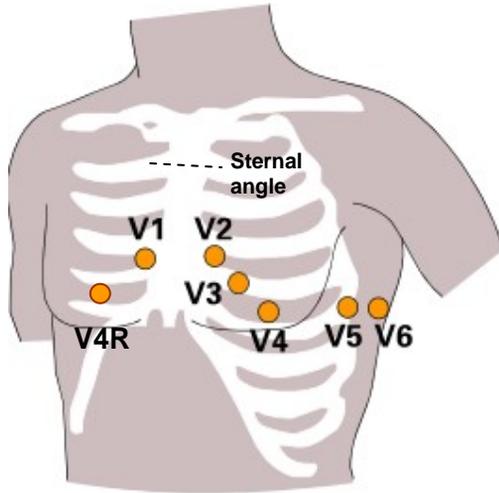


12-Lead ECG and STEMI
BLS Airway Management
Key Paramedic Procedures
Pediatric Medication Administration
Pediatric Assessment
Pediatric Vital Signs and GCS Scoring
SBAR Reporting
Spinal Immobilization
Vascular Access

PROCEDURES AND PATIENT CARE REFERENCE

12-LEAD ACQUISITION AND LEAD PLACEMENT



Limb Lead Placement:

Place limb leads on distal extremities if possible
Confirm correct lead placement for each limb
May be moved to proximal if needed (if motion artifact)

Chest Lead Placement:

To begin placement of chest leads, locate sternal angle (2nd ribs are adjacent) then count down to 4th interspace (below 4th rib)

V1 – 4th intercostal space at the right sternal border

V2 – 4th intercostal space at the left sternal border

V4 – 5th intercostal space at left midclavicular line

Note: Place V4 lead first to aid in correct placement of V3

V3 – Directly between V2 and V4

V5 – Level of V4 at left anterior axillary line

V6 – Level of V4 at left mid-axillary line

V4R – (to detect Right Ventricular Infarct) – mirrors V4 on right side of chest – move V4 lead across

- Do V4R if Inferior MI noted (elevation in II, III, avF)
- Label ECG for V4R

Note: Careful skin preparation prior to lead placement (rub with gauze or abrasive, clean skin oils with alcohol) is critical to obtaining a high-quality ECG

LOCALIZING SITE OF INFARCT

- Localization of an infarct pattern adds to the accuracy of ECG interpretation
- A STEMI will have 1 mm or more ST-segment elevation in two or more contiguous leads (which means findings noted in the same anatomical location of the infarct)
 - Contiguous leads for inferior infarction include II, III, and aVF
 - Contiguous leads for anterior infarction include V1-V4 (V1-V2 elevation also called septal infarction)
 - Contiguous leads for lateral myocardial infarction include Leads I, aVL, V5, and V6
 - Lateral MI findings may be in addition to anterior or inferior MI patterns (anterolateral or inferolateral)
- In patients with an inferior infarct pattern (Leads II, III, aVF), a separate ECG with V4R should be obtained
- A 1 mm ST-segment elevation in V4R when inferior infarction noted indicates right ventricular infarct

I – LATERAL	aVR	V1 – SEPTAL or ANTERIOR	V4 – ANTERIOR (V4R – RVMI)
II - INFERIOR	aVL – LATERAL	V2 – SEPTAL or ANTERIOR	V5 – LATERAL
III – INFERIOR	aVF - INFERIOR	V3 – ANTERIOR	V6 – LATERAL

STEMI RECOGNITION AND DESTINATION

STEMI Recognition	<ul style="list-style-type: none">• Patients who have ECGs of acceptable quality with the following messages are candidates for transport to STEMI Receiving Centers:<ul style="list-style-type: none">o ***Acute MI*** (Zoll)o ***Acute MI Suspected*** (LIFEPAK 12)o ***Meets ST-Elevation MI Criteria*** (LIFEPAK15)• The 12-lead ECG should be inspected prior to initiation of a STEMI Alert – a steady baseline in all 12-leads and a tracing free of artifact is critical for accurate interpretation• Causes of artifact include patient motion or tremor, poor lead contact, or electrical interference• Good skin preparation is essential for optimal lead contact and clear 12-lead tracings• If artifact is noted the ECG should be repeated• Paced rhythms may cause false readings – the pacemaker spike is not always detected by the computer algorithm. Inform facility if patient has a pacemaker during report.
STEMI Report	If a STEMI is noted on 12-lead ECG, the receiving STEMI facility should be notified as soon as possible following completion of the ECG
Destination Policy	<p>Patients with an identified STEMI shall be transported to a STEMI Receiving Center (SRC)</p> <ul style="list-style-type: none">• Patients shall be transported to the closest SRC unless they request another facility• A SRC that is not the closest facility is an acceptable destination if estimated additional transport time does not exceed 15 minutes• Patients with cardiac arrest who have a STEMI identified by 12-lead ECG before or after arrest shall be transported to the closest SRC• Patients with unmanageable airway en route shall be transported to the closest available emergency department

STEMI REPORT

- A patient with a computer interpretation of ***Acute MI*** (Zoll) or ***Acute MI Suspected*** (LP-12) or ***Meets ST Elevation MI Criteria*** (LP-15) is a candidate for transport to a STEMI Receiving Center
- Verify that 12-lead tracing has good tracings and baseline in all 12-leads and does not have significant baseline artifact or other deficit before initiating a STEMI Alert

SITUATION	<ul style="list-style-type: none"> • Identify the call as a “STEMI Alert” • Estimated time of arrival (ETA) in minutes • Patient age and gender • Report ECG computer interpretation has a STEMI message (as listed above) • Report if subsequent ECG findings are variable or if ECG quality not optimal (e.g., if no ***Acute MI*** findings noted in tracings without significant artifact)
BACKGROUND	<ul style="list-style-type: none"> • Presenting chief complaint and symptoms • Pertinent past cardiac history • History of pacemaker (important – paced rhythms may give false ECG interpretations)
ASSESSMENT	<ul style="list-style-type: none"> • General assessment • Pertinent vitals (especially heart rate and BP) and physical exam • Cardiac rhythm • Pain level
RX – RECAP	<ul style="list-style-type: none"> • Prehospital treatments given • Patient response to prehospital treatments

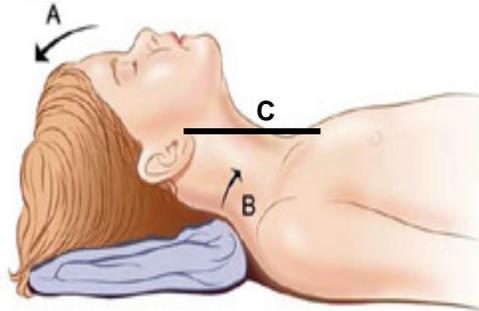
BLS AIRWAY MANAGEMENT

GOALS	<p>The goal of airway management is to ensure adequate ventilation and oxygenation. Initial airway management should always begin with BLS Maneuvers</p>
VENTILATION RATES AND DELIVERY	<p>Avoid excessive ventilation. In non-arrest patients, ventilation rates: Adults – 10 / minute Children – 20 / minute Infants – 30 / minute</p> <p>Deliver ventilations over one second to produce visible chest rise and to avoid distention of the stomach (do not squeeze hard or fast). Ventilation volumes will vary based on patient size.</p>
PREFERRED MANEUVERS	<p>For all patients who can be adequately ventilated (visible chest rise), bag-valve mask ventilation using two-person technique is the preferred method.</p> <p>Maneuvers – Use “JAWS” mnemonic J – Jaw thrust maneuvers to open airway A – Airway - Use oral or nasal airway W – Work together Ventilation using a bag-valve mask should include two rescuers – one to hold mask and other to deliver ventilations S – Slow and small ventilations</p>

**AIRWAY
POSITIONING**

Position the patient to optimize airway opening and facilitate ventilations (see below)

- **Use the sniffing position** with head extended (A) and neck flexed forward (B) unless suspected spinal injury.
- Position with head/shoulders elevated – anterior ear should be **at the same horizontal level as the sternal notch (C)**. This is especially advantageous in larger or morbidly obese patients.



KEY PARAMEDIC PROCEDURES

Skill	Indication / Comment	Contraindication
12-Lead ECG	<ul style="list-style-type: none"> • Chest pain or suspected Acute Coronary Syndrome (ACS) • Atypical ACS or anginal equivalents: <ul style="list-style-type: none"> ○ Symptoms include shortness of breath, diaphoresis, syncope, dizziness, weakness, and altered level of consciousness ○ Elderly patients, females and diabetics are more likely to present atypically • Arrhythmias (both pre- and post-conversion) • Suspected cardiogenic shock • Cardiac arrest after return of spontaneous circulation 	<ul style="list-style-type: none"> • Uncooperative patient • Any condition in which delay to obtain ECG would compromise immediately needed care (e.g. arrhythmia requiring immediate shock)
Blood Glucose Testing	<ul style="list-style-type: none"> • Altered level of consciousness • Patients with signs and symptoms of hypoglycemia (may include diaphoresis, weakness, hunger, shakiness, anxiety) 	<ul style="list-style-type: none"> • Patients not meeting any indication
Continuous Positive Airway Pressure (CPAP)	<p>Patient has 2 or more findings:</p> <ul style="list-style-type: none"> • RR >25 • Pulse ox <94% • Use of accessory muscles <p>and patient is awake, able to maintain airway & follow commands</p>	<ul style="list-style-type: none"> • Unconscious or unable to follow commands • Respiratory arrest / apnea • Pneumothorax • Vomiting • Major head, facial or chest trauma

KEY PARAMEDIC PROCEDURES

Skill	Indication / Comment	Contraindication
Endotracheal Intubation	<ul style="list-style-type: none"> • Patient with decreased sensorium (GCS less than or equal to 8) and apneic (adults) • Patient with decreased sensorium (GCS less than or equal to 8) and ventilation unable to be maintained with BLS airway <p>Note: In non-arrest patients, allow no more than 2 interruptions of ventilation lasting up to 30 seconds during laryngoscopy or intubation attempts</p>	<ul style="list-style-type: none"> • Pediatric patients under 40 kg • Suspected hypoglycemia or narcotic overdose • Maxillo-facial trauma with unrecognizable facial landmarks • Seizures • Patients with an active gag reflex <p>Note: Patients with perfusing pulses should be managed with BLS airways unless unable to successfully ventilate (e.g. trauma, respiratory insufficiency)</p>
Endotracheal Tube Introducer (Bougie)	<p>Helpful in situations with limited neck mobility, short neck, or immobilized patients</p> <p>Note: Do not force introducer as it can perforate pharynx or trachea</p>	<p>Cannot be used with endotracheal tubes smaller than 6.0 mm.</p>
External Cardiac Pacing	<p>Symptomatic bradycardia</p> <p>Note: Use careful titration with midazolam or morphine if required for relief of discomfort.</p>	<ul style="list-style-type: none"> • Cardiac arrest • Hypothermia • Pediatric Patients

KEY PARAMEDIC PROCEDURES

Skill	Indication / Comment	Contraindication
<p>Impedance Threshold Device (ITD) - ResQPOD (Optional Equipment)</p>	<ul style="list-style-type: none"> • Patients ≥ 9 years of age in cardiac arrest <ul style="list-style-type: none"> ○ Remove if patient resumes spontaneous breathing or regains perfusing pulse <p>Note: If secretions encountered, clear device by removing and shaking.</p>	<ul style="list-style-type: none"> • Age below 9 years • Perfusing pulse or spontaneously breathing • History of traumatic cardiac arrest due to blunt chest trauma • Flail chest
<p>Intranasal Naloxone</p>	<ul style="list-style-type: none"> • Patient with altered mental status, respiratory rate less than 12 and suspected opiate overdose <p>Note: May be less effective in patients with prior nasal mucosal damage</p>	<ul style="list-style-type: none"> • Shock • Copious nasal secretions or bleeding • Patients with established vascular access
<p>King Airway</p>	<ul style="list-style-type: none"> • Cardiac arrest • Inability to ventilate non-arrest patient (with BLS airway maneuvers) in a setting in which endotracheal intubation is not successful or unable to be done 	<ul style="list-style-type: none"> • Presence of gag reflex • Caustic ingestion • Known esophageal disease (e.g. cancer, varices, stricture) • Laryngectomy with stoma (place ET tube in stoma) • Height less than 4 feet

KEY PARAMEDIC PROCEDURES

Skill	Indication / Comment	Contraindication
LUCAS Chest Compression System	Patients with medical cardiac arrest who properly fit device.	<ul style="list-style-type: none"> • Traumatic arrest • Pregnant Patients • Improper fit of device <ul style="list-style-type: none"> ○ Too small – suction cup pad does not touch chest when lowered as far as possible ○ Too large – support legs of LUCAS cannot be locked to back plate without compressing patient
Needle Thoracostomy	Signs and symptoms of tension pneumothorax: <ul style="list-style-type: none"> • Altered level of consciousness • Decreased BP • Increased pulse and respirations • Absent breath sounds, hyperresonance to percussion on affected side • Jugular venous distention • Difficulty ventilating • Tracheal shift 	Any condition without signs and symptoms of tension pneumothorax

KEY PARAMEDIC PROCEDURES

Skill	Indication / Comment	Contraindication
Pulse Oximetry	Suspected hypoxemia Note: Accuracy may be affected by poor perfusion, hypothermia or cold extremities, excessive movement (e.g. seizures), nail polish, carbon monoxide poisoning, or anemia.	None
Stomal Intubation	Patients requiring intubation who have mature stoma and do not have a replacement tracheostomy tube available Note: Pass tube until cuff is just past stoma. If inserted further, mainstem bronchus intubation may occur as carina is only around 10 cm from stoma.	Patients without mature stoma
Tracheostomy Tube Replacement	<ul style="list-style-type: none"> • Dislodged tracheostomy tube (decannulation) • Tracheostomy tube obstruction not resolved by suction 	<ul style="list-style-type: none"> • Recent tracheostomy surgery (less than 1 month) • Inadequately sized tract or stoma for insertion of new tube (use endotracheal tube instead)
Waveform Capnography (ETCO₂)	<ul style="list-style-type: none"> • All intubated patients (King or ET Tube) • Can be used via nasal cannula in non-intubated patients with respiratory depression or distress 	None

PEDIATRIC MEDICATION ADMINISTRATION

Patient safety in medication administration is paramount. Accurate administration of pediatric medications requires multiple steps. Follow each of these steps in every case.

ASSESS PATIENT	Remember the 6 Rights – Right patient, right drug (and indication), right dose, right route of administration, right timing and frequency, right documentation
OBTAIN WEIGHT ESTIMATE IN KG	<ul style="list-style-type: none"> • Use Broselow tape in every child of appropriate height to determine color range of weight. <ul style="list-style-type: none"> ○ Broselow applies to patients less than 147 cm tall (4 feet 10 inches). • If taller than Broselow tape, estimate weight by patient/parent history or paramedic estimate and ALWAYS convert to kg using conversion table.
DETERMINE VOLUME ON DRUG CHART	<ul style="list-style-type: none"> • Consult drug chart based on medication name to determine volume in ml • If 50 kg or greater, utilize adult dosages
DRAW UP MEDICATION	<ul style="list-style-type: none"> • Verify drug being administered • Utilize smallest syringe for volume (e.g. 1 ml or less, use tuberculin syringe) • When giving IM or intranasal medication, load syringe only with amount to be administered
DOUBLE CHECK TO CONFIRM VOLUME	<ul style="list-style-type: none"> • Double-check volume and dose with drug chart in hand –verbalize name of medication, volume, dosage and route to another paramedic or EMT on scene.
ADMINISTER MEDICATION	<ul style="list-style-type: none"> • Administer by appropriate route • Observe patient for any signs of adverse reaction
DOCUMENTATION	<ul style="list-style-type: none"> • Always document drug dosages in chart by mg (if dextrose, in grams) • Document response to medication and any observed adverse reaction.

PEDIATRIC ASSESSMENT

PEDIATRIC ASSESSMENT TRIANGLE - GENERAL VISUAL ASSESSMENT

	Assessment	Abnormal
Appearance	Assess TICLS: Tone, Interactiveness, Consolability, Look/Gaze, Speech/Cry	Any Abnormal
Work of Breathing	Assess effort	Increased or decreased effort or abnormal sounds
Circulation	Assess for skin color	Abnormal skin color or external bleeding

PREHOSPITAL PRIMARY ASSESSMENT

	Assessment	Signs of Life-Threatening Condition
Airway	Assess patency	Complete or severe airway obstruction
Breathing	Assess respiratory rate and effort, air movement, airway and breath sounds, pulse oximetry	Apnea, slow respiratory rate, very fast respiratory rate or significant work of breathing
Circulation	Assess heart rate, pulses, capillary refill, skin color and temperature, blood pressure	Tachycardia, bradycardia, absence of detectable pulses, poor blood flow (increased capillary refill, pallor, mottling, or cyanosis), hypotension
Disability	Assess AVPU response, pupil size and reaction to light, blood glucose	Decreased response or abnormal motor response (posturing) to pain, unresponsiveness
Exposure	Assess skin for rash or trauma	Hypothermia, rash (petichiae/purpura) consistent with septic shock, significant bleeding, abdominal distention

BEGIN INTERVENTIONS IMMEDIATELY AND TRANSPORT PROMPTLY IF LIFE-THREATENING CONDITIONS ARE IDENTIFIED IN GENERAL VISUAL ASSESSMENT OR PRIMARY ASSESSMENT

VITAL SIGNS / GLASGOW COMA SCALE IN CHILDREN

Age	Normal RR	Normal HR	<i>Hypotension by systolic blood pressure</i>	
Term Neonate	30-60	100-205	Neonate: Less than 60 mmHg or weak pulses Infant: Less than 70 mmHg or weak pulses 1-10 yrs: Less than 70 mmHg + (age in yrs x 2) Over 10: Less than 90 mmHg	
Infant (<1 yr)	30-60	100-190		
Toddler (1-3 yr)	24-40	90-150		
Preschooler (4-5 yr)	22-34	80-140		
School Age (6-12yr)	18-30	70-120		
Adolescent (13-18 yr)	12-20	60-100		

Pediatric GCS	Infant	Score	Child	Score
Motor Response	Spontaneous movements	6	Obeys commands	6
	Withdraws to touch	5	Localizes	5
	Withdraws to pain	4	Withdraws	4
	Flexion	3	Flexion	3
	Extension	2	Extension	2
	No response	1	No response	1
Verbal Response	Coos and babbles	5	Oriented	5
	Irritable cry	4	Confused	4
	Cries to pain	3	Inappropriate	3
	Moans to pain	2	Incomprehensible	2
	No response	1	No response	1
Eye Response	Opens spontaneously	4	Opens spontaneously	4
	Opens to speech	3	Opens to speech	3
	Opens to pain	2	Opens to pain	2
	No response	1	No response	1

SBAR REPORTING

SBAR is a tool that is recommended to assure timely, effective communication during all patient-related communications between all health care providers. **SBAR** assures that urgent issues and immediate needs get addressed up front. **SBAR** is compatible with the trauma **MIVT** reporting. Routine use during base contact and patient handoff supports safe and effective patient care.

Key Information

SBAR Report Example

Key Information	SBAR Report Example
Situation <ul style="list-style-type: none"> • Identify yourself • What is the situation? • State urgent issues and immediate needs up front! 	This is Unit 123 with a STEMI alert. Patient is a 45 yo male with 12 lead positive for ST elevation
Background <ul style="list-style-type: none"> • What has happened up to this point? • What past history would be important to know for further patient treatment? (e.g. high risk medications, past medical history) 	Patient started having chest pain off and on the last 2 hours. Family called 911. Patient has no history of heart problems and takes Lipitor and metformin.
Assessment <ul style="list-style-type: none"> • How is the patient now? • Improved or worse since on scene? • Patient stable or unstable? 	RR 28 labored B/P 160/98 Diaphoretic, Pain 9 out 10, 12 lead ***Acute MI*** no significant artifact seen. No significant change with treatment. Airway stable.
Rx Recap <ul style="list-style-type: none"> • What field care given? • Was it effective? • Concerns? 	ASA, Nitro x2 and 100% rebreather. STEMI alert

TRAUMA BASE CALL EXAMPLE (Destination Decision Report)

S	This is paramedic unit 123 with a trauma call, requesting destination decision. We have a 66 year old male with a fall and altered level of consciousness, and we think the patient needs trauma center activation. Our ETA is 20 minutes.
B	The patient was working on his roof and fell approximately 10 feet, landing on his head on a cement path. He sustained an injury to the right parietal area and there is significant swelling in that area. He has a GCS of 14. He is apparently generally healthy although he does take aspirin daily.
A	BP 180/110, pulse 52, RR 10. SpO2 95%. His airway is stable. The patient is awake and cooperative, but is confused has repetitive questioning. He is vomiting and complains of a severe headache. He also has right chest wall tenderness but no flail chest, and has deformity of his right forearm with intact CMSTP.
R	We have him on 100% oxygen, in spinal precautions. We are going to be splinting his right forearm and will start an IV en route. We believe he needs trauma activation.

TRAUMA HAND-OFF EXAMPLE (Report at Trauma Center)

S	MECHANISM	This is unit 123 with a 66 year old male who fell from a roof onto a cement path.
B	INJURIES	Swelling and deformity in the right parietal area. He is confused, with repetitive questioning, vomiting, and complaining of a severe headache. He also has pain in the right chest and deformity of the right forearm which we splinted.
A	VITAL SIGNS	BP 180/110, pulse 52, RR 10. SpO2 95%. GCS is 14.
R	TREATMENT	100% oxygen non-rebreather, IV placed and infusing NS.

INDICATIONS FOR SPINAL IMMOBILIZATION

Penetrating Injury (Trauma to head, neck or torso)	<ul style="list-style-type: none"> • Presence of neurologic complaint or deficit – paralysis, weakness, numbness, tingling, priapism or neurogenic shock, loss of consciousness • Anatomic deformity of spine
Blunt Injury (Regardless of mechanism)	<ul style="list-style-type: none"> • Altered level of consciousness (GCS < 15) • Presence of spinal pain or tenderness • Anatomic deformity of spine • Presence of neurologic complaint or deficit – paralysis, weakness, numbness, tingling, priapism or neurogenic shock
Blunt Injury (When mechanism of injury is concerning)	<ul style="list-style-type: none"> • Presence of alcohol or drugs or acute stress reaction / anxiety • Distracting injury (e.g. long bone fracture, large laceration, crush or degloving injury, large burns) • Inability to communicate (e.g. speech or hearing impaired, language gap, small children, developmental or psychiatric conditions)

Concerning mechanisms of injury include but are not limited to:

- Violent impact to head, neck, torso, or pelvis (e.g. assault, entrapment in structural collapse)
- Sudden acceleration, deceleration or lateral bending forces to neck or torso (e.g., moderate- to high-speed MVC, pedestrian struck, explosion)
- Falls (especially in elderly patients)
- Ejection from motorized or other transportation device (e.g. scooter, skateboard, bicycle, motor vehicle, motorcycle, recreational vehicle, or horse)
- Victims of shallow-water diving incident

***** USE CLINICAL JUDGMENT – IF IN DOUBT, IMMOBILIZE *****

VASCULAR ACCESS

Skill	Indication / Comment	Contraindication
Saline Lock	When medication alone is being given or a potential for medication is anticipated	No anticipated need for prehospital medication or fluid.
Upper Extremity IV	When fluids or medications needed and patient not in shock or arrest	No anticipated need for prehospital medication or fluid.
Antecubital IV	<ul style="list-style-type: none"> • Shock • Adenosine (rapid IV bolus) • Cardiac arrest if IO cannot be obtained • Other peripheral sites not available and medications or fluids indicated 	No anticipated need for prehospital medication or fluid.
Intraosseous Access (IO)	<ul style="list-style-type: none"> • Cardiac arrest • In cases of profound shock or unstable dysrhythmia when rapid IV access or suitable vein cannot be rapidly located <ul style="list-style-type: none"> ○ Use lidocaine for pain control in non-arrest patients PRIOR to giving fluid or medication (Infusion is painful!) 	<ul style="list-style-type: none"> • If no medication or fluid is being administered (do not use for prophylactic vascular access) • If patient stable • When other routes for medications available (IM, IN)
External Jugular IV	Unstable patient needs emergent IV medication or fluids AND no peripheral site is available AND IO not appropriate (e.g. very alert patient).	<ul style="list-style-type: none"> • Contraindicated in cardiac arrest unless IO and antecubital IV cannot be started (interrupts CPR) • When other routes for medications available (IM, IN) – e.g. naloxone or use of glucagon instead of dextrose