

SAMPLE	Signs and Symptoms, Allergies, Medications, Past pertinent history, Last oral in/out, Events leading up to illness/injury
OPQRST	Onset (how did it start - fast? slow?), Provocation/Palliation (what makes it better/worse?), Quality (crushing, aching, dull, sharp, etc?), Radiation (where do you feel it?), Severity (1-10, what's a 10 for you?), Time (how long have you had it?)
DCAP-BTLS	Deformities, Contusions, Abrasions, Punctures/Penetrations - Burns, Tenderness, Laceration, Swelling
Vitals	Pulse, Respirations, Blood Pressure, skin, pupils
AVPU	Alert (person, place, time, events), Verbal, Painful (purposeful, flexion, extension), Unresponsive
Medications	5 R's: Right Patient, Medication, Dose, Route, Date

#### Legal, Ethical, etc

Stages of Grief:

1. **Denial** not me
2. **Anger** why me
3. **Bargaining** okay, but first let me
4. **Depression** Okay, but I haven't
5. **Acceptance** I am not afraid

Critical Incident Stress Debriefing (CISD) held within 24-72 hours. **Defusing** is a mini-CISD held within 1-4 hours.

4 elements that must be proved to establish **malpractice**:

1. EMT had a duty to act.
2. EMT breached that duty to act.
3. The patient suffered an injury.
4. EMT's negligence caused that injury.

**Advance Directives** include Do Not Resuscitate (DNR), living will, and health care power of attorney.

**Consent** is Expressed (patient OK), Implied (patient unresponsive or incompetent), and Consent to treat a minor or a mentally incompetent adult.

#### Gear BS

Mounted suction devices run at **>40lpm** flow and **-300mmHg** pressure.

**Oropharyngeal** airway sized from teeth to angle of jaw.

**Nasopharyngeal** airway sized from nose to ear.

**Oxygen** administered at 15lpm for mask, 6lpm for cannula. Comes in D,E (small) and M,G,H (large) sizes. Standard mask fitting size is 15/22mm. Delivered via **PRB, NRB, BVM**, Flow-Restricted Oxygen-Powered Ventilation Device (**FROPVD**), Automatic Transport Ventilator (**ATV**).

#### Drugs

Names:

Name	Description	Example
Chemical		1,2,3-propanetriol trinitrate
Generic	shortened chemical name	nitroglycerin tablets
Trade	brand name	Nitrostat
Official	Listed in US Pharmacopoeia or National Forumlary	nitroglycerin tablets, USP

**Routes:** sublingual, oral, inhalation, injection

**Forms:** tablet, liquid, gel, suspension, inhaled powder (e.g. MDI), gas, spray, fixed-dose nebulizer.

**Non-Prescribed Meds:** Oxygen, Oral Glucose, Activated Charcoal, Aspirin

**Prescribed Meds:** Metered Dose Inhaler (MDI), Nitroglycerin, Epinephrine

#### Anatomy

**References:** Proximal (near), Distal (far), Medial (center), Lateral (side), Anterior/ventral (front), Posterior/dorsal (rear), Superior (top), Inferior (bottom), Midaxillary (line through armpits), Midclavicular (line through center of collarbone).

**Positions:** Supine (face up), Prone (face down), Lateral Recumbent (side), Fowler's (torso elevated), Trendelenburg (legs elevated).

#### Bones:

Area	Components
Cranium	Frontal, Parietal, Occipital, Temporal Orbits, Maxilla, Mandible
Upper Extremity	Clavicle (collarbone), Scapula(shoulderblade) Humerus Ulna (medial), Radius (lateral) Carpals (wrist), Metacarpals (hand), Phalanges (fingers)
Thorax	Sternum, Ribs, Xiphoid process, Costal Margin
Pelvis	Iliac crest, Ilium, Pelvic Girdle
Spine	Cervical (7), Thoracic (12), Lumbar (5), Sacral (5), Coccyx
Lower Extremity	Femur Patella Tibia (medial), Fibula (lateral) Tarsals (ankle), Calcaneus (heel), Metatarsals (foot), Phalanges (toes)

### Organs

<b>RUQ</b> Gallbladder	<b>Upper Quadrants</b> Liver Pancreas Kidneys	<b>LUQ</b> Spleen Stomach
	<b>All Quadrants</b> Colon	
<b>RLQ</b> Appendix	<b>Lower Quadrants</b> Small Intestines Bladder	<b>LLQ</b>

### Airway:

Nose/Mouth, Oro/Nasopharynx, Epiglottis, Larynx, Trachea

Complications:

Snoring	Tongue obstruction
Wheezing	Bronchiole construction
Gurgling	Fluid in upper airway
Crowing or Stridor	Partial obstruction in larynx

### Pulses:

Carotid	Either side of neck
Brachial	Medial arm, b/t bicep and tricep
Radial	Palmar wrist, proximal to thumb
Femoral	B/t abdomen and upper thigh
Dorsal Pedal	Top of foot, near big toe ligament
Posterior Pedal	Behind lateral ankle bone

### Central Nervous System:

- **Voluntary** affects skeletal muscles
- **Autonomic**
  - **Sympathetic** "fight or flight"
  - **Parasympathetic** "feed or breed" - returns to normal

### Typical Vital Signs

#### Breathing

Adult (12-20)      Child (15-30)      Infant (25-50)

#### Heart Rate

Age	Range
Elderly	90
Adult	60-100
Child	80-120
Infant	120-150

#### Blood Pressure

Adult Male      100+min(age, 40) / 60-90  
                   Female      90+min(age, 40) / 60-90  
 Child            70+2\*age to 90+2\*age / (2/3 systolic)  
 Infant            > 70 / (2/3 systolic)

#### Capillary Refill

2 sec	Most People
3 sec	Adult Females
4 sec	Elderly

#### Geriatrics

Aging process starts at **30** and includes **kyphosis** (spine curve), reduced vision (especially at night) and **reduced pulmonary muscle, brain, kidney, and liver size.**

#### Vitals Overview

Illness	HR	BP	Resp	Skin	Pupils
Hypoglycemia	↑	↔	↔	cool/moist	
DKA	↑	↓	Kussmaul		
Anaphylaxis	↑	↓	↑		
CNS Stimulant	↑	↑	↑	diaphoretic	dil
CNS Depressant	↓	↓	↓		dil/sluggish
Narcotic	↓	↓	↓	cool/clammy	const
Head Injury	↑	↑↓	Unusual		Unequal
Anaphylaxis	↑	↓	↑	Hives	

### Cardiac Emergencies

Arteriosclerosis is when arteries become harder and less elastic

Atherosclerosis is a form of Arteriosclerosis caused by plaque

Signs and Symptoms:

- Chest discomfort or pain
- Sudden onset of sweating
- Cool pale skin
- Dyspnea
- Lightheadedness
- Anxiety or irritability
- Impending sense of doom
- Abnormal pulse
- Abnormal blood pressure
- Nausea/Vomiting
- Sluggish or dilated pupils

#### Treatment:

160-325mg Aspirin (chewable followed by normal best).

Nitroglycerin if prescribed to patient, up to 3 doses. Contraindicated by BP < 90, usage of ED drugs, or head injury.

### Diabetes

Typical BGL is 80-120 mg/dl, hypoglycemia defined as <60

#### Hypoglycemia

HR	BP	Resp	Pupils	Skin
↑				Cool/Moist

Signs/Symptoms:

- Tachycardia
- Cool, moist skin
- Hunger
- Seizure
- Elderly may mimic stroke

**DKA** (Diabetic Ketoacidosis) occurs when no insulin available to transport glucose.

Excess sugar → Excess urination

Burning fat → ketone production → ketoacidosis

Signs/Symptoms:

- Polyuria (excessive urination)
- Polyphagia (excessive hunger)
- Polydipsia (excessive thirst)
- Poor turgor
- Nausea
- Tachycardia
- Deep/Kussmaul's respirations
- Fruity/Acetone odor to breath
- BGL typically > 350 mg/dl

**HHNS** (Hyperglycemic Hyperosmolar Nonketonic Syndrome) similar to DKA but BGL even higher (600-1200 mg/dl) and fruity odor not present on breath.

**Treatment (all):** Oral Glucose, contraindicated if patient is unconscious. Oral glucose will fix hypoglycemia while having minimal negative effect on DKA or HHNS.

### Stroke

Previously called Cerebrovascular accident (CVA)

7 D's for good outcome: Detection, Dispatch, Delivery, Door, Data, Decision, Drug.

Types:

- **Ischemic** - caused by clots/atherosclerosis
- **Hemorrhagic** - ruptured vessel in brain
- **Transient Ischemic Attack (TIA)** - temporary stroke-like symptoms due to ischemia, typically < 15min duration.

Stroke Signs/Symptoms:

- Altered mental status (dizzy to unresponsive)
- Paralysis (hemiplegia) / weakness (hemiparesis) to one side
- Numbness on one side
- Altered speech (slurred to none)
- Loss of coordination
- Unequal pupils
- Treatment: Rapid transport and identify symptom start time. Thrombolitics can help treat ischemic strokes, but need to be administered within 3 hours of onset of symptoms.

Stroke Screens:

**Cincinnati** checks for facial droop, arm drift, and abnormal speech (ask pt to say "you can't teach an old dog new tricks"). **LA** checks facial droop, grip strength, arm drift, and other factors such as BGL, symptom duration, and patient age.

### Seizures

Types of Seizures:

- **Generalized Tonic-Clonic/Grand Mal** consists of the following phases:
  - Aura (sensation that patient is about to seize)
  - Tonic/Hypertonic (15-20 sec unconsciousness, then 5-15 sec rigidity)
  - Clonic 30 sec - 5 min convulsions
  - Postictal 5 min - 3 hrs deep sleep recovery, confusion, fatigue, soreness, headache
- **Simple Partial/Focal Motor/Jacksonian** consists of jerky movement to one area of the body.
- **Complex Partial/Psychomotor/Temporal Lobe** consists of 1-2 minutes of random activity like chewing / lip smacking.
- **Absence/Petit Mal** consists of several sec of blank stare, possible blinking/ chewing, and lack of attention. Most common in children.

**Treatment:** maintain ABCs. If patient seizes for > 10 min, they are considered to be in status epilepticus and require rapid transport to ensure patency of ABCs.

### Allergic Reactions

HR	BP	Resp	Pupils	Skin
↑	↓	↑		Hives

Routes: injection, ingestion, inhalation, absorption

Signs/Symptoms:

- Possible cyanosis
- tachycardia
- low blood pressure
- rapid breathing, or slow breathing if patient has crashed
- wheezing/stridor in breath
- hives

**Treatment:** Administer **EpiPen** (.3mg) or **EpiPen Jr** (.15mg) if prescribed to patient. Be careful to make sure patient is actually in anaphylaxis and not just overreacting. If no EpiPen, treat with 3 Rs (rest, reassure, and rapid transport).

### Poisoning

Routes: injection, ingestion, inhalation, absorption

Common Signs/Symptoms:

- NVD
- Respiratory distress
- Unusual BP, HR, pupils or skin

Questions to ask patient:

- When where you exposed?
- What were you exposed to?
- How long were you exposed to it?
- How much were you exposed to?
- What treatments have you tried so far?
- How much do you weigh?

**Treatment (ingested):** Can treat orally ingested poisons with 1g Activated Charcoal per 1 Kg patient's body weight (typically **30-100g** adults, **12-25g** children & infants). Contraindicated by ingestion of acids/alkalis (HCL, bleach, ammonia, ethanol) and cyanide, as activated charcoal does not absorb these.

**Treatment (absorbed):** if poison is solid powder, brush off and contact med control for decision on whether to flush. If poison is liquid, irrigate for > 20 min.

**Notes:** Carbon Monoxide Signs/Symptoms also include headache, confusion and tachypnea. SpO2 monitors don't differentiate between CO and O2.

### Drug/Alcohol Emergencies

Life-threatening Signs/Symptoms:

- Unresponsive
- Respiratory problems
- Fever (>100F/38C)
- Fast, slow or irregular pulse
- Vomiting w/ altered mental status
- Seizures

Stages of alcohol withdrawal:

1. (<8 hrs) nausea, insomnia, sweating, tremors
2. (8-72 hrs) more severe stage 1 s/s + hallucinations
3. (<48 hours) seizures
4. (2-5 days) Delirium Tremens (confusion, memory loss, tremors, restlessness, fever, NVD, sweating, elevated HR/BP, scary hallucinations (e.g. involving snakes, spiders and rats)).

### Heat, Cold and Submersion

Temp	Signs and Symptoms
95F-98F	alert and shivering cold skin, poor coordination tachycardia, tachypnea
90F-95F	confusion, no shivering cold, waxy skin bradycardia
86F-90F	stupor or coma dilated pupils, rigid muscles bradypnea, hypotension
<86F	further deterioration

**Heat Loss** occurs through radiation (60%), conduction and convection (15%), respiration and evaporation (25%).

Conditions:

- **Generalized Hypothermia**
- **Local Cold Injury**
  - **Superficial** (early) involves soft, cold skin that tingles on rewarming.
  - **Deep** (late) involves skin and underlying tissue. Firm to solid skin, swelling, blisters,
- **Heat Cramps** cramps/spasms
- **Heat Exhaustion** sweaty, pale, and normal-to-cool skin
- **Heat Stroke** hot and red skin, may be dry or moist.

**Treatment (hypothermia):** passively rewarm. If still shivering, actively rewarm with hot packs on chest, armpits and groin at no more than 1F/hour.

**Treatment (local cold injury):** Wrap in dry dressing. If BC and no possibility of refreezing, rewarm in 104F water, wrap in dry dressing and elevate.

**Treatment (hyperthermia):** Cool patient. If heat stroke, rapid transport.

Water Rescue	Patient rescued from water, needs no medical help
Submersion	Patient needs emergency care
Drowning	death within 24 hours of submersion
Drowning-related death	death >24 hours after submersion

Mammalian diving reflex may kick in below **70F/21C**.

**Acute Abdominal Pain**

3 types of abdominal pain are:

- **Visceral** (organ) pain: dull, aching, poorly localized, possibly intermittent.
- **Parietal** (lining) pain: sharp, localized, intense. Patient often flexes knees to chest with little movement and shallow breathing.
- **Referred** pain: visceral pain felt elsewhere due to shared nerve pathways.

Detection: palpate abdomen in painful area last looking for:

- Rigidity/involuntary guarding (patient reacts on palpation)
- Voluntary guarding (patient reacts just before palpation)
- Tenderness
- Masses (including pulsating ones)

**Treatment:** Vitals, Oxygen, Monitor, Initiate Transport. NO ORAL INTAKE.

**Obstetric Emergencies**

Stages of Labor:

- **Dilation** lasts from start of contractions to complete cervical dilation at 10cm. Longest stage. Contractions start at 30-60sec@10-20min intervals and end at >60sec@3-4min intervals.
- **Expulsion** lasts from complete cervical dilation to delivery. Mother may feel need to defecate. After baby's head appears ("crowning"), mother should push w/ each contraction.
- **Placental** lasts from just after delivery until the expulsion of the placenta.

Place pregnant women on **left** side.

Abnormal delivery occurs before 38 weeks of pregnancy.

Delivery Procedure:

1. Create a sterile work area.
2. Once infant crowns, exert gentle pressure to prevent "explosive delivery."
3. Rupture amniotic sac if intact.
4. Suction airway, mouth before nose to prevent aspiration.
5. Clamp and cut cord 6-9" from infant.

Complications:

- **Prolapsed Cord** is where the cord appears first. Pressure on cord from baby can cut off oxygen supply. Push fetus back and away from cord and transport rapidly.
- **Breech Birth** and **Limb Presentation** are where the wrong part (butt, limbs, etc) comes out first. Elevate pelvis and transport rapidly.
- **Meconium** staining happens when the infant defecates prior to delivery,

causing greenish or brown/yellow staining. Suction immediately before infant can breathe and rapid transport.

APGAR score used to assess baby's condition:

Category	Score	Presentation
Appearance	0	cyanotic or pale
	1	cyanotic feet or hands w/ pink core
	2	all skin pink
Pulse	0	no pulse
	1	HR < 100
	2	HR > 100
Grimace	0	no activity when flicking soles of feet
	1	some facial grimace
	2	grimace and cough, sneeze, or cry
Activity	0	limp and no movement
	1	some flexion, no movement
	2	active movement
Respiration	0	no respirations
	1	slow or irregular breathing w/ weak cry
	2	good respirations w/ strong cry

**General Trauma Knowledge**

Collision Types:

- Rotational (38%)
- Frontal (32%)
- Lateral (15%)
- Rear End (9%)

Blast Phases:

- Primary (pressure wave)
- Secondary (debris)
- Tertiary (patient collides w/ ground or stationary objects)

**Bleeding and Shock**

HR	BP	Resp	Pupils	Skin
↑	↓			pale, low cap refill

Average adult has 70ml/kg of blood. At 70kg, this is approx. 5L of blood.

Types of Shock:

- **Hypovolemic** reduced blood volume
- **Vasogenic** vessels dilate too much
  - **Anaphylactic** allergic reaction
  - **Septic** due to infection
- **Cardiogenic** heart stops working properly

Signs/Symptoms of blood loss:

Class	Blood Loss	Signs/Symptoms
1	<15%	None
2	<30%	Confusion/restlessness Pale skin Tachycardia (>100) Tachypnea Reduced pulse pressure
3	<40%	Reduced blood pressure Increasing confusion Decreased capillary refill
4	>40%	Decreased consciousness to stupor

Other Signs and Symptoms include:

- Thirst
- Sluggish/dilated pupils
- Nausea/Vomiting
- Cyanosis

**Treatment:** Possible trendelenberg position and possible PASG. Keep patient warm.

#### Soft Tissue Injuries

Types of soft tissue injuries:

Type	Name	Comments
Closed	Contusion	Bruising in dermis
Closed	Hematoma	Deeper contusion, large lump
Open	Abrasion	Rash/scraping away of epidermis
Open	Laceration	Cut. Can be linear (straight) or stellate (jagged)
Open	Avulsion	Loose flap of skin. Can be partial or total (detached)
Open	Amputation	
Open	Penetration/ Puncture	
Either	Crush Injury	Beware of sudden rapid blood loss.

**Treatment:** control bleeding with direct pressure, clean wound, dress and bandage, prepare to treat for shock.

**Treatment (evisceration):** cover w/ moist dressing, then occlusive dressing

**Treatment (amputation):** wrap in dry gauze, bag and cool. May use saline-soaked gauze.

#### Burns

Causes: Flame, contact, scald, steam, gas, electrical, flash.

By Depth:

Name	Affected	Signs/Symptoms
Superficial	Epidermis	Redness, pain, tenderness
Partial Thickness	Epidermis, Dermis	Blisters, pain, white/red/mottled skin
Full Thickness	All Layers	Lathery/charred skin, hard, no pain except at periphery

By Severity/Coverage Area:

Type	Superficial	Partial Thickness	Full Thickness
Minor	<50%	<15%	<2%
Moderate	-	<25%	<10%
Critical	-	>25%	>10%

Critical burns also include encircling burns and burns to face, eyes, ears, hands, feet, genitalia and respiratory tract

Rule of 9s:

Adult 18%	Trunk (anterior) Trunk (posterior) Lower extremity (each)
Adult 9%	Head and neck Upper extremity (each)
Child 18%	Trunk (anterior) Trunk (posterior) Head and neck
Child 14%	Lower extremity (each)
Child 9%	Upper extremity (each)

**Treatment:** flush with water (brush dry chemical burns), cover w/ dry dressing, pack dry gauze between fingers and toes.

#### Musculoskeletal Injuries

Types of fractures:

- Fracture (broken bone)
- Strain (muscle or muscle / tendon)
- Sprain (joint / ligament)

Types of forces:

- Direct (fracture at point of impact)
- Indirect (impact in one place and fracture at a different place)
- Twisting (extremity stationary while body twists)

**Treatment:** align if severe deformity or extremity is cyanotic, except for wrist, elbow, knee, hip and shoulder fractures. Splint and transport.

**Notes:** Femur and Pelvic fractures are life-critical due to potential for severe blood

loss. Use traction splint for isolated mid-shaft femur fracture.

### Head Injuries

HR	BP	Resp	Pupils	Skin
↑	↑↓	Unusual	Unequal	

Anatomy (outside in): Cranium, Dura Mater, Arachnoid, Pia Mater

Signs and Symptoms:

- Unequal Pupils
- Eyes don't track together
- Discoloration around eyes, especially **racoon sign**
- CSF or blood by ears
- **Battle's Sign** (bruising behind ear)
- Blood or CSF leaking from nose
- Unusual blood pressure
  - Systolic up due to ICP
  - BP down due to shock
- Tachycardia
- Unusual respirations
- Nausea and Vomiting
- Seizures

Types of Brain Injuries

- **Concussion** (confusion or lack of consciousness, often with headache)
- **Contusion** is a swelling of the brain tissue.
- Coup-Contrecoup injuries are injuries where the brain is impacted at two spots: the initial contact (acceleration) and when it hits the opposite side of the skull (deceleration)
- **Subdural Hematoma** is bleeding between the dura mater and arachnoid layers. 33% of head injuries lead to a Subdural Hematoma.
  - Acute (immediate)
  - Subacute (3-7 days)
  - Chronic (2-3 weeks)
- **Epidural Hematoma** is bleeding between skull and dura mater. Rapid, profuse bleeding leads to ICP. S/S may include briefly becoming responsive before deteriorating into unresponsiveness.

**Glasgow Coma Scale** checks 3 categories:

Eye Opening	Spontaneous (4) - None (1)
Verbal Response	Oriented (5) - None (1)
Motor Response	Obeys Command (5) - None (1)

### Spinal Injuries

Methods of Injury:

MOI	Comments
Compression	Compression along length of spinal column
Distraction	Stretching spinal column. Opposite of compression.
Flexion	Head forward, chin to chest.
Extension	Head backward.
Rotation	Rotation along length of spinal column.
Lateral Bending	Body bent severely from side.
Penetration	

Treatment: Immobilize.

### Chest, Abdomen & Genitalia

Types of Chest Injuries

Type	Comments
Hemothorax	Blood in chest cavity.
Pneumothorax	Air in chest from trauma (sucking wound or lacerated lung).
Spontaneous Pneumothorax	Air in chest from nontrauma weakness in lung.
Tension Pneumothorax	Air in chest compresses heart and good lung.
Mediastinal Shift	Mediastinum (incl trachea) deviates towards good lung from air in chest.
Pericardial Tamponade	Blood buildup in pericardial sac due to trauma. S/S similar to tension pneumo except breath sounds good.

Air forms between visceral pleura (organ side) and parietal pleura (outside) in the pleural space.

Signs and Symptoms:

- Cyanosis
- Dyspnea
- Unusual breathing
- Tracheal Deviation
- JVD
- Shock

**Treatment (sucking chest wound):** 3-sided occlusive dressing.

**Treatment (flail chest):** bulky dressing or tape.

**Treatment (all):** Position patient with injured side down.

**Hazardous Materials Emergencies**

Get info on chemicals with Hazardous Materials: The Emergency Response Guide and Material Safety Data Sheets (MSDS).

NFPA 704 groups materials into 4 classifications (the RGBW diamond commonly seen on trucks:

Color	Meaning
Blue	Health Hazard
Red	Fire Hazard
Yellow	Reactivity
White	Specific Hazard (OX=oxidizer, ACID=acid, etc)

Material Safety Data Sheets (MSDS) are sheets that should be stored with all chemicals detailing how to treat exposure, clean up spills, etc.

**Training:**

Level	Role
First Responder Awareness	Able to recognize a problem, but not take any corrective action
First Responder Operations	Initial responders to hazmat emergencies.
Hazmat Technician	Rescuers who actually resolve hazmat situation
Hazmat Specialist	Command/Management role

**Response Zones:**

Zone	Purpose
Hot	Actual rescue Initial decontamination Treatment for life-threatening conditions
Warm	Decontamination from hot zone Life-saving emergency care
Cold	Continuing emergency care