension or inadequate profusion in patients with exposure to an allergen
- Hives, itching, edema, mild signs of allergic reaction

BLS:

1. Provide general patient care.
2. If airway is compromised, follow airway management protocol.
3. Attempt to remove allergen from body or remove patient from environment if that is the allergen
4. Note: when removing stingers from skin, use a credit card or something similar to scrape across the skin to remove. DO NOT USE TWEEZERS.
5. EKG monitor, CO2 monitor, and pulse oximeter.
6. Establish vascular access and administer:
    - **A. Normal Saline:**
        - I. TKO rate
7. Watch for indication of anaphylaxis

ALS:

1. Administer:
    - **A. Diphenhydramine:**
        - I. 1-2mg/kg IV/IO/IM up to 50 mg
2. If signs/symptoms may cause airway obstruction move to anaphylaxis protocol.
3. If signs and symptoms get more severe move to anaphylaxis protocol.

Anaphylactic reaction Protocol

Indications:

- Hypotension or inadequate profusion with exposure to allergen
- Moderate to severe respiratory distress with exposure to allergen
- Patient with or without history of reactions to exposures of allergens
- Patient with swelling to lips, tongue, or throat due to a reaction to known/unknow exposures of allergies.

BLS:

1. Provide General patient care
2. Access ABC's
3. Follow Airway management protocol is necessary
4. Administer:
    - **A. Epinephrine 1mg/1ml (one time):**
        - I. Adult: 0.5 mg using either pre-measured syringe or a 0.3mg IM auto injector
        - II. Pediatric: 0.3mg using a pre-measured syringe or using a 0.3mg IM auto injector
5. If wheezing is present in lungs, may administer:
    - **A. Albuterol:**
        - I. 2.5 mg nebulized
6. Obtain vascular access and may administer:
    - **A. Normal Saline:**
        - I. Adult**:** May administer a 500 ml bolus if systolic pressure is less than 100 mmhg and/or MAP is less than 65
        - II. Pediatric: if systolic blood pressure is less than normal vital signs, may administer a bolus of 20 ml/kg max of 500. Max total dose of 60ml/kg total.
7. Obtain 12 lead ECG and transmit to receiving facility
8. Continue general patient care
9. Transport

ALS:

1. If signs and symptoms of severe reaction exist administer a second dose of:
    - **A. Epinephrine 1mg/1ml**
        - I. Adult**:** 0.5mg IM
        - II. Pediatric**:** 0.01 mg/kg, max dose of 0.3mg, IM
    - **B. Diphenhydramine**
        - I. If previously given
            - a. Adult: 25mg IV/IO/IM
            - b. Pediatric 0.5-1mg IV/IO/IM max dose of 25
        - II. If **not** previously given
            - a. Adult: 50mg/IV/IO/IM
            - b. **Pediatric**: 1-2mg IV/IO/IM
2. Interpret 12 lead ECG and transmit to receiving facility
3. May use pain management protocol
4. Continue General Patient Care
5. Transport

Behavioral Emergencies

Indications:

- Patients experiencing anxiety or agitation secondary to a medical intervention such as CPAP
- Patient experiencing mild anxiety or agitation regarding ambulance transport
- Patients with moderate to severe agitation that requires verbal, pharmacologic and or mechanical intervention to ensure that the patient and staff can be safely transported while in the ambulance
- Patient with immediate threat to their own safety, public safety, or responder safety and demonstrate associated sudden onset and ongoing presence of shouting, paranoia, panic, violence towards other, hyperthermia, and or "superhuman" strength"

Exclusion

- Patient with respiratory failure

Precautions:

- Aggressive behavior can be caused by several medical conditions (hypoglycemia, brain injuries, hypoxia, and psychiatric disorders).
- Improperly applied restraints can cause injury
- Do not restrain a pt. who is seizing.
- Be aware of items at the scene or medical equipment that may become weapons.
- If patient is handcuffed Law Enforcement must be present in ambulance while transporting the patient.
- If Law Enforcement is not able to be present, law enforcement must follow closely behind ambulance and must be in direct radio contact the entire transport.

BLS:

1. Ensure scene is safe for providers and others present. Involve Law Enforcement early in event.
2. Identify yourself and explain why you are at scene
3. Remove disturbing persons/objects
4. Maintain calm, reassuring, and professional attitude/manner
5. Maintain safe distance/position from pt.
6. Treat life-threatening injuries
7. Obtain transport hold if needed
8. If not safe to treat unrestrained, restrain per guidelines
9. EMS personnel must always act as the restrained patient's advocate
10. Restraints should be individualized and afford as much dignity as possible
11. Restraints should be humanely and professionally administered. Explain to the patient why you are using restraints, but DO NOT negotiate
12. Emphasize the therapeutic reasons for the restraints
13. Allow the patient the opportunity to cooperate.
14. Restraints should employ the least restrictive method necessary to safely care for the patient:

A. For the patient's safety and the safety of EMS personnel, at least 4-5 people should be involved in applying restraints-do not try it alone! Law enforcement involvement is suggested when possible.

15. Start with 4-point restraints with one arm above and one arm below. Never leave only one limb in restraints.
16. Make sure the patient is searched completely and remove all personal objects.
17. Documentation must include the reasons for restraint and the methods used.
18. Frequent assessment of the patient and the restraints used must be documented including circulatory, motor and sensory status of the restrained extremity.
19. Restraining a patient's hands and feet together behind the patient (hog-tying) is not allowed.
20. EMS does not apply handcuffs or hard plastic ties (flex cuffs), but if already in place and circulation is adequate, may be left on.
21. Handcuffs must be double locked to prevent inadvertent tightening, and should allow one little finger to fit between the handcuff and the wrist. Assure that a key is available during transport
22. Make sure patient is properly secured during transport so they cannot escape out of a moving ambulance

ALS:

1. May use the following medications for:
   A. Anxiety
      I. **Midazolam**
         a. Adult: 0.5- 1mg IM/IV/IN
         b. Pediatric: 0.01mg/kg IM/IV/IN

   B. Irritable and boisterous
      I. **Midazolam**
         a. Adult: 5 mg IM/IV/IN
         b. Pediatric: 0.1mg/kg IM/IV/IN
      II. **Haldol** (Adults Only)
         a. Adult: 5mg

   C. Verbally threatening
      I. Pediatric:
         a. **Ketamine:** 1-2mg/kg IM. Max dose of 250mg

      II. Adult: **B-55** (same Syringe) IM dose only (Adults only)
         a. Benadryl, 50 mg
         b. Haldol, 5 mg
         c. Versed, 5 mg

   D. Physically threatening or attacking people
      I. **Ketamine**

a. Adults: 250mg IM
b. Pediatric: 5mg/kg

2. Notify ED staff that meds have been given. Once patient calms down, these medications can have a strong effect and cause respiratory failure.

Restraint Protocol

Restraint Use

PURPOSE:

To provide guidance and criteria for the use of physical restraint of patients during care and transport.

DEFINITION:

Any mechanism used to physically confine a patient. This includes, but is not limited to: soft composite dressing, tape, leathers or hand cuffs wrapped and secured at the wrist and/or ankles and/or chest or lower extremities.

POLICY / PROCEDURE

A. If EMS personnel judge it necessary to restrain a patient to protect him/her self from injury, or to protect others (bystanders or EMS personnel) from injury:

   1. Document the events leading up to the need for restraint use in the patient record.
   2. Document the method of restraint and the position of restraint in the patient record.
   3. Document the reason for restraining the patient.
   4. In the event that the patient spits, the rescuer may place over the patient's mouth and nose a surgical mask or an oxygen mask that is connected to high flow oxygen.

B. Inform patient of the reason for restraint.

C. Restrain patients in a manner that does not impair circulation or cause choking or aspiration. **DO NOT restrain patients in the prone position (face down)**. Prone restraint has the potential to impair the patient's ability to breathe adequately. Police officers are trained in restraining violent individuals safely. Utilize the police on the scene in deciding the appropriate restraint technique to maximize the safety of the rescuers and the patient.

D. As soon as possible, attempt to remove any potentially dangerous items (belts, shoes, sharp objects, weapons) prior to restraint. Any weapons or contraband (drugs, drug paraphernalia) shall be turned over to a Law Enforcement Officer.

E. Assess the patient's circulation (checking pulses in the feet and wrists) every 5-10 minutes while the patient is restrained. If circulation is impaired, adjust or loosen restraints as needed. Document the presence of pulses in each extremity and the patient's ability to breathe after restraint is accomplished. Be prepared to turn the patient to facilitate clearance of the airway while also having suction devices readily available.

F. Inform hospital personnel who assume responsibility for the patient's care at the hospital of the reason for restraining the patient.

G. The EMT at his discretion may request that law enforcement accompany and or follow the patient to the hospital. **Any patient restrained in handcuffs shall have law enforcement accompany the patient in the patient compartment or follow the ambulance.**

Child Birth

Indications:

- Pregnant women who are in labor or potentially in labor including contraction or possible ruptured membranes

Precautions:

1. Take appropriate infection control precautions.
2. If pre-term labor, consider transporting immediately to nearest facility.
3. Notify medical control early if complications so hospital can be notified.

BLS:

1. Child birth:
    A. Provide General patient care
    B. Determine if patient is in active labor by the following:
        I. Contractions every 5 minutes that last at least for minute at a time and has been occurring for the past 1 hour
    C. Determine past history from the patient:
        I. Other child births (may indicate a quicker delivery than to be expected)
        II. Complications with previous/ current pregnancy (may initiate transport if complications arise)
    D. Assess contraction length from beginning to end
    E. Assess time between contractions by measuring from start of one to start of another
    F. Place pt. in comfortable position
    G. During contraction, assess for perineal bulging, crowning, or prolapsed cord
    H. If delivery is not eminent, transport should be initiated.
    I. If delivery is imminent, prepare OB kit for delivery. If transporting at this point, pull over and deliver child
    J. Request for more assistance.
    K. When head appears, check for nuchal cord and unwrap the cord in needed
    L. While supporting the head, deliver the anterior shoulder by gently pulling down
    M. Deliver the posterior shoulder.
    N. Allow the remainder of the body to deliver naturally. **Note time of birth.**
    O. Stimulate respirations while drying, then wrap infant, and cover head ASAP
    P. If in respiratory distress, suction nose and avoid suctioning mouth.
    Q. Wrap the child in a blanket to keep warm
    R. Once the cord has stopped pulsating, Apply two cord clamps one inch apart approximately 6 inches away from child's abdominal area.
    S. Give child to mother for skin to skin contact. Cover both mom and baby with blanket to keep warm.
    T. Assess APGAR and record after 1 min and 5 min.
    U. Assist in delivery of placenta and retain in plastic bag
    V. Massage uterus upward to stimulate contractions and control bleeding
    W. Start IV NS and administer 500-1,000 cc fluid challenge if excessive prenatal or postpartum bleeding
2. If vaginal bleeding or limb is noted, **transport immediately** to the nearest facility
3. If prolapse cord
    A. Insert gloved hand and manipulate presenting part anteriorly to minimize cord compression

   B. Position patient in left recumbent position
4. If infant is deliver prior to EMS arrival
   A. Obtain Initial AGAR score
   B. Provide appropriate resuscitation
   C. Secure infant in proper restraint device (car seat EMS child seat) and transport to closest receiving facility.

ALS:
In addition to above and as appropriate:
1. Support neonate with airway as indicated.

A score is given for each sign at one minute and five minutes after the birth. If there are problems with the baby, an additional score is given at 10 minutes. A score of 7-10 is considered normal, while 4-7 might require some resuscitative measures, and a baby with APGAR score of 3 and below requires immediate resuscitation.

	Sign	0 Points	1 Point	2 Points
A	Activity (Muscle Tone)	Absent	Arms and Legs Flexed	Active Movement
P	Pulse	Absent	Below 100 bpm	Above 100 bpm
G	Grimace (Reflex Irritability)	No Response	Grimace	Sneeze, cough, pulls away
A	Appearance (Skin Color)	Blue-gray, pale all over	Normal, except for extremities	Normal over entire body
R	Respiration	Absent	Slow, irregular	Good, crying

Hypoglycemia

Indications:

- Patient with a blood glucose reading less than 70mg/ml with an altered level of consciousness.

Exclusion

- Patients who are hyperglycemic

BLS:

1. Provide general patient care
2. Follow airway management protocol is needed.
3. Asses blood glucose reading if below 70 mg/dl administer the following:
    A. Conscious:
        I. 1 tube of oral glucose, May repeat once if needed or
        II. Food containing glucose
    B. Unconscious: (unable to protect their own airway)
        I. Glucagon
            a. Adult: 1mg IM (or 2mg IN)
            b. (ALS) Pediatric: 0.1mg/kg (or 0.2mg/kg IN)
4. Reassess blood sugar
5. If patient Is refusing transport, follow refusal or transport protocol

ALS

1. Patient has significant altered mental status ALS providers may bypass glucagon and administer:
    A. Pediatric
        I. Less than 9kg
            a. **Dextrose 10%** 0.5g/kg (5ml/kg) or
            b. **Dextrose 50%** 0.5-1g/kg, mixed with 25ml of normal saline
        II. Greater than 9kg
            a. **Dextrose 10%**: 0.5g/kg (5ml/kg) or
            b. **Dextrose 50%**:0.5-1g.kg mixed with 50ml normal saline
        III. If IV access cannot be obtained, administer Glucagon 0.1mg/kg IM, Max 1mg
        IV. If Glucagon is not effective Dextrose may be administered via IO, but must be transferred higher level of care.
    B. Adult
        I. 1st dose: 100ml Dextrose 10%IV/IO bolus
        II. 2nd dose: 100ml Dextrose 10% IV/IO bolus (if needed)
        III. 3rd dose: 50ml Dextrose 10% IV/IO Bolus (if needed)
        IV. May be re-dosed every 2 min until mental status and glucose level is back to normal limits
        V. If Dextrose 10% is not available:
            a. Dextrose 50% 50ml IV/IO bolus every 5 minutes until glucose and mental status is baseline
        VI. If IV access cannot be obtained administer:
            a. Glucagon 1mg
2. Continually re-assed blood sugar
3. If blood glucose level is baseline for patient but patient mental status has not improved move to CVA or altered mental status protocol.
4. If patient is refusing transport, refer to refusal protocol.

Hyperglycemia Protocol

Indications:

- Patient with a blood glucose level above 400mg/dl with or without diabetic history.

BLS:

1. Provide General Patient Care
2. Obtain blood glucose reading
3. Attempt to determine cause of hyperglycemia
    A. Known diabetic with an infection
    B. Missed or inadequate insulin or glucose control medication
    C. Dehydration
4. Obtain vascular access
5. Administer normal saline IV/IO
    A. Pediatric: 20ml/kg
    B. Adult-14-65 Y/O: 500ml
    C. Adult-Greater than 65 or history of CHF: 250ml
6. If patient has altered mental status perform stroke scale on patient, treat according to CVA protocol if needed
7. Obtain 12 lead ECG

ALS:

1. Apply noninvasive ETCO2
2. If patient is hypotensive, may administer another bolus according to the age groups above
3. Interpret 12 lead ECG for possible hyperkalemia

Heat Emergencies/ Heat Stroke

Indications:

- Patients experiencing mild signs of heat exposure including:
  - heat cramps
  - dizziness
  - headache
  - tachypnea
  - tachycardia
  - orthostatic hypotension
  - profuse sweating
  - cold clammy skin
  - dizziness or fainting
- Or other signs of dehydration after being exposed to a hot and/or humid environment.

Exclusions:

- Patients demonstrating elevated temp and altered mental status due to an infectious disease
- Patient with febrile seizure
- Patients with behavioral emergencies

BLS:

1. Provide general patient care
2. Remove patient from environment
3. Provide oral fluids if possible
4. If patient is experiencing moderate signs of dehydration
   A. Apply cold pack to groin and neck area
   B. Obtain vascular access
   C. Administer:
      I. **Normal Saline**
         a. Bolus at 20ml/kg
5. Preform stroke scale assessment and follow CVA protocol if needed
6. Avoid rapidly cooling patient.
7. Obtain blood glucose level (Hypoglycemia may mimic heat stroke symptoms)
   A. Treat per Hypoglycemia protocol is needed.

ALS:

1. If unable to tolerate oral fluids
   A. May administer antiemetic's according to the Nausea, Vomiting, Diarrhea and Dehydration Protocol.
2. Obtain and interpret 12 lead ECG
3. Treat seizures per protocol if needed

Nausea/Vomiting/Diarrhea/ Dehydration Protocol

Indications:

- Moderate to severe nausea and vomiting
- Prophylaxis to prevent nausea/vomiting due to motion sickness or other condition
- Loss of fluid without adequate replacement and with signs of dehydration

BLS:

1. Follow General Patient Care Protocol.
2. Access ABC's
3. If patient present with moderate to severe nausea and/or vomit with loss of fluid including:
    A. Poor skin tugor
    B. Dried mucus membranes
    C. Tachycardia
    D. Delayed capillary refill
    E. Obtain vascular access and administer:
        I. Normal Saline
            a. Adult:
                i. If history of CHF, administer 250 ml of normal saline at a wide open rate
                ii. If NO history of CHF, administer 500ml bolus of normal saline
                iii. Asses lung sounds during and after fluid bolus
            b. Pediatric:
                i. Administer 20ml/kg IV Bolus
                ii. May repeat to a max of 40ml/kg
4. If patient has nausea, treat with inhalation of isopropyl alcohol pad.
    A. Place pad below patients nose and encourage them to breathe deeply through their nose
    B. May repeat as needed
5. Assess blood sugar and treat according to Hypoglycemia and Hyperglycemia/DKA protocol.

ALS:

1. For moderate/nausea/vomiting, administer one of the following
    A. **Ondansetron PO oral dissolving tablets** (if available)
        I. Adult: 4mg (one full tablet)

2. For moderate to Severe nausea/ vomiting, may administer:

    A. **Ondansetron**
        I. Adult: 4mg IV/IO/IM, repeat every 10 min as needed
            a. Max dose of 8 mg

    B. **Diphenhydramine (May give if Ondansetron is not effective)**
        I. Adult: 25-50mg IV/IO/IM
        II. Pediatric: 0.5-2mg/kg IM/IV/IO
        III. Max dose of 50 mg

    C. Midazolam (may give if Diphenhydramine is not effective)
        I. 0.5-2mg IV/IO/IM (adults only)
            a. Caution when using after diphenhydramine due to the additive sedative effect.

Opioid Overdose Protocol

Indications:

- Patient with physical finding suggestive of opioid toxicity: including constricted pupils, altered mental status, decreased respirations, hypotension, and/or unconscious.
- Patient with altered mental status with an intentional or unintentional exposure to opioids

BLS

1. Provide General Patient Care
2. Asses blood sugar reading, treat hypoglycemia protocol if needed
3. If oxygen saturations are at or above 93%, continue to provide noninvasive airway support and transport.
4. If airway cannot be maintained and/or oxygen saturations get below 93% administer:
    - **A. Naloxone:**
        - I. Adult: 2mg IN/IM
5. If airway and oxygen interventions do not improve consider placing a supraglottic airway
6. Obtain vital signs, ECG, and ETCO2 monitoring.
7. Obtain vascular access and may administer normal saline.

ALS:

1. Consider using smaller doses of
    - **A. Naloxone**
        - I. 0.5mg IN/IM/IV/IO
        - II. Re-dose every 2 min until respirations and oxygen saturations increase
        - III. (ALS)Pediatric: 0.1mg/kg IN/IM (max dose of 2mg)

2. Consider alternative causes of respiratory distress, apnea, and/or altered mental status.

Other poisonings / Overdose

Indications:

- Patient with altered mental status or loss of consciousness after being exposed to a substance, medication or poison, (unintentional or intentional)

BLS

1. If the ingested substance poses a hazard or potential risk of contaminating EMS personnel, vehicles, or the receiving facility DO NOT transport the material with the patient
2. Consider decontamination
3. Provide general patient care
4. If possible, identify substance and amount ingested or otherwise exposed to. Collect any empty bottles/containers and transport with the patient
5. If suspected Opioid overdose, follow Opioid overdose protocol
6. Obtain blood sugar reading, follow hypoglycemia protocol as needed
7. Get baseline vital signs and ECG
8. Obtain vascular access and may administer
    - **A. Normal Saline**
        - I. TKO IV
9. Consider restraints if patient is becoming violent, follow restraint protocol
10. Treat seizures per seizure protocol
11. Transport

ALS:

1. Obtain and interpret 12 lead ECG if possible
2. If suspected cholinergic agent toxicity:
    - A. Administer:
        - **I. Atropine**
            - a. Pediatric: 0.05-0.1mg/kg IV/IM/IO until bronchoconstriction and dysrhythmias are controlled
            - b. Adult: 2mg IV/IM/IO until bronchoconstriction and dysrhythmias are controlled

3. If suspected magnesium sulfate overdose with significant diminished strength and reflexes of the patient
    - A. Contact medical control for orders regarding:
        - **I. Calcium Gluconate**

Seizure

Indications:

- Patient who have had, having, or suspected to have seizure like activity.

Exclusions:

- Patient with a history of seizure that has had no seizure like activity for the past 24 hours.

BLS:

1. Provide general patient care
2. Protect patient from injury from seizure activity
3. Manage airway and oxygenate according to protocol
4. Attempt to obtain history about the patient
    A. Diagnosis of seizures?
    B. Prescription for seizures? taking them appropriately?
    C. Recent trauma?
    D. Frequency of seizures?
    E. How long has it lasted?
    F. Similarity of past seizures to the most recent/ current seizure?
5. Obtain blood glucose reading
6. If trauma cannot be ruled out, consider C-Spine per protocol
7. Consider ALS intercept
8. Transport

ALS:

1. If patient is actively seizing, do not delay IV access to administer IV access
    A. No IV access, Administer:
        I. **Midazolam**
            a. 0.2mg/kg IM/IN, max of 0.5ml per nare
            b. repeat after 5 min if seizure persists

    B. IV access obtained previously, administer:
        I. **Diazepam:**
            a. Pediatric: 30days- 4 years old: 0.2-0.5mg, every 2-5min
                a. Max total dose of 5mg
            b. Pediatric: 5 years and older: 1 mg every 2-5 min
                a. Max total dose of 10mg

        Or

        II. **Midazolam**: repeat every 5 min if seizure persists
            a. 0.1mg/kg, max dose of 10mg

2. If patient continually seizes after two doses of medication, contact medical control
3. Transport

Shock

Indications:

- Patient with hypotension due to hypovolemia (traumatic or non-traumatic)
- Patient with hypotension and or signs of poor perfusion due to tension pneumothorax
- Patients with poor perfusion due to cardiogenic shock
- Patients with signs of poor perfusion due to neurological injury.

BLS

1. Provide general patient care
2. Treat and prevent any life threats
    A. Hemorrhage
        I. Use direct pressure
        II. If not successful with direct pressure, may use tourniquet to stop bleeding if applicable
3. Obtain vascular access, preferred two large bore IV's
4. Administer
    A. **Normal Saline** if:
        I. Adult: systolic is less than 90 mmHg Systolic or MAP is lower than 65
            a. Administer 500 cc bolus of normal saline
        II. Pediatric: is less than normal vital signs appropriate for age
            a. Administer 20ml/kg of normal saline to maintain a systolic blood pressure within 5-10 mmHg of normal blood pressure for the age

ALS:

1. Obstructive shock:
    A. Assess for presence of tension pneumothorax. If present, treat with needle decompression
    B. May need to perform more than once.
2. Hemorrhagic shock- treat per Hemorrhage control and resuscitation
3. Neurologic shock- if hypotension occurs with bradycardia administer:
    A. **Atropine**
        I. Adult: 1mg IV/IO
            a. Max dose of 3 mg
        II. Pediatric: 0.02mg/kg IV/IO
            a. Minimum dose of 0.1mg, Max dose of 1mg
4. Provide pain management per protocol.

Burns

Indications:

- Patients exposed to AC and DC power including household wiring, outdoor power lines (buried and overhead), portable and fixed generators, and batteries.
- Patients in open areas with unexplained unconsciousness/coma or cardiac arrest
- Thermal burns
- Chemical burns
- Electrical Burns

Exclusions:

- Patients who were not exposed to electrical current
- Patients who have been TASED
- Minor sunburns less than 1% BSA

BLS

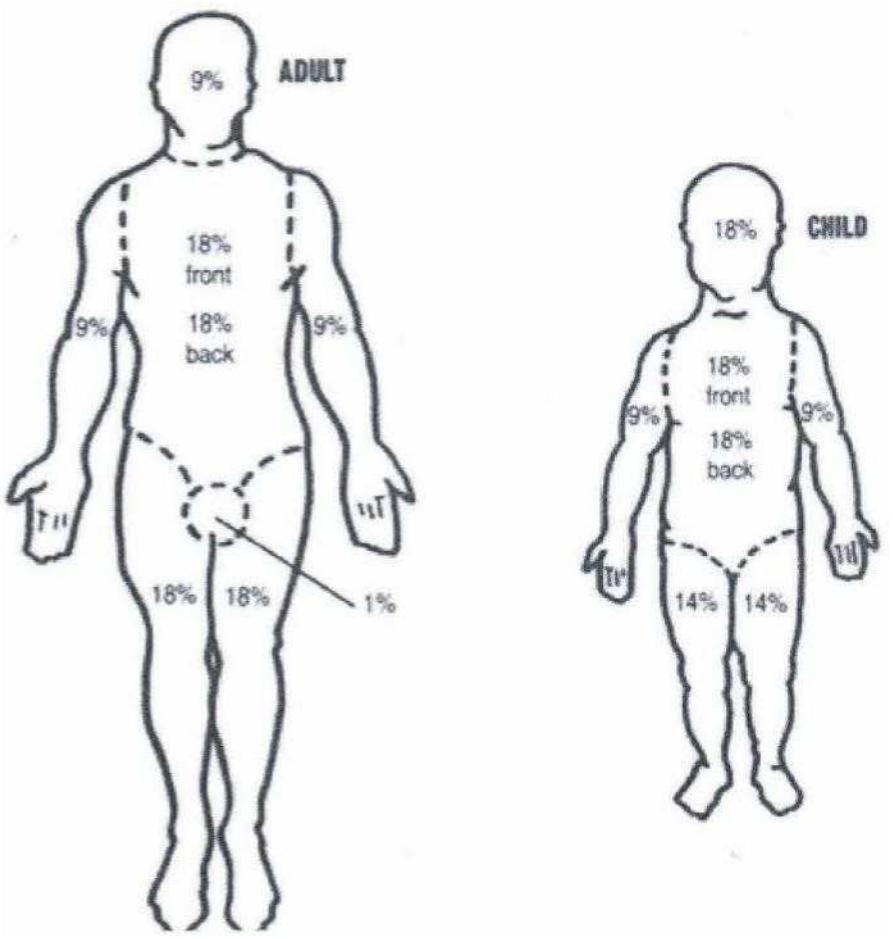
1. Provide General Patient Care
2. If multiple victims, provide reverse triage, and consider additional units
    A. Treat according to cardiac arrest protocol
    B. Use airway management protocol as indicated
3. Remove all restrictive clothing and jewelry
    A. May have to cut off jewelry
4. Thermal burns:
    A. Heat
        I. Douse with water and remove smoldering clothing
        II. Cover burns with dry sterile burn sheet
    B. Cold/Frostbite
        I. Remove from environment
        II. Determine internal temp and severity of hypothermia
            a. Mild 90-95 F
            b. Moderate 82-90 F
            c. Severe below 82 F
        III. Prevent further heat loss
5. Electrical Burn
    A. Cover burns with sterile dry burn sheet
    B. Reduce the risk of infection
6. Chemical Burns
    A. Remove contaminated clothing
    B. Provide gross decontamination (may need fire department assistance)
    C. Proper BSI must be worn when handling patients with chemical burns.
7. Calculate TBSA
    A. If greater than 20% administer 500cc bolus, warm IV fluids
8. Avoid hypothermia in patients with significant skin burns, due to the patient not being able to regulate body pressure.

ALS

1. Obtain and interpret 12 lead ECG, and treat with appropriate protocol

2. Administer:
    A. **Normal Saline**
        I. Maintenance dose: 0.25 X KG X BSA% burned
        II. Shock dose:
            a. Bolus 20ml/kg boluses as needed to
            b. Maintain a MAP of greater than 65mmhg.
3. Apply ETCO2 monitoring
4. Consider aggressive airway management if airway/inhalation burns are indicated
    A. If indicated avoid aggravation of the tissue

RULE OF NINES:



Entrapment, Entanglement, Crush Injuries, and Rhabdomyolysis

Indications:

- Patient with entrapment or entanglement (body or limb) for greater than 30 minutes.
- Patient who have been entangled in a device or object (harness) for greater than 30 minutes.
- Patient who have been entangled in a piece of machinery (PTO) for greater than 30 minutes.
- Patient who have been unable to move off a hard surface who have signs of pressure injuries.

BLS

1. Provide General Patient Care
2. Asses and treat any life threats
3. Prevent heat loss of patient
4. Place patient on cardiac monitor
5. If extremity is entrapped or entangled:
    A. Apply a tourniquet(s) proximal from the injury but *do not tighten*
        I. If tourniquet(s) cannot be placed due to lack of access, a tourniquet should be immediately available and deployed after the extremity is disentangled.
    B. Obtain vascular access (do not delay extrication to obtain)
        I. Administer:
            a. **Normal Saline**
                i. 10ml/kg during extrication
                Or
                ii. 20ml/kg if signs of shock are present.
6. Following extrication or disentanglement,
    A. Follow shock protocol
    B. Obtain 12 lead ECG

ALS

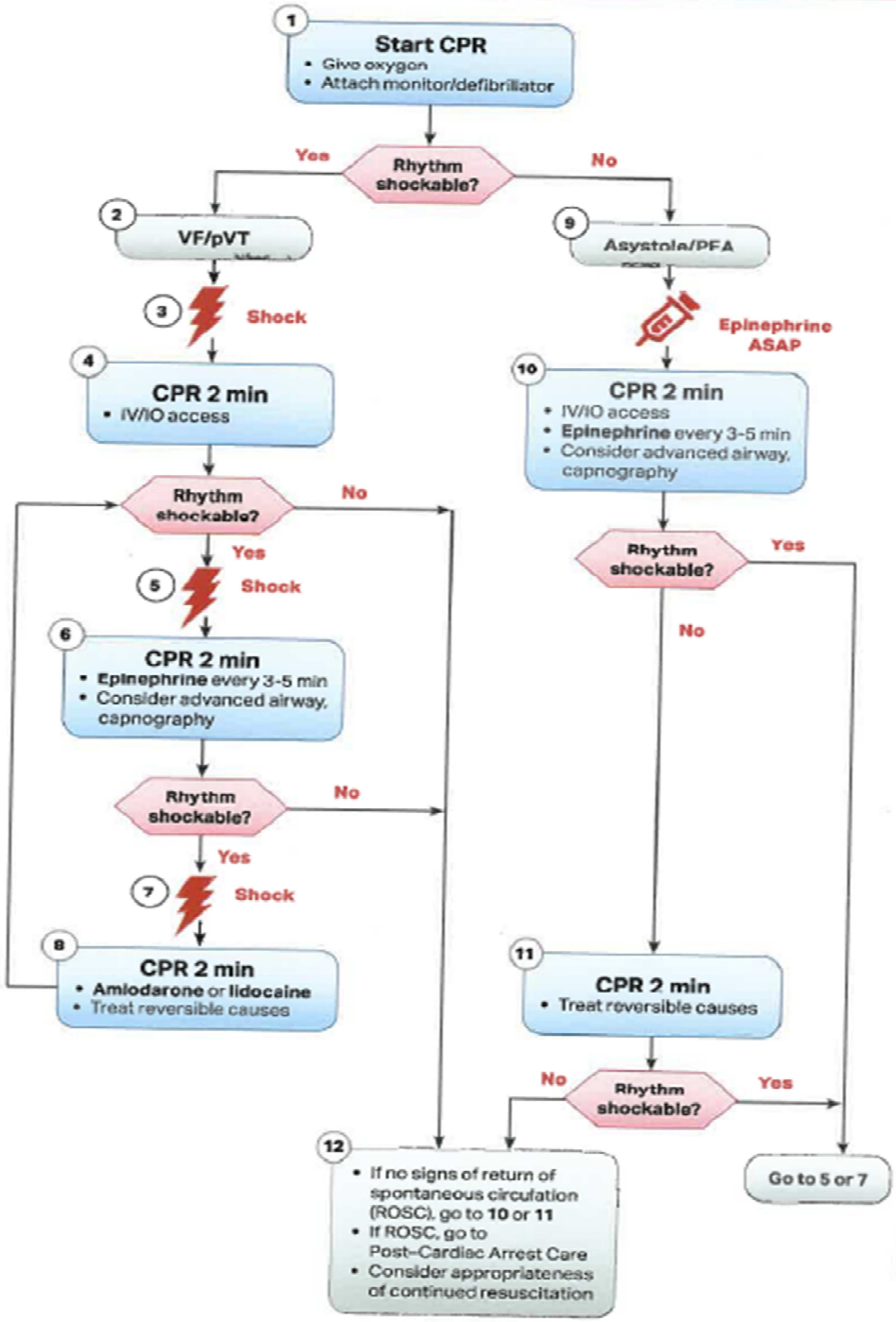
1. Provide Pain Management, and Airway Management per protocol.
2. Monitor cardiac rhythms and other signs of hyperkalemia
3. If MOI has high suspicion of hyperkalemia
    A. May administer:
        I. **Sodium bicarbonate** immediately before extrication.
            i. 2 mEq/kg
            ii. Max of 100 mEq IV/IO just prior to extrication
4. If signs of hyperkalemia are present.
    A. Administer:
        I. **Calcium chloride** (must be administered in a free flowing IV)
            I. Adult: 1g over 5 minutes
            II. Pediatric: 20mg/kg over 5 minutes

Adult Cardiology/ Arrest

Adult Cardiac Arrest Algorithm

American Heart Association.

Advanced Cardiovascular Life Support



CPR Quality

- Push hard (at least 2 inches [5 cm]) and fast (100–120/min) and allow complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Change compressor every 2 minutes, or sooner if fatigued.
- If no advanced airway, 30:2 compression-ventilation ratio.
- Quantitative waveform capnography
  - If P_{ETCO_2} is low or decreasing, reassess CPR quality.

Shock Energy for Defibrillation

- **Biphasic:** Manufacturer recommendation (eg, initial dose of 120–200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.
- **Monophasic:** 360 J

Drug Therapy

- **Epinephrine IV/IO dose:** 1 mg every 3–5 minutes
- **Amiodarone IV/IO dose:** First dose: 300 mg bolus. Second dose: 150 mg.
  or
  Lidocaine IV/IO dose: First dose: 1–1.5 mg/kg. Second dose: 0.5–0.75 mg/kg.

Advanced Airway

- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement
- Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions

Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Abrupt sustained increase in P_{ETCO_2} (typically ≥40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

Reversible Causes

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo-/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

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Adult Cardiac Arrest

Indications:

- All medical patients who suffer cardiac arrest including VF, VT, PEA, and Asystole

Exclusion

- Patients meeting termination of resuscitation protocol
- Patients who have a confirmed DNR/DNI

BLS:

1. Unwitnessed arrest, cardiac arrest prior to EMS arrival
   A. Verify pulselessness and apnea (pulse check no longer than 10 seconds)
   B. If confirmed pulseless, initiate CPR for two minutes
      I. Following current AHA guidelines
   C. Continue manual compressions while attaching defibrillator pads and placing mechanical compression device (LUCAS)
      I. Minimize interrupting chest compressions
   D. Analyze cardiac rhythm
      I. If shockable rhythm:
         a. With mechanical compressions (LUCAS)
            i. Defibrillate without stopping chest compressions
         b. With manual chest compressions
            i. Continue chest compressions while defibrillator is charging, pause to deliver shock and continue chest compressions.
      II. If no shockable rhythm, continue CPR
2. Witnessed Arrest
   A. Begin chest compressions
   B. Attach defibrillation pads and defibrillate as soon as possible
      I. Resume CPR after shock or no shock advised
3. Repeat sequence of pulse check, rhythm analyzing, and shocks every two minutes
   A. If providing manual compressions, switch out compressors every two minutes to prevent fatigue
4. Obtain blood glucose reading and treat according to protocol
5. Obtain vascular access
6. Insert supraglottic airway
7. Attach ETCO2 and/or colorimetric device to ensure air exchange
8. Once advanced airway is placed, provide continuous chest compressions.
9. Ventilate patient every 5-6 seconds (utilize ventilator timer)
10. Secured patient to a long back board and transport
11. Follow return of spontaneous circulation protocol if needed

ALS

1. If no vascular access is obtained yet, obtain.
2. In addition to the above administer:
   A. **Epinephrine** 1mg/10/ml IV/IO
      I. 1mg every 4 minutes
      II. Max total dose of 4 mg
      OR
   B. Vasopressin
      I. 40 units IV/IO repeat once in 10 minutes
3. If patient is in refractory pulseless VF/VT after initial defibrillation administer:
   A. Amiodarone

I. 300mg IV/IO
II. May repeat once at 150mg after 5 minutes
III. Max total dose of 450 mg
IV. Contraindicated in Torsade's De Pointes

OR

B. Lidocaine

I. 1-1.5mg/kg IV/IO
II. May repeat at 0.5-0.75 mg/kg every 5 minutes

4. If Torsade's De Pointes administer
   A. Magnesium Sulfate
      I. 2g IV/IO
5. If patient remains in refractory V-Fib after 3 rounds of defibrillation Administer
   A. Sodium Bicarbonate 8.4%
      I. 100mEq IV/IO to all patients being transported with refractory VF/VT

6. If it is a traumatic arrest preform bilateral needle decompression
7. Treat 6 reversible causes (H's and T's)
   - Hypovolemia
   - Hypoxia
   - Hydrogen Ions (acidosis)
   - Hypo-hyperkalemia
   - Hypothermia
   - Tension Pneumothorax
   - Cardiac Tamponade
   - Toxins
   - Thrombosis Pulmonary
   - Thrombosis Coronary

Adult Bradycardia Protocol

Indications

- Patients with symptomatic bradycardia, including heart rate less than 50 and one of the following
  - Altered mental status
  - Chest pain
  - Respiratory distress/hypoxemia
  - Evidence of CHF
  - Hypotension (systolic less than 90mmHg)

Exclusions

- Patients with asymptomatic bradycardia
- Patients with possible MI.

BLS:

1. Provide general patient care
2. Obtain ECG
3. Check blood glucose level- treat per protocol
4. Obtain vascular access
5. Consider ALS

ALS:

1. Preform and interpret 12 lead ECG
2. Consider reversible causes
3. If patient is bradycardic and has signs of poor perfusion
   A. Begin transcutaneous pacing
      I. Consider sedation using:
         a. Midazolam
            i. 0.2 mg/kg IV/IO/IN
            ii. Max dose of 10 mg
            OR
         b. Ketamine
            i. 0.5-2 mg/kg max single dose of 250 mg
            OR
         c. Fentanyl
            i. 0.5-2 mg/kg max dose of 200 mcg
   B. Pace at 70 beats per minute
   C. Start at 70 milliamps
      I. Increase milliamps until mechanical captured by the presence of a palpable carotid pulse
   D. Pace without delay on Type 2-Second Degree Heart Block and 3rd degree heart block
4. If pacing is not readily available or patient has minor signs of poor perfusion administer:
   A. Atropine
      I. 1mg IV/IO
      II. Max dose of 3mg
5. Provide pain management per protocol.

Adult Tachycardia protocol

Indications:

- Patients with unexplained or sudden tachycardia
- Patients with heart rate greater than 140bpm and one of the following:
  - Altered level of consciousness
  - Chest pain
  - Respiratory distress
  - Evidence of CHF
  - Hypotension

Exclusions:

- Patients with an identifiable cause (dehydration, pneumonia, shock, etc.)

BLS

1. Provide general patient care
2. Obtain 12 lead
3. Obtain vascular access
4. Obtain blood glucose level and treat per protocol

ALS

1. Obtain and interpret 12 lead ECG
   - A. If 12 lead indicates SVT (a narrow QRS complex less than 0.12) with no significant signs of distress perform
     - I. Vagal maneuver
       - a. Ask patient to bear down Or
       - b. Ask patient to blow into a 5cc syringe
     - II. Administer
       - **a. Normal Saline**
         - i. 20ml/kg bolus
     - III. If vagal maneuver is not successful administer:
       - **a. Adenosine**
         - i. 6mg rapid IV push
         - ii. Flush immediately after with 10 cc flush.
     - IV. If no conversion after 3 minutes, administer:
       - **a. Adenosine**
         - i. 12mg rapid IV push
         - ii. Flush immediately after with a 10 cc flush
         - iii. Repeat X1 after 3 min if no conversion
   - B. If 12 lead indicates ventricular tachycardia with no substantial signs of distress or perfusion
     - I. Administer:
       - **a. Adenosine**
         - i. 12mg rapid IV push
         - ii. Flush immediately after with a 10 cc flush
         - iii. Repeat X1
     - II. After 3 min if no conversion, administer:
       - **a. Amiodarone Infusion**
         - i. 150mg IV/IO administered over 10 minutes
         - ii. Single dose only
   - C. If 12 lead indicates SVT, ventricular tachycardia or undifferentiated tachycardia rhythm, with a rate greater than 140 and poor signs of perfusion:
     - I. Prepare for synchronized cardioversion

a. Apply ETC02 monitoring
    i. Consider sedation with:
        1.Midazolam
            1) 0.2mg/kg IV/IO/IN
            2) Max dose of 10mg
            OR
        2.Ketamine
            1) 0.5- 2mg/kg IV/IO/IM
            2) Max dose of 250mg
            OR
        3.Fentanyl
            1) 1-2mcg/kg
            2) Max dose of 200 mcg
b. Preform cardioversion
    i. SVT
        1.50-100J escalate subsequent doses as needed
    ii. VTach
        1.100J escalate subsequent doses as needed

D. If Torsade's D Pointes is indicated, administer:
    I. **Magnesium Sulfate**
        a. 2gIV/IO
E. If 12 lead indicates atrial fibrillation contact medical control if causing poor perfusion and signs of distress

Pediatric Cardiology/ Arrest

Pediatric Cardiac Arrest

Indications:

- All pediatric patients who suffer cardiac arrest including VF, VT, PEA, and Asystole.

Exclusion

- Patients less than 29 days old, see neonatal resuscitation.
- Patients meeting termination of resuscitation protocol.

BLS:

1. Unwitnessed arrest, cardiac arrest prior to EMS arrival
   A. Verify pulselessness and apnea (pulse check no longer than 10 seconds)
   B. If confirmed pulselessness, Initiate CPR at a rate of 100-120 compressions per minute
      I. 30:2 for single rescuer
      II. 15:2 if two or more rescuers are present.
      III. Following AHA guidelines
   C. Continue manual compressions while attaching defibrillator pads and mechanical compression device
      I. Mechanical compression device (LUCAS) is contraindicated in patients 13 years and younger
      II. Minimize interrupting chest compressions
   D. Deliver 12-20 breaths per minute (1 breath every 3-5 seconds)
   E. Analyze cardiac rhythm
      I. If shockable rhythm:
         a. If VF/VT or AED indicates shock, pause manual compressions and defibrillate
            i. BLS- AED Shock
            ii. ALS- 2 J/kg
      II. If no shockable rhythm, continue CPR
2. Witnessed Arrest
   a. Begin chest compressions
   b. Attach defibrillation pads and defibrillate as soon as possible
      i. BLS- AED Shock
      ii. ALS- 2 J/kg
      iii. Adult or pediatric pads can be used in patients greater than 1 year of age
   c. Resume CPR after shock or no shock advised
3. Repeat sequence of pulse check, rhythm analyzing/ and shocks every two minutes
   a. If providing manual compressions, switch out compressors every two minutes to prevent fatigue
4. Insert supraglottic airway
5. Attach ETCO2 and or colorimetric device to ensure air exchange
6. Ventilate patient every 5-6 seconds (utilize ventilator timer)
7. Once advanced airway is placed, provide continuous chest compressions.
8. Obtain blood glucose reading and treat according to protocol
9. Obtain vascular access
10. Secured patient to a long back board and transport
11. Follow return of spontaneous circulation protocol if needed

ALS

1. If no vascular access is obtained yet, obtain.
2. In addition to the above administer:

A. Epinephrine 1mg/10ml IV/IO
   I. 0.1mg/kg every 5 minutes
   II. Max total dose is 0.3mg/kg
   OR

B. Vasopressin
   I. 0.4 units/kg IV/IO
   II. Single dose only

3. If patient is in refractory pulseless VF/VT after initial defibrillation administer:
   A. Amiodarone
      I. 5mg/kg IV/IO
      II. May repeat once at 5mg/kg after 5 minutes
      III. Max total dose of 15mg/kg
      IV. Contraindicated in Torsade's De Pointes
      OR

   B. Lidocaine
      I. 1 mg/kg IV/IO
      II. May repeat at 0.5-0.75 mg/kg every 5 minutes
4. If patient with a down time believed to be greater than 5 minutes administer:
   A. Sodium Bicarbonate 8.4%
      I. 1 mEq/kg IV/IO
5. If it is a traumatic cardiac arrest preform bilateral needle decompression
6. Treat 6 reversible causes (H's and T's)
   - Hypovolemia
   - Hypoxia
   - Hydrogen Ions (acidosis)
   - Hypo-hyperkalemia
   - Hypothermia
   - Tension Pneumothorax
   - Cardiac tamponade
   - Toxins
   - Thrombosis pulmonary
   - Thrombosis coronary

7. Transport

Pediatric Bradycardia

Indications

- All pediatric patient with symptomatic and non-symptomatic bradycardia

Exclusions

- Pediatric patients with a known history of bradycardia

BLS

1. Provide general patient care
2. Obtain ECG and apply ETCO2 monitoring
3. Check blood glucose level- treat per protocol
4. Obtain vascular access
5. Consider ALS

ALS

1. Utilize Broselow (or equivalent) for weight base measurements.
2. Preform and interpret 12 lead ECG
3. If heart rate is below 60bpm and poor system perfusion, administer:
    - **A. Epinephrine 1mg/10ml**
        - I. 0.01mg/kg IV
        - II. Repeat every 3-5minutes
    - **B. Atropine 0.02mg/kg**
        - I. repeat once to a maximum dose of 1mg
4. If no response to phrenological therapy, begin pacing
    - A. Pace at 100 beats per minute
    - B. Start at 10 milliamps
        - I. Max milliamps of 150mA
        - II. Increase milliamps until mechanical captured by the presence of a palpable carotid pulse
        - III. Pace without delay on type 2- 2nd degree and 3rd degree heart block
5. Provide pain management per protocol.
6. Consider 6 reversible causes (H's and T's)
    - Hypovolemia
    - Hypoxia
    - Hydrogen Ions (acidosis)
    - Hypo-hyperkalemia
    - Hypothermia
    - Tension Pneumothorax
    - Cardiac tamponade
    - Toxins
    - Thrombosis pulmonary
    - Thrombosis coronary
7. Transport

Pediatric Tachycardia

Indications

- All patients with unexplained or sudden onset of tachycardia
- All pediatric patients greater than 2 years of age with a heart rate greater than 180
- All pediatric patients less than two years of age with a heart rate greater that 220bpm with signs and symptoms of poor perfusion such as:
    - Altered mental status
    - Respiratory distress
    - Hypotension/shock
    - Chest pain
    - Delayed capillary refill

Exclusion

- All pediatric patients with explained cause of tachycardia secondary to a non-cardiac cause.

BLS

1. Provide general patient care
2. Place on cardiac monitor/AED
3. Obtain vascular access
4. Obtain blood glucose level and treat per protocol

ALS

1. Utilize Broselow (or equivalent) tape for weight base measurements
2. Obtain and interpret 12 lead ECG
    A. If 12 lead indicates SVT (a narrow QRS complex less than 0.12) with no significant signs of distress preform:
        I. Vagal maneuver
            a. Infants: place a cold pack over the pt's eyes and apply gentle pressure for 10-20 seconds
            b. Adolescents: Ask patient to blow into a 5cc syringe or bear down.
        II. Administer:
            a. Normal Saline
                a. 20ml/kg
                b. Once
3. If vagal maneuver or normal saline bolus is not successful contact medical control for possible adenosine administration
4. If 12 lead indicates ventricular tachycardia or unstable SVT contact medical control for cardioversion.

Return of Spontaneous Circulation (ROSC)

Indications

- Patients with an arrest presumed to be cardiac etiology that have had a return of spontaneous circulation
- Patients with an arrest who have a return of spontaneous circulations who have a GCS less than 10 or cannot follow commands
- Patients who have an invasive airway in place but have adequate or absent respirations after ROSC

Exclusions:

- Patients in a coma for other causes
- Cardiac arrest from a traumatic etiology

BLS

1. Provide general patient care
2. Provide proper airway management and oxygenation
3. If not already obtained, obtain vascular access
4. Assesses blood sugar and treat per protocol
5. Treat per shock protocol

ALS

1. Continue providing condition specific care appropriate per protocol
2. Consider maintenance of systolic blood pressure between 90-100 mm/Hg
    A. Administer:
        I. **Epinephrine infusion**
            a. 2-10 mcg/min
            b. Maximum of 20mcg/min

Medications

Adenosine

Name:	**Adenosine (ALS)**
Supplied:	6 mg/1ml & 12 mg/2ml
Adult Dose	
Tachycardia 1st dose	6mg Rapid IVP
Tachycardia 2nd dose	12 mg rapid IVP 3 min after initial dose.
Tachycardia 3rd dose	12mg Rapid IVP 3 min after seconds dose. Max total dose 30mg.
Contraindications:	**N/A**
Pediatric Dose	
Pediatric:	MD order. 0.1mg/kg IVP
Contraindications:	**N/A**
Special notes:	May decrease rate to see underlying rhythm Reduce dose if heart transplant. Flush with 10 cc flush immediately.

Albuterol Sulfate

Name:	**Albuterol (BLS & ALS)**
Supplied:	2.5 mg/3 ml solution
Adult Dosage	
Adult dose:	2.5 mg/3 ml in neb every 5 min or continuous
Contraindications:	**Heart Rate greater than 150bpm**
Pediatric Dose	
Pediatric dose:	2.5mg/3ml solution every 5 minutes
Contraindications:	**None**
Special notes	Use caution in Pts. With heart disease, HTN, DM, or elderly taking antidepressants. Beta-receptor blocking agents and Albuterol inhibit each other

Amiodarone

Name:	**Amiodarone (ALS)**
Supplied:	150mg/3ml
Adult Dose:	
Cardiac Arrest (VF/VT)	300mg every 5 minutes, Repeat once at 150mg. Max total dose 450mg
Tachycardia:	150mg Slow IV push over 10 minutes
Contraindications:	**N/A**
Pediatric Dose	
Pediatric Dose:	2.5mg/3ml solution
Contraindications:	**N/A**
Special notes	May cause bradycardia, hypotension, and new onset or worsening arrhythmia.

Aspirin

Name:	**Aspirin (BLS, ALS**
Supplied:	81 mg chewable tablets
Adult Dose:	
Suspected acute coronary Syndrome	324 mg (4- 81mg tablets)
Contraindications:	**Allergy to drug**
Pediatric Dose	
Pediatric:	None
Contraindications	**Do not give**
Special notes	May increase bleeding

Atropine

Name:	**Atropine (ALS)**
Supplied:	1 mg/10ml
Adult Dose:	
Bradycardia	0.5mg IV/IO Max dose of 3mg
Cholinergic Toxicity	2mg IV/IO/IM until dysrhythmias are subsided
Neurogenic shock	1mg IVP Max of 3 mg IV/IO
Contraindications:	**N/A**
Pediatric Dose	
Bradycardia	0.02mg/kg max dose of 1mg
Cholinergic Toxicity	0.05-.1mg/kg IV/IO/IM until dysthymias subside
Neurogenic Shock	0.02mg/kg. Minimum dose of 0.1mg- max dose of 1mg
Contraindications:	**N/A**
Special notes:	➢ Organophosphates/nerve gas may need large doses – contact MD

Calcium Chloride

Name:	**Calcium Chloride (ALS)**
Supplied:	1 G/10ml
Adult Dose:	
Hyperkalemia	1g IV/IO
Contraindications:	**N/A**
Pediatric Dose	
Hyperkalemia	20mg/kg
Contraindications:	**N/A**
Special notes:	Do nor rapidly bolus. Must infuse in a free flowing large bore IV or may cause severe necrosis.

Dextrose 10%

Name:	**Dextrose, D10 (ALS)**
Supplied:	10% dextrose 250ml
Adult Dose (hypoglycemia)	
1st adult dose:	100ml repeat every two minutes
2nd adult dose:	100ml repeat every two minutes
3rd Adult Dose	50 ml
Max Total dose 500ml	
Contraindications:	**N/A**
Pediatric Dose (hypoglycemia)	
hypoglycemia:	0.5g/kg or 5L/kg single dose
Max Pediatric Dose	➢ 500ml
Contraindication:	**N/A**
Special notes:	Dextrose is necrotic and should only be administered through a free flowing vascular sight.

Dextrose 50%

Name:	**Dextrose (D10) (ALS)**
Supplied:	50% dextrose 50ml
Adult dose:	
Hypoglycemia :	25ml. Max dose of 50g (100ml). Max dose of 50g (100ml)
Contraindication	**N/A**
Pediatric Dose: Hypoglycemia	
Less than 30 days old	0.5g/kg. Mixed with 25ml normal saline
More than 30 days old	0.5-1g/kg. Mixed with 50ml normal saline
Max Pediatric Dose	➢ 50g 100ml
Contraindication	➢ N/A
Special notes:	➢ Dextrose is necrotic and should only be administered through a free flowing vascular sight. Use only diluted 50% dextrose for pediatric patients

Dextrose, Oral

Name:	Dextrose, Oral (BLS & ALS)
Supplied:	24 gm/tube
Adult Dose	
Hypoglycemia	1 tube, repeat as necessary
Contraindications	**Inability to swallow, or protect the airway. Unconscious**
Pediatric Dose	
Less than 3 years of age	None
3 years of age or more	½ tube (12g). One time only
Contraindication	**Inability to swallow, or protect the airway. Unconscious**
Special Notes	Do not use if any risk of aspiration or vomiting exists

Diazepam

Name:	Diazepam (ALS)
Supplied:	10mg/2ml Carpuject
Adult dose	
Seizure	5-10mg IV/IO every 10-15min. Max total dose of 30mg
Contraindications:	
Pediatric Dose	
Seizure-30 days to 4 years old	0.2-0.5 mg IV. Repeat every 2-5 min. Max dose of 5mg
Seizure-5 years and older	1mg IV. Repeat every 2-5 min. Max dose of 10 mg
Contraindications	**N/A**
Special notes:	May cause respiratory depression

Diphenhydramine

Name:	Diphenhydramine, Benadryl (ALS)
Supplied:	50 mg/ 1 ml vial
Adult Dose	
Allergic Reaction, anaphylaxis, nausea and vomiting	25-50mg PO/IV/IO/IM Max total dose of 50mg
Contraindications	**N/A**
Pediatric Dose	
Allergic Reaction, anaphylaxis, nausea and vomiting	0.5-2mg/kg. Max dose of 50mg
Contraindications	**N/A**
Special notes	Do not administer PO unless patients airway is patent

Duo Neb (Ipratropium and albuterol sulfate)

Name:	**Duo neb (ALS)**
Supplied:	0.5mg ipratropium and 3mg albuterol sulfate
Adult dose:	
COPD	0.5mg/3mg one time dose via nebulizer
Asthma	0.5mg/3mg one time dose via nebulizer
Contraindications:	**N/A**
Pediatric Dose	
Asthma	0.5mg/3mg one time dose via nebulizer
Contraindications	**N/A**
Special notes	**May cause hypersensitivity reactions, angioedema, hives and anaphylaxis.**

Epinephrine auto-injector 1mg/1ml

Name:	**Epinephrine auto-injector 1mg/1ml Epi-Pen (BLS-ALS)**
Supplied:	0.3mg Auto-injector.
Adult dose:	
Anaphylaxis	0.3mg IM/SQ one time injection
Asthma	0.3mgIM/SQ One time injection
Contraindications:	**N/A**
Pediatric Dose	
Anaphylaxis	0.3mg IM/SQ. One time injection
Asthma	0.3mg IM/SQ. One time injection
Contraindications	**N/A**
Special notes	**Over dosage or inadvertent administration of large doses can cause sharp increase in blood pressure that results in cerebrovascular hemorrhage.**

Epinephrine 1mg/1ml

Name:	**Epinephrine 1mg/ml (ALS-BLS)**
Supplied:	1 mg/1ml vials
Adult Dose:	
Anaphylaxis	0.5mg IM
Asthma	0.5mg IM
Contraindications:	**N/A**
Pediatric Dose	
Anaphylaxis	**BLS**: 0.3mg IM/ SQ. one time dose **ALS**: 0.1mg/kg max of 0.3mg
Asthma	0.3mg IM/SQ
Contraindications	**N/A**
Special notes	**Over dosage or inadvertent administration of large doses can cause sharp increase in blood pressure that results in cerebrovascular hemorrhage.**

Epinephrine 0.1mg/ml

Name:	**Epinephrine 0.1mg/ml, 1mg/10ml (ALS)**
Supplied:	1 mg/10ml Luer-Jet
Adult Dose:	
Cardiac arrest	1mg IV/IO, Every 5 min. Max dose of 4 mg
Bradycardia	2-10 mcg/min via IV pump
ROSC	2-10 mcg/min via IV pump
Contraindications:	**N/A**
Pediatric Dose	
Cardiac Arrest	0.01-0.03mg/kg
Bradycardia	0.01mg/kg, Every 5 min. Titrate to effect
Contraindications	**N/A**
Special Notes	**Over dosage or inadvertent administration of large doses can cause sharp increase in blood pressure that results in cerebrovascular hemorrhage.**

Fentanyl Citrate

Name:	**Fentanyl citrate (ALS)**
Supplied:	100 mcg/2ml vials, 50mcg/1ml
Adult Dose:	
Airway management premedication	2-3 mcg/kg IN/IV/IM/IO. One time dose
Pain	1-2mcg/kg IN/IV/IM/IO - Every 5-15min as needed
Contraindications:	**N/A**
Pediatric Dose:	
Pain(1-3 years of age)	2-3mcg/kg IN/IV/IM/IO , every 5-15 min. Max total dose of 100mcg
Pain (4-13 years of age)	2-3mcg/kg IN/IV/IM/IO
Special Notes:	May cause respiratory depression, brady-arrhythmias, sedation, and vasodilation

Glucagon

Name:	**Glucagon (BLS & ALS)**
Supplied:	1 mg vial
Adult dose:	
Hypoglycemia	1mg IM. One time dose
Hypoglycemia	2mg IN. One time dose.
Contraindications:	**Allergy**
Pediatric Dose:	
Hypoglycemia	0.1mg/kg
Hypoglycemia	0.2mg/kg
Contraindication :	**Allergy**
Special notes:	Causes increase myocardial oxygen demand, use caution when given to patients with cardiac disease

Haloperidol

Name:	**Haloperidol (ALS)**
Supplied:	5 mg/1 ml vial
Adult dose:	
Behavioral emergencies	5-10mg IM. One time dose Max total dose of 10mg
Contraindications:	**Allergy**
Pediatric Dose:	
None	None
Contraindications:	**Do not use with Pediatric Patients.**
Special notes:	May cause rapid mood fluctuation. May cause prolonged QT

Hydromorphone

Name:	**Hydromorphone (Dilaudid) (ALS)**
Supplied:	1mg/ml
Adult dose:	
Pain	.25mg -2mg IM/IV/IO. Every 15 min. Max total dose of 4mg.
Contraindications:	**Allergy**
Pediatric Dose:	
Pain	0.015mg/kg IM/IV/IO/ Every 15min. Max total dose of 4mg.
Contraindications:	**Do not use with Pediatric Patients.**
Special notes:	May cause respiratory arrest, sedation, and vasodilation May cause sever hypotension if given in a bolus.

Ipratropium

Name:	**Ipratropium (ALS)**
Supplied:	0.5mg/vial
Adult dose:	
COPD	0.5mg, neb treatment. One-time dose
Asthma	0.5mg, neb treatment. One-time dose.
Contraindications:	**Allergy**
Pediatric Dose:	
Asthma	0.5mg, neb treatment. One-time dose.
Contraindications:	**Do not use with Pediatric Patients.**
Special notes:	May cause hypersensitivity reactions, Edema, hives and anaphylaxis.

Ketamine

Name:	Ketamine (ALS)
Supplied:	500mg/10ml, 50mg/ml
Adult dose:	
Analgesia	0.25mg/kg IV/IO/IN/IM. Every 5-15min. Max dose of 250mg
Excited Delirium	5mg/kg. IM. One-time dose. Max total dose of 500mg.
Sedation	0.5-2mg/kg IV/IO.IM. every 5-15min. Max total dose of 500 mg.
Contraindications:	**Allergy**
Pediatric Dose:	
Analgesia	0.25mg/kg IV/IO/IN/IM. Every 5-15min. Max dose of 250mg
Sedation	0.5-2mg/kg IV/IO.IM. every 5-15min. Max total dose of 500 mg.
Contraindications:	**Allergy**
Special notes:	Ketamine should always be diluted prior to administration with equal parts normal saline. May cause vomiting.

Lidocaine Hydrochloride

Name:	Lidocaine 2%(ALS)
Supplied:	100mg/5ml Luer-jet
Adult dose:	
Cardiac Arrest (VF/VT)	Initial single dose 1-1.5mg/kg Repeat doses at 0.5-0.75mg/kg every 5 min Max of 3 doses.
Interosseous access	0.5mg/kg IO. Single dose over 2 minutes.
Contraindications:	**N/A**
Pediatric Dose:	
Cardiac Arrest (VF/VT)	Initial single dose 1mg/kg IV/IO Repeat doses at 0.5-0.75mg/kg IV/IO every 5 min Max of 3 doses.
Interosseous Access	0.5mg/kg IO. Single dose over 2 minutes.
Contraindications:	**N/A**
Special notes:	Discontinue if signs of toxicity occur, respiratory depression, bradycardia, and hear block.

Magnesium Sulfate 50%

Name:	Magnesium Sulfate 50% (ALS)
Supplied:	5 gm/10 ml, 500mg/ml
Adult dose:	
Asthma	1-2g over 2 minutes
Torsade's De Pointes	2g over 2 minutes
Eclampsia	4g over 10 minutes
Contraindications:	**N/A**
Pediatric Dose:	
Asthma	25-100mg/kg IV/IO. Max dose of 2g.
Torsade's De Pointes	25-50mg/kg IV/IO. Max dose of 2g
Contraindications:	**N/A**
Special notes:	May lead to magnesium Toxicity with renal impairment. Check CMS in extremities

Midazolam

Name:	**Midazolam, Versed (ALS)**
Supplied:	10mg/2ml, 5mg/ml
Adult dose:	
Anxiety	0.5-1mg IM/IV every 10 minutes
Sedation	Initial dose: 2-5mg IM/IV/IN once Secondary doses: 1/2 initial dose every 10 minutes
Seizure	0.2mg/kg IN/IM (max 0.5ml per nare) 0.1mg/kg IV/IO Repeat every 5 min if seizure persists. Max total dose of 10mg.
Contraindications:	**N/A**
Pediatric Dose:	
Anxiety	0.01mg/kg IN/IM/IV. One time dose
Sedation	0.1mg/kg IV/IO/IM every 10 minutes
Seizure	0.2mg/kg IN/IM (max 0.5ml per nare) 0.1mg/kg IV/IO. May repeat every 5 minutes if seizure persists. Max dose of 10mg
Contraindications:	**N/A**
Special notes:	May cause respiratory depression, and or cardiac/ respiratory arrest. Has no Analgesic effects must be given with pain medication if treating pain.

Morphine Sulfate

Name:	**Morphine Sulfate (ALS)**
Supplied:	10 mg/1 ml
Adult dose:	
Pain management	0.1-0.2mg/kg IM/IV/IO every 15 min. Max total dose of 20mg
Contraindications:	**N/A**
Pediatric Dose:	
Pain Management	0.1-.2mg/kg. IM/IV/IO. Every 15 min. Max total dose of 20mg
Contra indications:	**N/A**
Special notes:	May cause respiratory depression and hypotension.

Naloxone Hydrochloride

Name:	**Naloxone Hydrochloride (BLS and ALS)**
Supplied:	0.4 mg/1ml, vial
Adult Dose:	
Opioid Overdose	BLS: 2mg IN. Max total dose of 2 mg. ALS: 0.5mg IV/IN/IO/IM every 2mintues. Max total dose of 4 mg.
Contraindications:	
Pediatric Dose:	
Opioid Overdose	BLS: 0.1mg/kg in. Max total dose of 2mg. ALS: 0.1mg/kg. Max total dose of 2mg.
Contraindications:	**N/A**
Special notes:	Naloxone may not outlast long acting opioids and more may have to be administered if signs keep redeveloping.

Nitroglycerin Sublingual (BLS & ALS)

Name:	**Nitroglycerin (BLS & ALS)**
Supplied:	0.4 mg tablets
Adult Dose:	
CHF/ Pulmonary Edema	BLS: 0.4mg SL. Every 5 min unless Systolic blood pressure is greater than 140mmHg ALS: Initial dose:0.8mg SL. Second dose: after 2 min 0.4mg SL. Other doses 5 min after at 0.4mg SL
Suspected Acute Coronary Syndrome	0.4mg SL, every 5 min until pain is relieved or systolic blood pressure is at or below 90mmHg
Contraindications:	**Any use of an erectile dysfunction use in the past 24 hours. Do not use**
Pediatric Dose:	
CHF/ Pulmonary Edema	0.4mg SL, every 5 minutes. Max total dose of 1.2mg (3 tablets)
Contraindications:	**Systolic blood pressure at or below 140mmHg. Do not give.**
Special notes:	Patients with poor cardiac dysfunction may cause severe hypotension.

Nitroglycerin IV(ALS)

Name:	**Nitroglycerin IV(ALS)**
Supplied:	50mg/250ml
Adult Dose:	
CHF/ Pulmonary Edema	80mcg/min IV. Titrate by 5mcg every 5-10 minutes/ or if blood pressure is at or below 120mmHg Systolic
Suspected Acute Coronary Syndrome	10mcg/min IV, titrate every 5 min until pain is relieved/ or systolic blood pressure is at or below 90mmHg
Contraindications:	**Any use of an erectile dysfunction use in the past 24 hours. Do not use**
Pediatric Dose:	
None	None
Contraindications:	**Do not use with Peds**
Special notes:	Patients with poor cardiac dysfunction may cause severe hypotension.

Ondansetron (ALS)

Name:	**Ondansetron, Zofran (ALS)**
Supplied:	4mg/2ml, 2mg/ml
Adult Dose:	
Nausea and vomiting	4mg IV/IO/IM every 15min. Max total dose of 8mg.
Contraindications:	**May cause prolonged QT**
Pediatric Dose:	
None	None
Contraindications:	**N/A**
Special notes:	Patients with poor cardiac dysfunction may cause severe hypotension.

Propofol (ALS)

Name:	**Propofol (ALS)**
Supplied:	10mg/ml Vials
Adult Dose:	
Invasive airway sedation and analgesia	Initiate 20mcg/kg/min infusion IV/IO. Titrate 5-10mcg increments every 5-10 minutes as necessary. Max dose of 80mcg/kg/min
Contraindications:	**May cause prolonged QT**
Pediatric Dose:	
Invasive airway sedation and analgesia	Initiate 20mcg/kg/min infusion IV/IO. Titrate 5-10mcg increments every 5-10 minutes as necessary. Max dose of 80mcg/kg/min
Contraindications:	**N/A**
Special notes:	Does not provide analgesic effects. May cause hypotension If used with fentanyl may cause bradycardia in pediatric patients.

Rocuronium (ALS)

Name:	**Propofol (ALS)**
Supplied:	10mg/ml Vials
Adult Dose:	
Invasive airway sedation and analgesia	1mg/kg. Max single dose of 100mg/kg Repeat every 30-45 minutes.
Contraindications:	**May cause prolonged QT**
Pediatric Dose:	
Invasive airway sedation and analgesia	1mg/kg. Max single dose of 100mg/kg Repeat every 30-45 minutes.
Contraindications:	**N/A**
Special notes:	May cause anaphylactic reactions and malignant hyperthermia Avoid using in epileptic seizures due to masking of physical signs of seizures. Does not provide sedation or analgesia. DO NOT administer without sedative or analgesia medications

Sodium Bicarbonate 8.4% (ALS)

Name:	**Sodium Bicarbonate 8.4%(ALS)**
Supplied:	8.4% 50meq/50ml
Adult dose:	
Invasive airway sedation and analgesia	Initial Dose: 0.1mg/kg IV/IO, Given once. Maintenance dose: 0.01-0.02mg/kg IV/IO Every 30-35 minutes
Contraindications:	**N/A**
Pediatric Dose:	
Invasive airway sedation and analgesia	Initial Dose: 0.1mg/kg IV/IO, Given once. Maintenance dose: 0.01-0.02mg/kg IV/IO Every 30-35 minutes
Contraindications:	**N/A**
Special notes:	Cannot be infused at the same time as Calcium chloride, calcium gluconate, or nor epinephrine.

Vecuronium (ALS)

Name:	**Vecuronium ALS)**
Supplied:	1mg/ml
Adult dose:	
Cardiac Arrest	50 mEq. Once time dose IV/IO
Entrapment	2mEq/kg. One-time dose. Max total dose of 100mEq
Anticholinergic Toxicity	1mEq/kg. Every 5 min until rhythm is stable or improves
Contraindications:	**N/A**
Pediatric Dose:	
Cardiac Arrest	1mEq/kg
Anticholinergic Toxicity	1mEq/kg. Every 5 min until rhythm is stable or improves
Contraindications:	**N/A**
Special notes:	Avoid using in epileptic seizures due to masking of physical signs of seizures. Does not provide sedation or analgesia. DO NOT administer without sedative or analgesia medications

Procedures and Equipment

Blood Glucose Testing (BLS and ALS)

Equipment:

- Blood Glucose Meter
- Test Strips
- Band-Aids
- Disposable lancets
- Alcohol wipes
- Gloves.

Procedure:

1. Grasp desired finger on either hand, near the joint closest to the fingertip
2. Insert test strip in blood glucose meter to turn on.
3. Wipe the side of desired finger off with alcohol wipe and allow to dry completely
4. Prepare and use lancet according to the manufacturer's instructions.
5. Squeeze finger to draw blood out.
6. With the glucometer and the test strip, obtain a small blood sample with the edge of the test strip, coming straight down on the blood.
7. Once blood is obtained, place band aid over top of blood.
8. Blood glucose reading should be displayed on the front screen.
9. Dispose of lancet in sharps container

Cardiac Monitoring

Equipment

- Zoll X Series Monitor/Defibrillator.
- 4 lead ECG cables
- Electrode Patches
- 12 lead ECG attachment.

Indications for use:

Suspected cardiac compromise, including chest pains, or pressure and patients with known heart problems, respiratory distress, hypotension, syncope (fainting) events, trauma, CVA, altered LOC or any patient you feel can benefit from monitoring.

PROCEDURE:

1. Turn monitor on.
2. Attach leads to electrodes and then to patient, one patch on upper right torso, on upper left torso, and lower left torso, right lower torso, Attach leads as follows:

   WHITE- UPPER RIGHT
   BLACK- UPPER LEFT
   RED- LOWER LEFT
   GREEN- LOWER RIGHT

3. White on right. Smoke over fire
4. Check ECG trace, watch and listen to monitor for messages.
5. If patient is unresponsive consider placing patient on defibrillation pads, in conjunction with 4 lead ECG.
6. Monitor patient for any changes in condition.

CARDIAC DEFIBRILLATION

Equipment

- ZOLL "X" SERIES AED
- DEFIB PADS

INDICATIONS

A cardiac arrest patient will be unresponsive to voice or vigorous touch, will be breathless and pulseless. Pulselessness is assessed by palpation of the carotid artery for 5 to 10 seconds.

CONTRAINDICATIONS:

- CHILDREN UNDER 1 YEAR OF AGE

Defibrillation must only be attempted in unconscious, non-breathing patients who present in ventricular fibrillation (V-Fib) OR Pulseless Ventricular Tachycardia (V-Tach) as confirmed by monitor.

A. Ensure scene safety and apply universal precautions
B. Verify Cardiopulmonary arrest and initiate CPR, or if in progress ensure that 2 minutes of good CPR has been done before the AED analyzes. (If crew witnesses arrest then immediately analyze.)
C. Perform CPR for 2 minutes
D. Insert oral airway and maintain open airway
E. Ventilate with a pocket mask with oxygen or BVM with oxygen.
F. Turn on AED

G. Bare patient's chest; wipe chest dry with towel or clothing, cut excessive chest hair with scissors and/or shaver to ensure good pad adhesion. Attach the DEFIB PADS according to the diagram on package. The APEX patch is applied to the lower left lateral rib cage below the left nipple. The STERNUM patch is placed on the upper right rib cage just below clavicle and to the right of the sternum. Ensure that each of the electrodes are making good contact with the patient's skin and are not covering any part of any other electrodes.
H. After 2 minutes of CPR monitor will announce to stop CPR to analyze cardiac rhythm

1. If "SHOCK ADVISED" clear patient VISUALLY CHECK HEAD TO TOE FOR ALL PERSONNEL TO BE CLEAR and press "SHOCK"

2. Continue CPR for 2 minutes

3. Press analyze after 2 minutes of CPR

4. Continue steps 1 and 2 and 3 until "NO SHOCK INDICATED" message or pulse returns.

5. Transport as soon as possible without delaying appropriate treatment options.

6. While transporting a patient:

    a. Take every precaution to ensure safety of all personnel.
    b. Allow monitor to analyze every 2 minutes.

7. Communicate all pertinent patient information to receiving medical facility.

CONTRAINDICATIONS FOR DEFIBRILLATION:

A. Conscious patients.
B. Unconscious patients not presenting in V-fib or Pulseless V-Tach.
C. Patients in pooled water or standing water.
D. When a rescuer is in direct contact with patient (touching).

SPECIAL INSTRUCTIONS

1. Only personnel who are trained will be allowed to use the AED. All personnel should have gloves on.
2. CPR should not be delayed at any time for any reason to people needing CPR. Setting up for defibrillation should occur simultaneously with CPR activities.
3. Whenever possible, the defibrillator should be placed to the side of the patient's head between the Pt and Rescuer.
5. Once the AED is applied to a patient, it should remain on the patient to allow for continued monitoring until care is transferred to the hospital staff.
6. The patient can be defibrillated if he/she is in a wet area or subjected to adverse weather conditions. However, moving the patient to a non-conductive environment is advised before defibrillation. Do not defibrillate when pt or rescuer is immersed in water or any liquid.
8. The AED should be applied to patients in cardiopulmonary arrest who have sustained trauma. This benefits the patient in whom VF cardiac arrest may have precipitated the trauma.
9. Although VF in children is rare, it does occur and these patients merit assessment. For children older than 1 year, follow the standard operating procedures. Airway clearance and maintenance should always be high priority in any pediatric arrest.
10. Patients with Automated Internal (Implanted) Defibrillators should have the AED applied and follow standard operating procedures. If the ICD is in the process of shocking a patient, allow the ICD 30-60 seconds to complete it's treatment cycle.
11. Patients with Pacemakers should not have a defibrillator pad placed over the power pack. The defibrillator pad should be placed just below power pack.
12. Patients found to have a Nitroglycerin patch or any other patch on the chest should have it removed prior to defibrillation. Remove with gloved hands.
14. Following successful defibrillation, most patients will need assisted ventilation because of diminished level of consciousness.

DOCUMENTATION OF EVENTS:

The AED does not have a voice recorder but does have a SUMMARY recorder. After each cardiac arrest event two copies of the SUMMARY report shall be printed: 1 for the hospital and 1 to be attached to the run report.

BATTERY CARE AND MAINTENANCE:

After each use of the Zoll "X" Series, the operators' checklist must be completed to ensure all maintenance has been done. The battery does not need to be changed after usage. Make sure that the power cord is plugged in and the battery charging indicator light on the front of the unit are on and that the unit is charging.

UNIT FAILURE:

If a defibrillator failure occurs take unit out of service leave note on garage whiteboard and notify EMS director of situation. The monitor is out of service.

VAGAL MANEUVERS:

Procedure:

The patient **MUST** be attached to a cardiac monitor and **MUST** have Vascular Access prior to performing the procedure.

Indication(s):

This procedure may be performed on any patient who is in:

1. Supraventricular Tachycardia with adequate perfusion.

Contraindication(s):

1. For known carotid occlusion **DO NOT DO** carotid massage.

Consideration(s):

Approved methods include:

1. Valsalva maneuver.
2. Head-down tilt with deep inspiration.
3. Having patient blow through a straw for 5 seconds.
4. Activation of the "diving reflex" by facial immersion in ice water (unless ischemic heart disease is suspected).

In infants and young children, the most effective vagal maneuver is the application of ice to the face.

Cardioversion (ALS)

Indications:

1. Unstable Tachycardia
2. Heart rate above 150 bpm

Contraindications:

1. Stable tachycardia
2. Hypothermia

Precautions:

Procedure:

1. Explain to Pt.
2. Have intubation equipment, suction, IV and arrest meds ready
3. Consider sedation per protocol
4. Turn on defibrillator and attach limb leads
5. Place Defibrillation pads anterior/posterior /on patient
6. Select appropriate energy level
    a. Adult-
        i. SVT (narrow regular complexes)- 50-100joules, escalating 2nd and subsequent shocks as needed
        ii. VTach- Wide regular complexes- 100joules, escalating 2nd and subsequent shocks.
        iii. A-Fib- 120-200joules. If onset is within 48 hours.
    b. Peds
        i. SVT (Narrow regular complexes- 0.5-1J/kg. Repeat at 2J/Kg and 4J/kg if needed
        ii. VTach- (Wide regular complexes)- 0.5-1J/kg. Repeat at 2J/Kg and 4J/kg if needed
7. Announce you are doing cardioversion and make sure everyone is clear
8. Check monitor and assess rhythm
9. Contact MD if any questions/concerns.

Special Notes:

1. Low "R" wave = adjust gain or change lead placement
2. AHA = rate usually above 150 bpm when cardioversion is used
3. A-Fib longer than 48 hours, contact MD before converting rhythm.

Transcutaneous Pacing ALS

Indications:

1. Symptomatic bradycardia
2. Symptomatic 2nd degree type II or 3rd degree block
3. Asystole
4. Slow PEA due to drug OD, acidosis or electrolyte abnormalities

Contraindications:

1. Tachycardia
2. Hypothermia

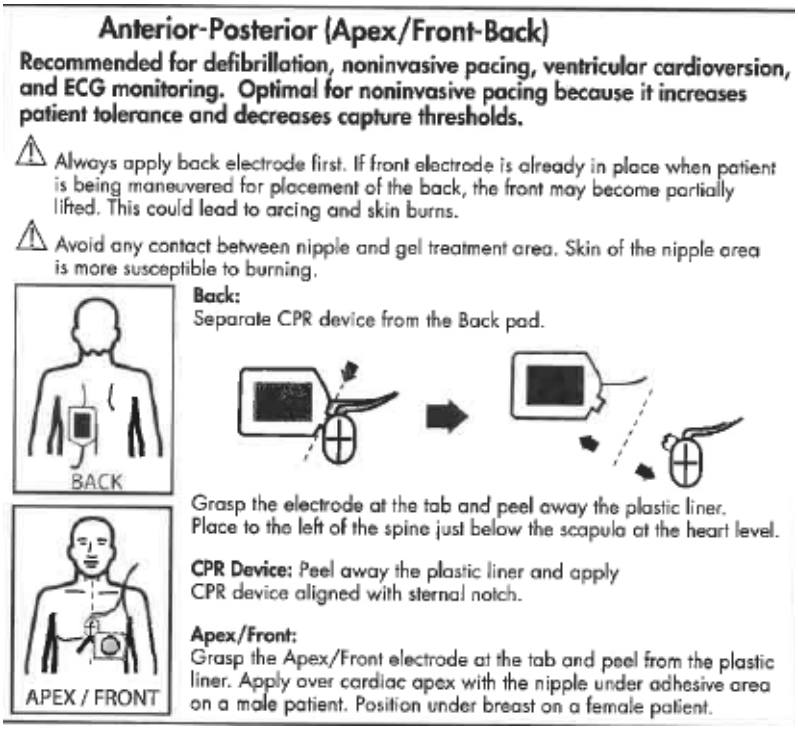
Precautions:

Procedure:

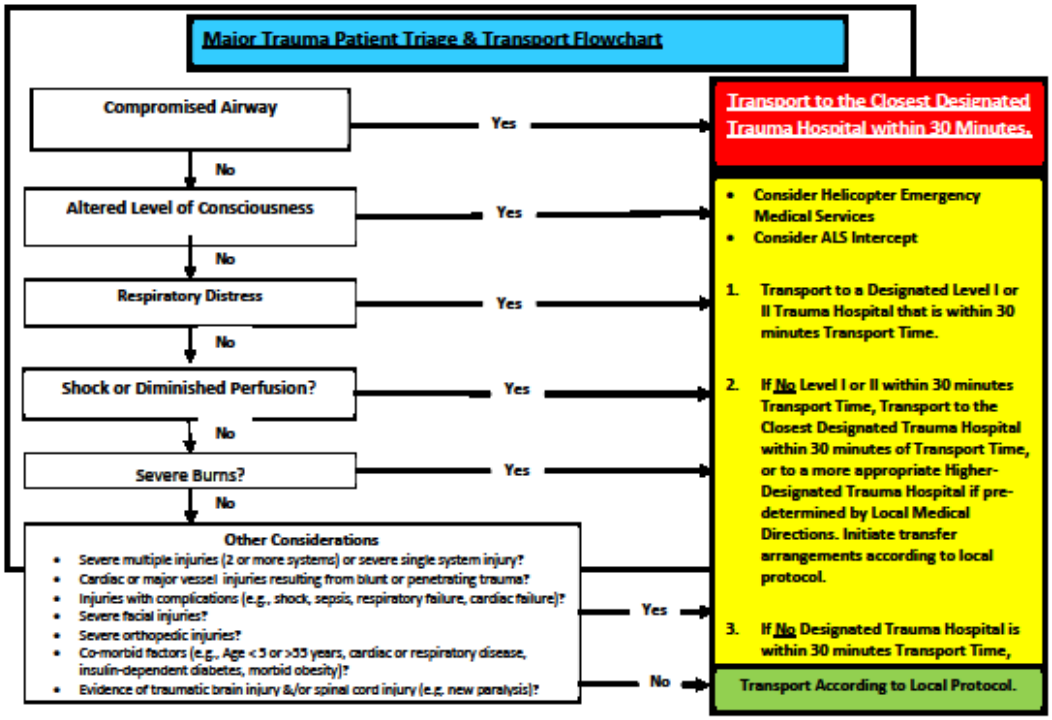
1. Place chest electrodes 4lead, and place defibrillation pads in **anterior/posterior configuration. See diagram below**
2. Consider sedation per protocol
3. Turn on pacemaker
4. Set rate at 70bpm
5. Bradycardia = slowly increase mA until electrical capture.
6. If electrical capture, ensure mechanical capture
7. If obtained – ensure mechanical capture.
8. Increase mA by 10% to ensure adequate threshold

Special Notes:

1. Ensure adequate oxygenation in children with bradycardia



Trauma/Triage Transport Guidelines



Selective Spinal Immobilization

Indications:

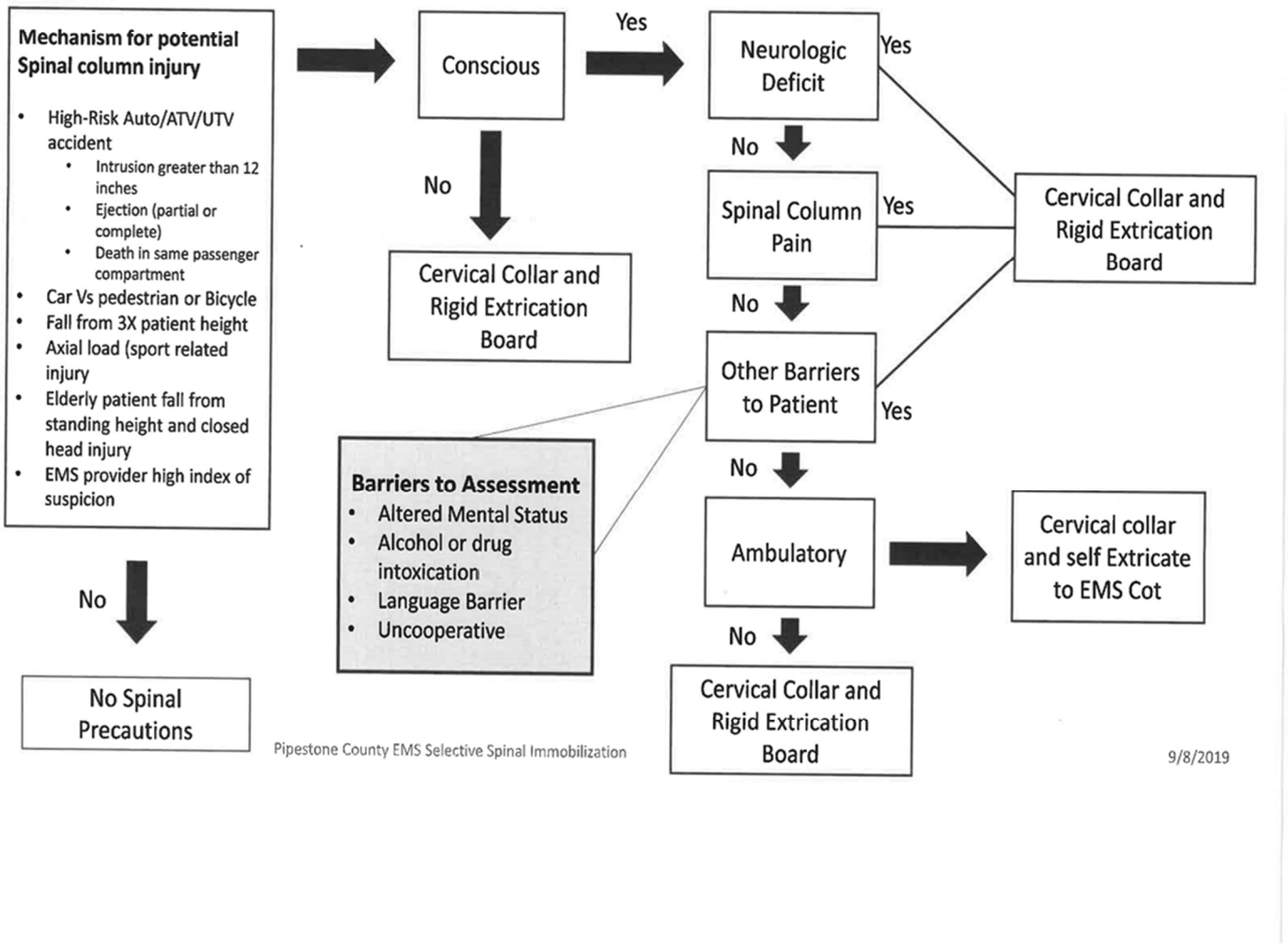
- Any Patient with a traumatic injury from s suspicious mechanism of injury that may have caused an injury to the spinal column as indicated by:
    - New Neurological deficit
    - Spinal column pain
    - Inability to ambulate
    - Preened a barrier to assess patient. (AMS, Cognitive impairment, alcohol and/or drugs, Language barrier or inability to communicate
- Suspicious mechanisms
    - High risk auto crash
        - Intrusion in any part of the vehicle greater than 12 inches
        - Ejection (partial or complete of any person in the vehicle
        - Death of occupant in either vehicle
    - Car vs pedestrian
    - Fall greater than 3x patient height
    - Axial load injury (diving, football, sports related injury)
    - Elderly patient with fall from standing height and possible closed head injury
    - EMS provider high index of suspicion.
- Patients with an acute unstable spinal column injury that have been confirmed by medical imaging.

Exclusions:

- Patients with traumatic injury without mechanism of injury acute neurologic deficit, or spinal column pain, and whom there is no barrier to assessment.
- Patients with penetrating trauma

Note Selective Spinal Immobilization flow chart:

Selective Spinal Immobilization flow chart.



SAM Pelvic Sling (BLS-ALS)

Introduction:

- SAM Pelvic Sling is a forced controlled circumferential pelvic belt
- Designed for unstable suspected pelvic fractures.
- The Sam sling has a spring tensioned belt buckle that is designed to apply a designated pressure around the pelvis.
- Is reusable.

Indications:

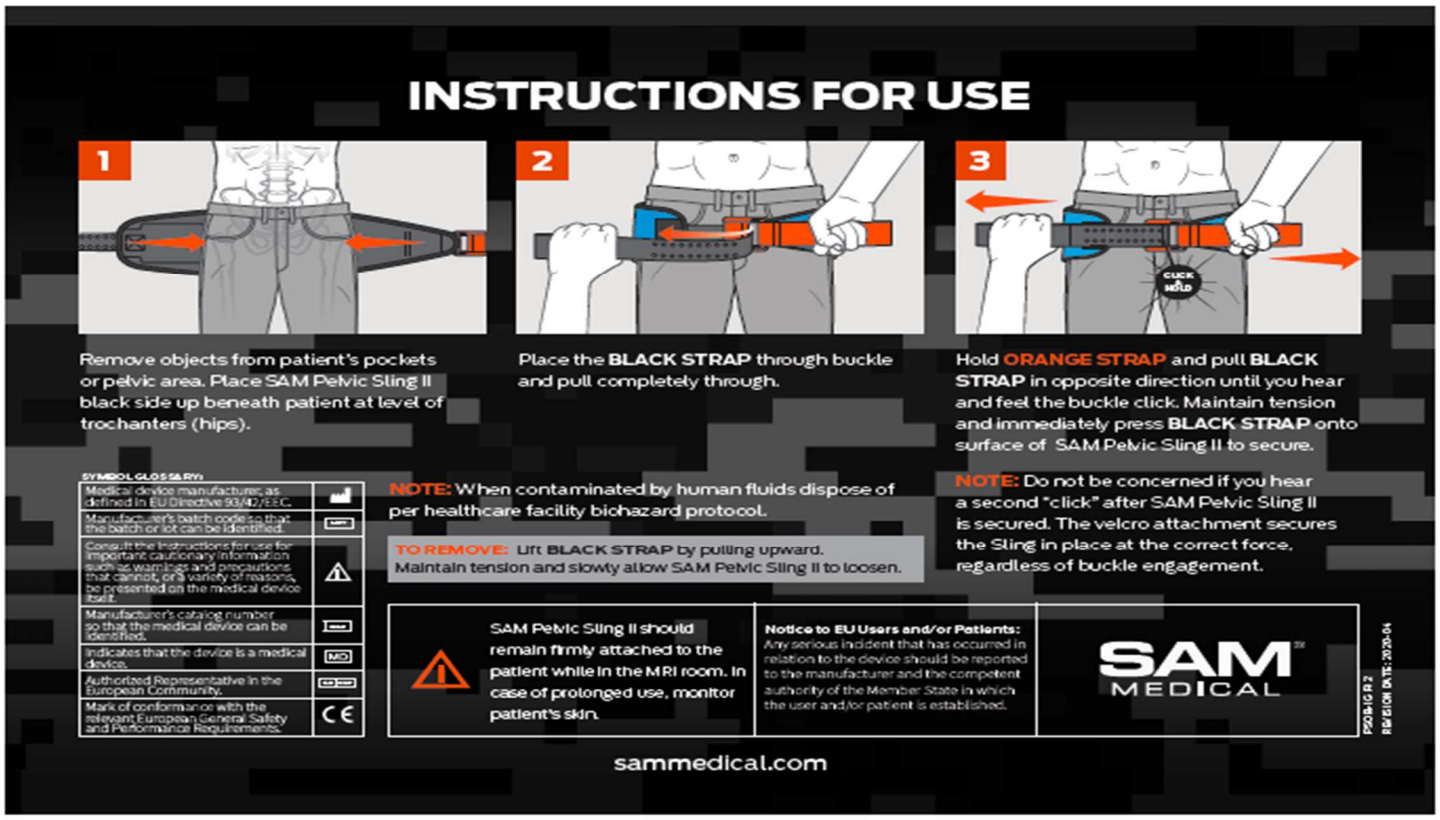
- Unstable pelvic fractures
- Specially designed for unstable open book pelvic fractures.

Procedure:

- Remove items from patients back
- Slide SAM Sling under the patient back positioned directly over the top of the patient's trochanter's (hips)
- Feed the black belt through the orange buckle on the other side of the SAM Sling.
- Pull the belt tight until you hear a "click" from the belt Buckle. The click indicates proper tension has been met.
- Once the click is heard, secured the strap to the Velcro on the SAM Sling itself.

Special Considerations:

- Cannot be used in use in hip circumference less than 32 inches and greater than 50inches.



Bolin Chest Seal (BLS- ALS)

Equipment:

- Bolin Chest seal

Indications for use:

- Sever Dyspnea with recent chest wound
- Frothy blood from wound
- Absent breath sound on affected side
- Sucking or hissing sound coming from chest wound
- Coughing up blood

Procedure:

1. Open and examine site of the wound.
2. Apply direct pressure to the wound with sterile gauze until chest seal can be performed.
3. Wipe off and remove any dirt, liquid, and or blood around the wound to provide an adequate seal with the chest seal.
4. Peel off backing to the chest seal and apply over the wound so that the valves are directly over the wound, facing away from the chest.
5. Once the seal is in place, osculate lung sounds and assess after the intervention.
6. If unable to seal chest wound due to large area being exposed attempt to cover open wound with an occlusive dressing and securing the chest wound on all 4 sides.
7. Patient may need a needle decompression.

Tourniquet (CAT Type) BLS-ALS

INTRODUCTION:

- Tourniquets have long been a source of controversy because of the problems associated with their use (ischemia, nerve injury, etc.). Recent advances in military medicine have improved the design and allowed for increased use for civilian EMS.

INDICATIONS:

- Penetrating trauma from firearms and stabbings involving severe hemorrhage
- Incidents involving blast injuries to extremities
- Incidents resulting from industrial or farm accidents involving severe hemorrhage
- Multiple causality injuries and lack of resources to handle hemorrhage control

CONTRAINDICATIONS:

- Any bleeding that can be managed by direct pressure, elevation, or cold pack administration.
- Major bleeding to a non-extremity

PROCEDURE:

- Recognition that bleeding is uncontrollable with direct pressure
- Apply tourniquet to the proximal segment of the bleeding limb
- Tighten device until bleeding is stopped and secure device
- Transport patient to trauma center and report time of placement

SPECIAL NOTE:

If transport to trauma center will be greater than 30 minutes, reassess tourniquet for possible removal

Needle Decompression ALS

Equipment: 14 gauge pneumothorax needle.

Indications:
- Tension pneumothorax.

Precautions:
1. Crepitus and/or subcutaneous air may be present with simple or tension pneumothorax
2. Always insert needle over top of rib
3. The specialized pneumothorax needle must be used for this procedure

Procedure:
1. Identity 2nd intercostal space and clean site
2. Insert needle over the top of the 3rd rib in the seconds intercostal space, at 45° angle
3. A slight give should be felt, advance further into chest until bevel clears the pleura
4. Advance catheter over the needle and then remove needle
5. Secure catheter to chest
6. May be connected to LOW suction
7. Notify receiving hospital that procedure was performed

Pediatric:
1. Children < 12 y/o use 14g. 1 ¾ needle

Special Notes:
1. Rush of air, fogging in tube or patient improvement indicate correct placement
2. Bilateral decompression may be required
3. Once needle is placed, EMS should not remove

VASCULAR ACCESS PROTOCOL (ALS-BLS)

VASCULAR ACCESS:

Vascular Access attempts should not unnecessarily delay transport: most attempts should be completed in route. All attempts are to be documented on the patient's chart.

Indication(s) Peripheral Vascular Access:

This procedure may be performed on any patient whenever there is a potential need for:

1. Intravenous drug administration.
2. Need to administer IV fluids for volume expansion.
3. IV necessary for patient condition.

Contraindication(s):

1. None

Consideration(s):

1. Saline locks may be used when appropriate and flushed with a 10 cc bolus of NS, as needed.
2. Extension tubing should be utilized on ALL IV lines.
3. Avoid arms that have dialysis shunts present.

Indication(s) Intraosseous Access:

This procedure may be performed **at the medial anterior surface of tibia** on any patient who requires IV drugs or IV fluids **AND** who is:

1. **Unconscious and unresponsive, AND**

2. **Peripheral line cannot be immediately established.**

Contraindication(s):

1. Placement in, or distal to a fractured

bone.

Consideration(s):

1. Only 1 (one) attempt is permitted per extremity.

Intravenous Infusion BLS-ALS

INDICATIONS/NORMAL SALINE 500 cc BAG:

- Bleeding or potential bleeding from traumatic or non-traumatic causes, e.g. ectopic pregnancy, GI bleed, abdominal pain
- Hypotension/dehydration from other causes, i.e. septicemia, hypothermia, anaphylaxis, spinal cord injury, protracted vomiting or diarrhea
- Burn patients with arrhythmia, hypotension, delayed transport times, or need for analgesia
- Diabetics with BS > 240 mg/dL, with signs of dehydration or when it is unclear if the situation is diabetic ketone acidosis.
- Fluid challenges
- Anticipated need for medication administration in non-hypovolemic medical conditions such as chest pain, isolated head injuries with brief LOC, confusion or amnesia, seizures, hypoglycemia, shortness of breath, drug overdose, tachycardia > 120, hypertension with systolic BP > 200 and CVAs.
- All non-traumatic pediatric patients (≤ 12 years) requiring IV.

INDICATIONS/SALINE LOCK:

- Any patient > 12 years, not requiring volume replacement or multiple medication administration.

PEDIATRIC CONSIDERATIONS:

- In the arrested or unconscious patient < 8 years, IO is the preferred vascular access route.

SPECIAL NOTES:

- Vascular access may be established prior to medical control contact.
- For penetrating, thoracic, or abdominal trauma and all trauma patients with a systolic BP < 90 or pulse > 120, attempts at IV insertion should not delay transport. Obtain IV access in route in these patients unless there is prolonged extrication.
- Distal sites, such as the hand or forearm, are preferred in non-critical patients. The antecubital and external jugular site can be used in cases where rapid cannulation is required, i.e. cardiac arrest or severe trauma.
- Hickman catheters®, peripherally inserted central catheter (PICC), implanted central venous access lines (Portacath®) and AV shunts should not be used for prehospital venous access
    - May use if already accessed by transferring facility during an ALS interfacility transports.
- Document site, type fluid, rate, needle gauge, and total volume infused.
- If IV solutions have been “setup” (tubing inserted into bag) prior to use, the date and time of the setup must be documented on the IV bag. This setup must be used within 24 hours of the time it was prepared.

CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP) BLS-ALS

Continuous Positive Airway Pressure has been shown to rapidly improve vital signs, gas exchange, reduce the work of breathing, decrease the sense of dyspnea, and decrease the need for endotracheal intubation in patients who suffer from shortness of breath from, COPD, pulmonary edema, and CHF. In patients with CHF, CPAP improves hemodynamics by reducing left ventricular preload and afterload.

Equipment:

- CPAP fixed flow generator
- Procedure pack with 10cm CPAP valve
- Appropriately sized mask
- Nebulizer kit for in line neb

INDICATIONS

A. Any patient who is in respiratory distress with signs and symptoms consistent with COPD, suspected pulmonary edema, CHF, asthma **and** who is
   1) Awake and able to follow commands
   2) Is over 12 years old and is able to fit the CPAP mask
   3) Has the ability to maintain an open airway
   4) **And** exhibits two or more of the following;
      1. A respiratory rate greater than 25 breaths per minute
      2. Use of accessory muscles during respirations

CONTRAINDICATIONS

- Patient is in respiratory/cardiac arrest, apneic
- Patient is suspected of having a pneumothorax or has suffered trauma to the chest.
- Patient has a tracheostomy
- Patient is actively vomiting or has upper GI bleeding

PROCEDURE

1. EXPLAIN THE PROCEDURE TO THE PATIENT
2. Connect CPAP mask to oxygen, set at 10 LPM
3. Place the patient on continuous pulse oximetry
4. Place the patient on cardiac monitor and record rhythm strips with vital signs
5. Place patient in sitting or semi-fowlers position
6. Place the delivery device over the mouth and nose, slowly
7. Secure the mask with provided straps or other provided devices
8. Use 5 cm H2O of PEEP valve and increase as needed from there.
9. Check for air leaks
10. Monitor and document the patient's respiratory response to treatment
11. Check and document vital signs every 5 minutes.
    a. Can administer Albuterol and or ipratropium (ALS) if needed.
12. Continue to coach patient to keep mask in place and readjust as needed
13. Contact medical control to advise them of CPAP initiation
14. If respiratory status deteriorates, remove device and consider intermittent positive pressure ventilation via BVM and/or placement of non-visualized airway.

REMOVAL PROCEDURE

A. CPAP therapy needs to be continuous and should not be removed unless the patient cannot tolerate the mask or experiences respiratory arrest or begins to vomit.

B. Intermittent positive pressure ventilation with a Bag-Valve-Mask, placement of a non-visualized airway should be considered if the patient is removed from CPAP therapy.

V. SPECIAL NOTES

A. Do not remove CPAP until hospital therapy is ready to be placed on patient.

B. Watch patient for gastric distention, which can result in vomiting.

C. Procedure may be performed on patient with Do Not Resuscitate Order.

D. Due to changes in preload and afterload of the heart during CPAP therapy, a complete set of vital signs must be obtained every 5 minutes.

E. CPAP will use the equivalent of 15 lpm of oxygen when in operation. It will be beneficial to connect the CPAP to the in ambulance oxygen connection as soon as possible from your portable tank.

Endotracheal Intubation (ALS)

Equipment:

- Proper BSI
  - Face shield, and gloves must be worn.
- Suctioning device and accessories
- Oral or nasal airways
- Bag valve mask
- Invasive end-tidal CO2.
- Colormetric (if desired)
- Back up airway (I-Gel)
- Appropriately sized ET Tube
- Stethoscope
- Magill forceps
- Bougie (if desired)
- Tube holder

Indications:

Endotracheal intubation is an advanced ALS method of airway control in the following patients:

1. Patients with a decreased level of consciousness that are not able to protect their airway and have no gag reflex present.
2. Cardiac or respiratory arrest

Precautions:

1. Should not be performed on patients with respiratory depression with a reversible cause (opioid overdose)
2. Intubation should be done with in-line stabilization in trauma victims
3. Only preform on patients who have no gag reflex
4. Good continuous compressions and ventilations should be the priority during a cardiac arrest with manageable airway. During cardiac arrest, intubation should not take place until after the second defibrillation or four minutes of high quality CPR.

Insertion Procedure:

1. Begin positive pressure ventilation with 100% oxygen and nasal/oral airway. Ventilate initially, attempting to maximize oxygen saturation, and ventilating over 1 second.
2. Direct the application of cricoid pressure and maintain until airway is secured. If the patient begins to actively vomit, cricoid pressure should be discontinued until the vomiting stops and the airway has been cleared.
3. Clear airway of foreign bodies/secretions. Have suction available.
4. Check equipment, insert stylet, and lubricate tube.
5. Place patient in sniffing position. In trauma, manually maintain in-line stabilization
6. Hold laryngoscope in left hand; insert in right side of mouth and move the tongue to the left.
7. Insert tube with right hand until proximal end of cuff lies ½" to 1" beyond cords. Manually secure the tube until it has been properly secured. Note tube depth at teeth.
8. Remove stylet and inflate cuff with 5-10 cc air.

9. Ventilate patient with 100% oxygen while assessing for stomach sounds, chest rise and lung sounds.
10. After 6-7 ventilations attach end-tidal C02 detector Colormetric and note color change (purple bad/ yellow good) or if available wave form and digital number.
11. Other indications that the tube is place correctly include.
    a. The patient's Sa02 reading and color improvement.
    b. Condensation collects inside the tube with each breath
12. A Maximum of two attempts per provider is allowed
    a. Patient should be ventilated for 2 minutes between attempts
    b. If intubation is not successful after 2 attempts, other means of airway management should be utilized including Supraglottic airway oral or nasal airway.
13. Secure tube with appropriate tube holder, again noting tube depth.
14. Position patient on backboard and immobilize head with c-collar and head blocks
15. If evidence of gastric distention, insert gastric tube:
    a. Lubricate tube
    b. Place head in neutral or slightly flexed position (non-trauma only) to facilitate passage into the esophagus.
    c. Insert gastric tube into mouth and advance to the second black line.
    d. Aspirate gastric contents with catheter tipped syringe to confirm tube placement. If no return, advance tube to third marker and make aspiration attempt.
    e. If unable to aspirate stomach contents, assess tube placement by quickly injecting about 25 cc of air while auscultating over epigastrium. If no air gurgling is heard, remove tube and reinsert.
16. Frequently reassess ET tube placement (especially when patient is moved and before entering the hospital). Use direct visualization if necessary.
17. If sedation is necessary following intubation, 1-2 mg Versed may be given slow IV/IO prior to Medical Control contact. Sedation is generally preferred prior to extubation for improved level of consciousness.
18. Gastric tube:
    - Lubricate tube
    - Place head in neutral or slightly flexed position (non-trauma only) to facilitate passage into the esophagus.
    - Insert gastric tube into mouth and advance to the second black line.
    - Aspirate gastric contents with catheter tipped syringe to confirm tube placement. If no return, advance tube to third marker and make aspiration attempt.
    - If unable to aspirate stomach contents, assess tube placement by quickly injecting about 25 cc of air while auscultating over epigastrium. If no air gurgling is heard, remove tube and reinsert.
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20. If sedation is necessary following intubation, 1-2 mg Versed may be given slow IV/IO prior to Medical Control contact. Sedation is generally preferred prior to extubation for improved level of consciousness.

Removal Procedure

1. Have suction equipment ready
2. Log roll patient to the side
3. Deflate the distal cuff. The pilot balloon should completely deflate
4. Remove ET tube during inspiration (if patient is spontaneously breathing) while suctioning the airway

Pediatric Considerations

1. Use of gastric tube in children is especially important as gastric distension can significantly compromise lung expansion.
2. For ET tubes in pediatric patients, the proper depth marking at the teeth/gums will vary from 8cm in the premature infant to 20cm in the adolescent (see weight based resuscitation tape) but is generally 3 times the tube diameter in cm. The vocal cord marker on the distal end of the tube should be present at the glottic opening to ensure that the tip of the tube is in mid-tracheal position.
3. Use the weight based resuscitation tape to estimate tube size. ET tube size may also be approximately the outside diameter of the child's little finger or 4 +age/4=tube size in children greater than 1 year.
4. The ETC02 detector should be used on patients 1-15 kg.

Special Notes

1. In the adult un-intubated patient, intubation should be attempted. The endotracheal tube is approved for ALS use while the supraglottic are all approved for both BLS and ALS use.
2. All advanced airways must be left in place if a patient is pronounced dead in the field.
3. If intubation was unsuccessful, document difficulties such as "jaws clenched" or "copious vomiting", etc.
4. Proper placement of an ET tube in and adult is approximately:
    a. Males: 23 cm at the lips and 22 cm at the teeth
    b. Females: 22 cm at the lips and 21 cm at the teeth
    c. If in doubt, 22cm at the lips should work for most adults

Tracheal Tube Inducer (Bougie) ALS

INTRODUCTION:
The tracheal tube introducer is a gum-elastic bougie (intubating bougie) that is an adjunct for difficult endotracheal intubations.

INDICATIONS:

1. For directional control during routine or difficult endotracheal intubations when the laryngeal inlet cannot be completely seen
2. May be used as a tracheal tube exchanger.

PRECAUTIONS:

1. Excessive force, passage beyond the carina, or blind introduction may result in soft tissue damage or rupture the bronchus.
2. ET tube should not be threaded over the introducer without the laryngoscope in place.

CONTRAINDICATIONS:

1. None

PROCEDURE:

1. On difficult intubations, paramedics should make at least one attempt at endotracheal intubation using the introducer prior to resorting to the supraglottic airway device.
2. A 15 French introducer should be used for ET tube sizes 6.0 to 11.0.
3. Lubricate introducer with KY jelly.
4. Perform laryngoscopy. If cords not visible, identify landmarks to aid intubation.
5. Place introducer into the pharynx and direct into larynx. If necessary, bend the introducer to negotiate the corner. Correct placement may be confirmed by detection of tracheal “clicks”.
6. Leave laryngoscope in place while assistant threads ET tube over introducer into trachea. If tube stick at laryngeal inlet, a 90° counterclockwise rotation may help.
7. Hold the tube firmly in place and gently withdraw the introducer.
8. Remove laryngoscope and confirm tube placement as usual.
9. If preferred, the ET tube may be placed over the introducer prior to intubation, instead of using stylet.

PEDIATRIC CONSIDERATIONS:

1. A 10 French introducer should be used for ET tube sizes 4.0 to 5.5. This is a recommended but optional piece of equipment for ALS services.

SPECIAL NOTES:

1. Must be stored in original container.
2. May be reused if not cracked or damaged. Clean with soap and water followed by disinfection with manufacturer recommended solution. A disposable version is available, but not recommended.

End Tidal CO2 Detection (Colormetric)BLS-ALS

INTRODUCTION:
Carbon dioxide (CO_2) is a byproduct of respiration. Approximately 5% of the exhaled air of a healthy patient is carbon dioxide. End-tidal CO_2 ($ETCO_2$) detection devices are useful in identifying the correct placement of an advanced airway (ETT, supraglottic airway). The Easy Cap CO_2 detector is a disposable chemical indicator that can be used for up to three hours. It works by detecting $ETCO_2$ on the following color scale:

- Range A (purple): < 0.5% $ETCO_2$
- Range B (tan): 0.5 - 2.0% $ETCO_2$
- Range C (yellow): > 2.0% $ETCO_2$

INDICATIONS:

1. To assist in determining correct advanced airway placement patients > 15 kg (33 lb.)

PRECAUTIONS:

1. In low perfusion states, such as cardiac arrest, the production of CO_2 is significantly diminished and therefore, dramatic color changes may not be evident. In these cases, if the detector remains purple, reassessment of other correct tube placement indicators is crucial.
2. $ETCO_2$ detectors should always be used in conjunction with other assessments such as lung sounds, chest rise, ET tube locator, absence of gastric sounds, tube fogging, pulse oximetry, syringe aspiration technique, and direct visualization (in the case of ET intubation). Never rely entirely on $ETCO_2$ detection as the sole method of assessment for tube placement.
3. A patient who has received mouth to mouth ventilation may exhibit false positive readings.
4. A patient that has recently consumed carbonated beverages may cause a false positive reading if ventilation is attempted through a tube placed in the esophagus.

PROCEDURE:

1. Perform advanced airway management per guideline.
2. Assess tube placement listening for lung sounds, gastric sounds, and looking for chest rise.
3. Place ETC02 monitoring on patient and confirm air exchange.
4. After 6 - 7 ventilations, place the Easy Cap device on the ET tube, appropriate ventilation port of the ET tube or I-Gel and continue ventilating the patient. If placement is correct, the device should change color from purple to tan (or possibly yellow) with each ventilation. A color change is a positive indication of correct tube placement.
5. The $ETCO_2$ detector should be removed after placement has been confirmed, but may be used again to reassess tube placement. This is a single patient use device.
6. Document results of $ETCO_2$ detection on run report form.

PEDIATRIC CONSIDERATIONS:

1. The Pediatric $ETCO_2$ detector should be used on pediatric patients.

SPECIAL NOTES:
1. Ensure package has not been opened and the detector is not expired.

End Tidal CO2 Monitoring (Capnography) ALS-BLS

PURPOSE

It is the purpose of this policy to ensure proper use of End Tidal CO_2 ($ETCO_2$) Monitor: to provide optimal care to all intubated patients utilizing end tidal CO_2 monitoring, to confirm correct placement of the endotracheal tube and/or measure the adequacy of ventilation and perfusion of patients utilizing ventilatory assist devices.

For non-intubated patient's, end-tidal Capnography waveform may also be monitored. A patient's ventilatory status can be monitored when the patient presents with respiratory and cardiac emergency situations.

Monitoring with Capnography will allow the providers to closely watch the patient's condition and assess treatment.

Manufacturer specific guidelines should be followed.

INDICATIONS

All patients with an advances airway in place

CONSIDERATIONS

Use the Neonatal adapter for infants at or less than 5 kg, use the Adult adapter for all others.

PROCEDURE

$EtCO_2$ monitoring in intubated patients:

- A self-test may take up to one minute to assure the display is on the screen.
- Connect the 15 mm airway adapter of the sampling sensor to the ET tube adapter. The airway adapter will allow connection of a standard ventilation device.
- Normal exhalation moisture will not affect the sampling. However, if medication is injected into the ET tube and either bronchial secretions or vomitus surrounds the sampling device due to suctioning, erroneous readings will occur. It is suggested that while performing these functions the sensor should be temporarily removed, otherwise the sensor may need to be replaced with a new sensor.
- The CO_2 module will not recognize a breath when the $EtCO_2$ value is less than 8mm Hg. However, the waveform remains valid and can be used to determine the $EtCO_2$ measurement and the presence, if any, of respiration. A strip should be printed out for the intubation record.
- When CO2 is not detected, three factors must be quickly evaluated for possible causes:

Loss of airway function:

- Improper tube placement
- Apnea

Loss of circulatory function:

- Massive PE
- Cardiac arrest
- Exsanguination

Equipment malfunction:

- ETT extubation

- ETT obstruction

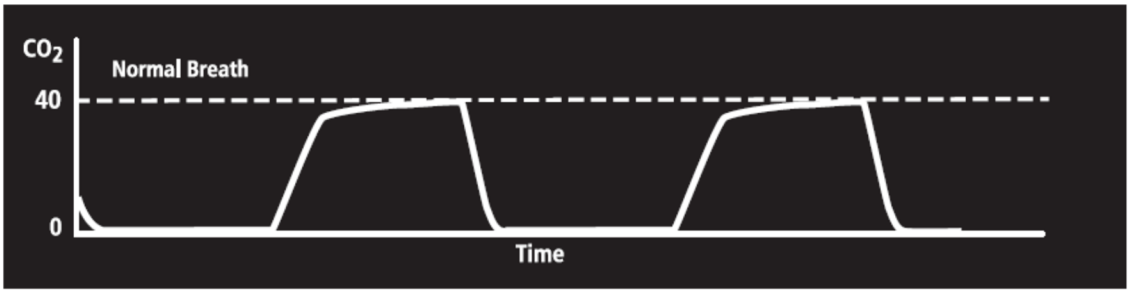
Assure the waveform is visible on the screen. The $EtCO_2$ monitoring area will display a reading from 0 to 100 mm Hg.

$EtCO_2$ monitoring in non-intubated patients:

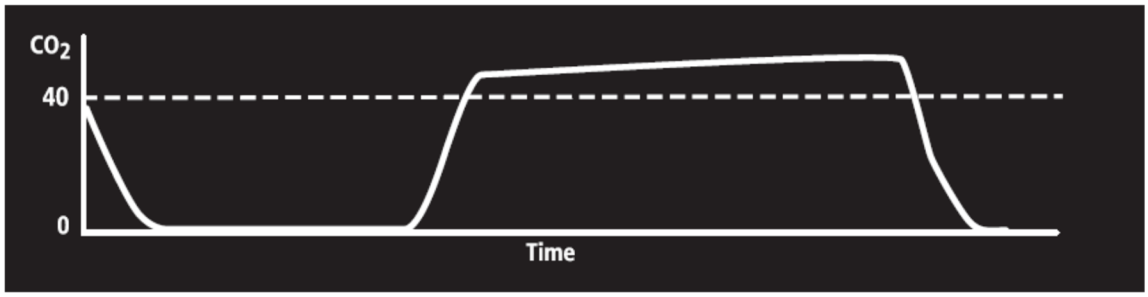
- Normal exhalation moisture will not affect the sampling.
- The CO2 module will not recognize a breath when the EtCO2 value is less than 8 mm Hg. However, the waveform remains valid and can be used to determine the $EtCO_2$ measurement and the presence, if any, of respiration.
- When CO2 is not detected, possible causes such as equipment malfunction, loss of airway function, total airway obstruction, or device malfunction may have occurred and must be quickly corrected. See the causes listed under the intubated patient section.
- Assure the waveform is visible on the screen. The EtCO2 monitoring area will display in 0 to 100 mm Hg.

Oxygen must be given by the mainstream mask at a minimum flow of 6 LPM. Oxygen is delivered from the tubing to the mask.
Look for changes in the shape and character of the waveform as well as the $EtCO_2$ level.

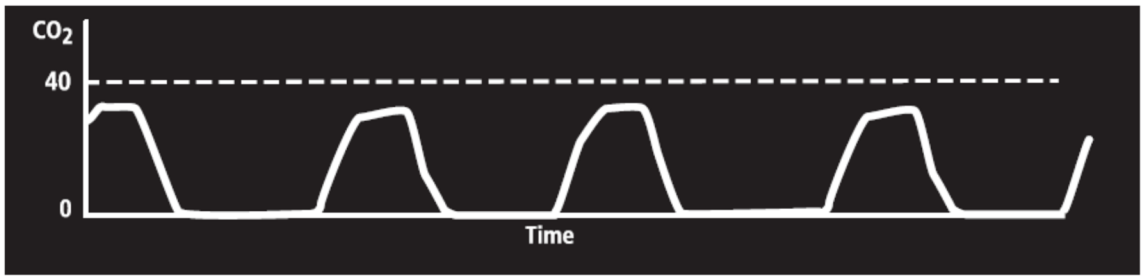
Waveform Examples:
The following are examples of EtCO2 waveforms that should be used to establish a baseline and to track the patient's over time. Proper interpretation of the waveforms can signal the need for interventions before the classic signs of distress are evident.
Normal: Square and boxlike. Same appearance as patient's with healthy lungs.



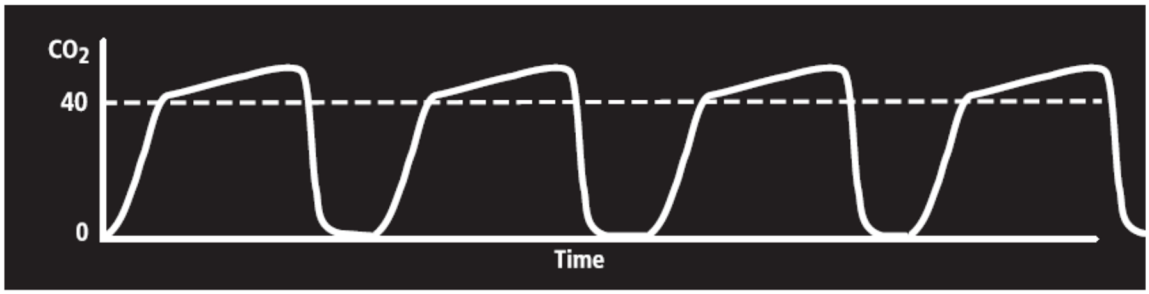
Hypoventilation: Which can be due to sedation/analgesia; drug or alcohol intoxication; postictal states; head trauma; CVA; CHF, meningitis/encephalitis.



Hyperventilation: Anxiety, panic attack, respiratory distress (well compensated)



Bronchospasm: Diagnose the presence of bronchospasm, assess the severity of asthma and COPD and gauge the response to treatment.



Hemorrhage Control Agent QuikClot

Indications:

1. Control and manage severe bleeding
2. Should be used only as an adjunct for injuries upon determination that conventional methods have been inadequate to stop bleeding.

Contraindications:

Precautions:

1. Topical use only
2. Do not use on sucking chest wounds, open brain injuries and fractures with exposed bone
3. Do not use if foil package has been opened or damaged
4. Quick Clot is not intended for IV application

Procedure:

1. Attempt to control bleeding with direct pressure to wound using sterile gauze dressing
2. If bleeding is stopped or nearly stopped after pressure, wrap and tie bandage to maintain pressure on the wound and transport
3. If moderate to severe bleeding continues after 90 seconds, hold QuikClot ACS+ and rip open packet.
4. Remove previously applied bandages and wipe away as much excess blood and liquid in wound area as possible.
5. Pack self-contained sponge into wound
6. Immediately reapply direct pressure for one to two minutes, then wrap and protect area with compression bandage
7. Transport as soon as possible
8. Be certain QuikClot ACS+ package accompanies patient to hospital so physician or medical staff can follow directions to remove QuikClot.
9. Nosebleeds: Control bleeding with direct pressure. Tear open QuikClot Nosebleed package.
10. Take out the QuikClot nosebleed gauze
11. Insert gauze into bleeding nostril. Insert until resistance is felt and not deeper than the length of the roll.
12. Pinch nostrils for 5 minutes or until bleeding stops. Gently pull out the gauze. Leave in nostril for no longer than 60 minutes. If bleeding continues, apply another gauze.

Transport patient to hospital

Intraosseous Infusion EZ-IO (BLS-ALS)

Procedure: If patient is conscious, advise of EMERGENT NEED for this procedure and obtain informed consent.

1. Wear approved BSI equipment
2. Determine EZIO AD or PD indications
3. Rule Out Contraindications
4. Locate appropriate insertion site tibia plateau or humeral head.
5. Prepare insertion site using aseptic technique
6. Prepare the EZIO driver and appropriate needle set
7. Stabilize site and insert appropriate needle set
8. Remove EZIO driver from needle set while stabilizing catheter hub
9. Remove stylet from catheter, place stylet in approved sharps container
10. Confirm placement
11. Connect primed EZ-Connect or extension set
12. **ALS: Slowly administer appropriate 40mg./2ml. of Lidocaine 2% (preservative free) IO to alert patients over 2 minutes**
13. **Allow Lidocaine to dwell in IO space 60 seconds**
14. **Syringe bolus (flush) the EZIO catheter with 2-5 ml of normal saline**
15. **Slowly administer subsequent Lidocaine (half initial dose) 1ml. over 60 seconds.**
16. **Repeat PRN**
17. Begin infusion
18. Utilize pressure (pressure bag or infusion pump for continuous infusions
19. Dress site, secure tubing and apply wrist band as directed
20. Monitor EZIO site and patient condition
21. Contact receiving hospital

Special Notes:

1. Caution with Lidocaine when only in ventricular rhythm
2. All medications, blood and blood products given IV can be given IO
3. Device may be left in for 24 hours

NIO Intraosseous Insertion (Adult)

Indications:

- Provide intraosseous access as an Alternative to IV access during emergencies for adults.

Contraindications:

- Skin infection at the site location
- Tumor at the site location
- Abnormalities of bone strength (e.g. osteogenesis imperfecta, osteopetrosis, osteoporosis)
- Osgood-Schlatter disease
- Deformation of insertion site
- Previous intraosseous insertion / failure on the same bone within last 48 h
- Previous orthopedic procedures near the insertion site
- Fracture of the bone with in the same extremity or the selected bone for insertion
- Inability to locate anatomical landmarks or excessive tissue.

Procedure:

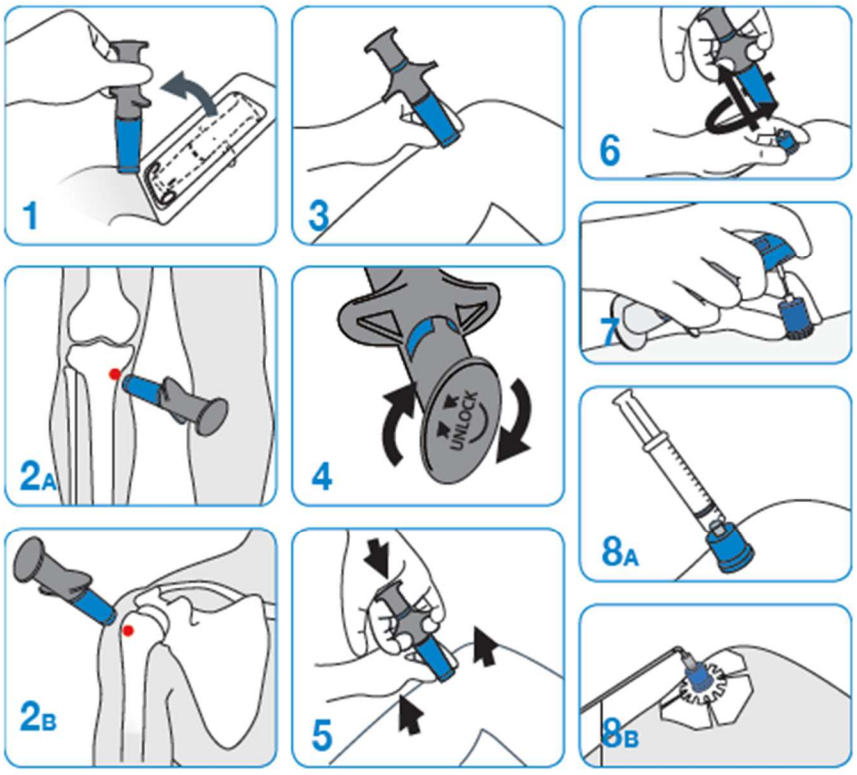
1. Open the pack and take out the NIO. Make sure that the NIO is free of all packaging parts.
2. Select one of the following injection sites:
    a. Primary site for intraosseous insertion:
        i. Proximal tibia: Approximately 1 inch or 2 cm medially and 1/2 inch or 1 cm proximally to the tibial tuberosity.
    b. Secondary site for intraosseous insertion:
        i. Humeral Head (Adults Only): Adduct the patient's hand and locate the greater tubercle next to the head of the humerus.
            1. NOTE: To prevent accidental removal of the device, immobilize patient's arm after procedure is complete.
3. Disinfect the skin on the insertion site using an alcohol prep pad or similar antiseptic. Place your non-dominant hand on the textured dots located on the lower part of the NIO and position the NIO at a 90 degrees angle to the skin at the insertion site.
    a. The non-dominant hand should maintain this position throughout this procedure.
    b. Note: This is a two-handed procedure
4. Unlock the NIO by rotating the cap 90 degrees in either direction.
5. Place the palm of your dominant hand over the cap. Press the device against the patient's skin and maintain downward pressure. While pressing down on the device, pull the trigger wings upwards. This action will activate the device.
6. Gently pull the NIO up in a rotary motion while holding the base of the needle stabilizer against the insertion site.
7. While holding the needle stabilizer and cannula in place, remove the stylet by pulling it up (use a twisting motion of the stylet if necessary). Place stylet into an appropriate biohazard container.
8. Connect a syringe and confirm secure fitting. If desired, aspirate bone marrow.

a. Always confirm successful needle placement by flushing with up to 20 cc of fluid
b. It is recommended to use the NIO Fixation sticker to affix the NIO stabilizer. Connect any standard system for infusion. Cover the insertion site with a sterile, occlusive dressing.

9. If infusing fluid via NIO site, a pressure bag or IV pump may be used to facilitate the appropriate rate of fluid.
10. Removal instruction: Remove the cannula and needle stabilizer by twisting and pulling vertically.
11. Dispose of the removed components in the appropriate biohazard container. Cover the insertion site with a sterile, occlusive, wound dressing.

NIO DESIGN:

- The NIO is a single use, semi-automatic, spring loaded IO device with dual safety features for enhanced caregiver and patient safety.
- After deployment, a unique stabilizer base firmly secures the needle in place.



NIO Intraosseous Insertion (Pediatric)

Indications:

- Provide intraosseous access as an Alternative to IV access during emergencies.
- Pediatric patients ranging from 12-9 years of age and 9-3 years of age.

Contraindications:

- Skin infection at the site location
- Tumor at the site location
- Abnormalities of bone strength (e.g. osteogenesis imperfecta, osteopetrosis, osteoporosis)
- Osgood-Schlatter disease
- Deformation of insertion site
- Previous intraosseous insertion / failure on the same bone within last 48 h
- Previous orthopedic procedures near the insertion site
- Fracture of the bone with in the same extremity or the selected bone for insertion
- Inability to locate anatomical landmarks or excessive tissue

RECOMMENDED NEEDLE PENETRATION DEPTH:

Age Proximal Tibia

Age	Proximal Tibia Needle Depth
9-12 Years of Age	18mm
3-9 Years of Age	Adjust to 14mm

Procedure:

1. Disinfect the skin at the Injection site using an antiseptic or similar wipe. Open pack and remove the NIO-P.
2. Patients 9-12: The device is ready to use. Patients 3-9: Dial the red stabilizer base until it stops.
3. Place the designated location arrow (R for patient's right leg, L for patient's left leg) on the prominent aspect of the Tibial tuberosity with the location arrows pointing upwards towards the knee and parallel to the long axis of the tibia. This aligns the device so the insertion site is medial to the Tibial tuberosity.
4. Hold the device by the textured dots and unlock it by rotating the safety cap 90° in either direction.
5. Note: Two-handed control should be maintained throughout the procedure. Place your non-dominant hand on the textured dots located on the lower part of the NIO-P and position the NIO-P 90° to the surface of the skin at the insertion site. Place the palm of your dominant hand over the safety cap and press the device against the skin. While maintaining downward pressure, pull the trigger wings upward. This action will activate the device.
6. Secure the stabilizer base against the patient and separate by lifting the device upwards.
7. Hold the red stabilizer hub in place while pulling out the trocar. The trocar removal notch on the distal end of the NIO-P can be used to assist in removing the trocar from the cannula. Place the trocar into a sharps container.

8. If indicated, aspirate bone marrow. Always confirm successful needle placement per your protocol. Note: By holding the stabilizer hub, maintain stabilizer position when connecting / disconnecting any luer lock line / syringe from cannula.
9. After confirming placement, affix the stabilizer base to the limb. It is recommended to use the NIO Fixation to affix the stabilizer base. Connect any standard infusion set. If the port is open, cover the insertion site with a sterile occlusive dressing.
10. REMOVAL INSTRUCTIONS: Remove the cannula and needle stabilizer base by pulling upward. Dispose using a biohazard container. Cover the insertion site with a sterile occlusive dressing.

NIO DESIGN:

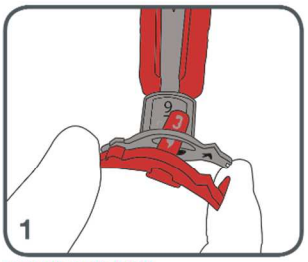
The NIO-P is an automatic, single use, spring-loaded IO device with a double safety mechanism, and location arrows for easy site identification maximizing caregiver and patient safety. Post activation, the needle stabilizer base firmly secures the needle.

RECOMMENDATIONS:

- To ensure proper penetration, use the NIO-P in accordance with the location arrow's indication.
- Follow the directed method to set penetration depth, but it is essential to correctly assess the most effective penetration depth according to body habitus.
- Reassess IO site immediately after step 8 (confirm needle placement).
- It is recommended to frequently monitor the limb every 10 minutes for the first half hour or longer after beginning of drug administration.
- Use a pressure bag for optimal infusion rates.
- Continue to monitor extremity for complications on a regular basis, especially pre and post infusion. Prior to drug administration, the needle should be verified for placement and patency by confirming its stability in the bone.

NIO™ Next Steps

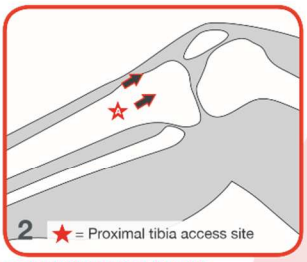
PERSYS MEDICAL
713.723.6000 • info@ps-med.com
www.ps-med.com



OPERATING THE NIO-P

1. Remove the NIO-P from its packaging. Locate and disinfect access site. Ensure penetration depth indicator correlates with patient's age. For 3-9 year olds, leave the red spacer intact. For 9-12 year olds, remove the red spacer.

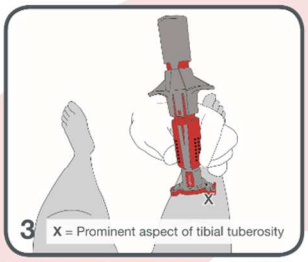
Age	Proximal Tibia
3-9 years	14mm
9-12 years	Adjust to 18mm



LOCATING THE PROXIMAL TIBIA

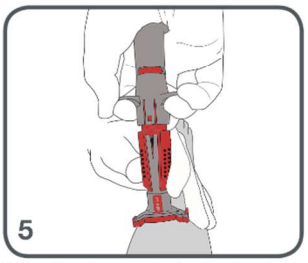
2. This device features locating arrows which aid in access site landmarking.

A. To operate, place the designated locating arrow (R for right leg, L for left leg) on the prominent aspect of the tibial tuberosity, aligned parallel to the long axis of the tibia. Locating arrows should be pointing up towards the patient's knee.

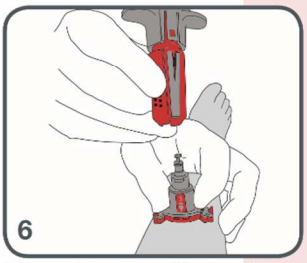


3. With your non-dominant hand, hold the NIO-P by the textured dots at a 90° angle to the access site and maintain downward pressure.

4. With the device in contact with the patient's skin, unlock the NIO-P by rotating the cap 90° in either direction until the cap aligns with the trigger wings. **Deploying the NIO-P is always a two-handed procedure.**

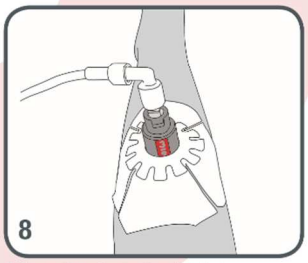


5. Place the palm of your dominant hand over the cap of the NIO-P and apply downward pressure. With your non-dominant hand, continue to stabilize the NIO-P against the patient's skin. While maintaining downward pressure with your dominant hand, use your fingers to squeeze the trigger wings. This will deploy the device.



6. Grasp and hold the red stabilizer base with your fingers and gently lift the NIO-P in an upward and rotating motion.

7. Apply the NIO Fixation dressing over the stabilizer base. Next, hold the stabilizer base firmly and remove the trocar by pulling it up with your fingers or by using the keyhole notch on the distal end of the device, leaving the cannula in the stabilizer base.



8. Connect a syringe and aspirate for bone marrow. Confirm placement by flushing with fluid per institutional protocol. To apply extension tubing with primed tubing, press luer hub down firmly and apply a quarter turn clockwise.

301700652 Rev.2 05.2020

I-Gel (BLS&ALS)

Indications:

- Cardiac arrest of any cause
- Existing or impending respiratory failure
- Inability for the patient to maintain a patent airway
- Inability to achieve endotracheal intubation after 2 attempts
- Any airway compromise requiring invasive airway management to ensure adequate oxygenation ventilation and or prevention of aspiration.

Equipment:

- Proper BSI
- Suctioning device and accessories
- Oral or nasal airways
- Bag valve mask
- Invasive end-tidal CO2.
- Colormetric (if desired)
- Appropriately sized I-Gel
- Stethoscope
- Tube holder

Procedure:

1. Apply oxygen via nasal cannula at 10lpm
2. Attach cardiac monitor, SP02, blood pressure, and ETC02
3. Consider having at least one large bore IV in place prior to placing I-Gel
4. Utilize the appropriate size I-Gel:

I-Gel Size	KG Weight	Pounds
1	**2-5kg**	**4-11lbs**
1.5	**5-12kg**	**11-26lbs**
2	**10-25kg**	**26-55lbs**
2.5	**25-35kg**	**55-77lbs**
3	**30-60kg**	**77-132lbs**
4	**60-90kg**	**132-200lbs**
5	**90kg+**	**200lbs+**

5. Lubricate all surfaces of I-Gel with water base Sterile lubricant
6. For a non-trauma patient
    a. Elevate head of patient (either cot or placing padding under shoulder of patient)
7. For traumatic patients with C-Spine precautions
    a. Attempt to elevate the patient so the head is higher in the air that the feet (only slightly as this help with the insertion of the I-Gel)
    b. Maintain a inline neutral position while insertion
8. Remove dentures or artificial teeth if they are in place
9. Suction any vomitus's, blood, secretion prior to insertion. (may need an assistant).
10. Hold I-Gel with dominant hand, while grabbing the tongue and chin of the patient
11. Slightly pull up the chin of the patient
12. Insert the distal tip of the I-Gel in following the hard pallet of the mouth (roof of the mouth)
13. Insert the I-Gel until full seated.
14. Connect BVM with ETC02 and high flow oxygen in place.
15. Auscultate epigastric sounds and lung sounds.
    a. Listening for negative epigastric sounds and bilateral lung sounds.
16. Check presence of wave form Capnography and or Colormetric changing color.
17. Secure I-Gel in place using tube holder.
18. Insert OG tube through the side opening of the I-Gel until proper size if desired.

Oximetry BLS-ALS

INTRODUCTION:
The use of pulse oximetry aids in the assessment of respiratory function in the field. The pulse oximeter allows for non-invasive monitoring of oxygen saturation (the percent of hemoglobin saturated with oxygen; referred to as SaO_2 or O_2 sat. A normal SaO_2 for healthy individuals is 95-100%. A low (≤ 93%) or falling SaO_2 indicates that the airway or ventilatory status may be compromised.

INDICATIONS:
1. Respiratory distress/complaints
2. Cardiac problems
3. Multiple system trauma
4. Poor color
5. Patients requiring use of airway adjuncts and/or assisted ventilations
6. Suspected shock
7. Altered level of consciousness

PROCEDURE FOR PATIENTS WITH SaO_2 < 90% OR FALLING SaO_2:
1. Check airway and manage as indicated.
2. Check pulse oximetry device placement. Possible causes of inaccurate readings include:
    a. Excessive probe movement
    b. Optical interference by bright light (direct sunlight, fluorescent and xenon arc lighting). Poor waveforms/signals (hypovolemia, hypothermia, profound hypotension, or vasoconstriction)
    c. Artificial fingernails and certain dark colored nail polishes may interfere with use.

PEDIATRIC CONSIDERATIONS:
1. Special probes may be required to obtain readings in pediatric patients.

PRECAUTIONS:
1. Patients with hemoglobin disorders such as CO poisoning, anemia, and methemoglobinemia may give artificially high SaO_2 readings. Readings in such patients should be interpreted with extreme caution.

Pulse oximetry readings may be difficult to obtain in states of low perfusion

SPECIAL NOTES:
1. Best probe site in adults is usually the middle fingertip with nail polish removed.
2. Attempt to obtain and document pulse oximetry readings before and during oxygen therapy.
3. The use of pulse oximetry as a vital sign is encouraged, as the oximeter may be helpful in detecting hypoxia not evidenced by signs or symptoms.

EPINEPHRINE DRIP

Concentration: 2mg/500ml NS

4 mcg/ml	
Mcg/min	**ml/hr**
1	15
2	20
3	45
4	60
5	75
6	90
7	105
8	120
9	135
10	150
11	165
12	180
13	195
14	210
15	225
Compound 2 mg in a 500ml bag of NS	

Concentration: 4mg/500ml NS or 2mg/250ml NS

8mcg/ml	
Mcg/min	**ml/hr**
1	7.5
2	15
3	22.5
4	30
5	37.5
6	45
7	52.5
8	60
9	67.5
10	75
11	82.5
12	90
13	97.5
14	105
15	112.5
Compound 4 mg in a 500ml bag of NS	

Norepinephrine (Levophed)

Concentration: 4mg/250ml D5W

Dose (mcg/min)	Rate (ml/hr)
0.5	1.9
1.5	5.6
2	7.5
2.5	9.4
3.5	13.1
4.5	16.9
5.5	20.6
6.5	24.4
7.5	28.1
8.5	31.9
9.5	35.6
10.5	39.4
11.5	43.1
12.5	46.9
13.5	50.6
14.5	54.4
16.5	61.9
17.5	65.4
18.5	69.4
19.5	73.1

Nitroglycerin Drip

NITROGLYCERIN INFUSION RATE. Can Titrate every 5 min. Systolic BP Greater than 90mmhg

Dose (mcg/min)	Rate (ml/hr)
5	3
10	6
15	9
20	12
25	15
30	18
35	21
40	24
45	27
50	30
55	33
60	36
65	39
70	42
75	45
80	48
85	51
90	54
95	57
100	60

Heparin Drip

Heparin Rate Char For only use with Heparin Concentration 100 units/ml (25,000 units/250ml)

Units/hr	Units/24hr	Ml/hr
500	12000	5
600	14400	6
700	16800	7
800	19200	8
900	21600	9
1000	2400	10
1100	26400	11
1200	2880	12
1300	31200	13
1400	33600	14
1500	36000	15
1600	38400	16
1700	40800	17
1800	43200	18
1900	45600	19
2000	48000	20