

Be able to triage patient: (USE numbers and colors) – Kahoot examples will be helpful

Rapidly determines patient acuity

- Categorizes patients so that the most critical are treated first
- Tracheal deviation acuity is high
- Know how to recognize if they are declining or improving

Emergency Severity Index (ESI)

- 5 levels triage system
- Incorporates concept of illness severity and **resource** utilization to determine who should be treated first
- Triage algorithm assigns ESI levels to patients

Definition	ESI-1	ESI-2	ESI-3	ESI-4	ESI-5
Stability of vital functions (ABCs)	Unstable	Threatened	Stable	Stable	Stable
Life threat or organ threat	Obvious	Likely but not always obvious	Unlikely but possible	No	No
How soon patient should be seen by HCP	Immediately	Within 10 min	Up to 1 hr	Could be delayed	Could be delayed
Expected resource intensity	• High resource intensity • Staff at bedside continuously • Often mobilization of team response	• High resource intensity • Multiple, often complex diagnostic studies • Frequent consultation • Continuous monitoring	• Medium to high intensity • Multiple diagnostic studies • Complex procedures	• Low resource intensity • One simple diagnostic study	• Low resource intensity • Examination only
Examples	Cardiac arrest, intubated trauma patient, overdose w/ bradypnea, severe respiratory distress	Chest pain probably resulting from ischemia, multiple trauma unless responsive	Abdominal pain or gynecological disorders unless in severe distress, hip fracture in older patient	Closed extremity trauma, simple laceration, cystitis	Cold symptoms, minor burn, recheck (e.g. wound), prescription refill

Difference between urgent and non-urgent.

On the exam - of the four options → who is your priority, who is urgent

- Urgent: higher acuity than other patients, no intervention causes increased deterioration,
- Nonurgent: discharging a patient, no intervention then they will be okay

Urgent

- Compromise of airway, breathing, circulation
- Open or massive bleeding
- Burn to chest, back, and neck
- New onset SOB
- Chest pain
- Drooling – might have an airway issue

- Singed nares

Non-urgent

- Small laceration
- Closed fracture

Know your ABCs

- Airway, breathing, circulation
- Airway
 - Inhalation injury (e.g. fire victim)
 - Obstruction (partial or complete) from foreign bodies, debris (vomit), or tongue
 - Penetrating wounds &/or blunt trauma to upper airway structures
- Breathing
 - Anaphylaxis
 - Flail chest w/ pulmonary contusion
 - Hemothorax
 - Pneumothorax (e.g. open, tension)
- Circulation
 - Direct cardiac injury (e.g. MI, trauma)
 - Pericardial tamponade
 - Shock (e.g. massive burns, hypovolemia)
 - Uncontrolled external/internal hemorrhage
 - Hypothermia
- Disability
 - A- patient is awake
 - V- patient responds to verbal stimulation
 - P- patient responds to painful stimulation
 - U- patient is completely unresponsive

Glasgow Coma Scale

- Eye opening
 - 1(none) - 4(spontaneous)
- Verbal response
 - 1(none) - 5(orientated)
- Motor response
 - 1(none) - 6(obey commands)

Primary survey- priority

- Airway and c-spine
- Breathing
- Circulation
- Disability
- Exposure

ESI SCALE-Triage

- Resuscitation- level 1. Example: cardiac arrest
- Emergent - level 2. Example: CP w/ cardiac history
- Urgent- level 3. Example: abdominal pain
- Less urgent- level 4. Example: laceration
- Nonurgent- level 5. Example: simple rash

Examples:

- Level 5: no resources. This patient will need an eye exam and will be discharged to home with prescriptions and an appointment to follow up with an ophthalmologist.
- Level 1:suspected medication overdose. Respirations are 10 and her spo2 on room air is 86%. Requires immediate life saving intervention. The patient's respiratory rate, oxygen saturation, and inability to protect her own airway indicate the need for immediate endotracheal intubation.
- Level 3: patient requires x-ray of his right arm and sutures to his elbow. 2 or more resources needed.
- Level 2: high risk. Suspected DVT due to onset shortness of breath, respiratory distress, and history of birth control pill administration.
- Level 4: one resource needed. Urinalysis and urine culture. Most likely has a UTI and will need oral medications.

Apply past assessment skills

- DVT: warmness, pain in leg, swelling
- PE: SOB, decreased O2, tachycardia, impending doom
- Bleeding: decreased BP and LOC, HA, seizure, cardiac abnormalities
- Shock: tachycardia, hypertension, tachypnea
- Hypovolemia: tachycardia, low BP, decreased urine output
- Normal cap refill: <3 secs
- Normal pupils: PERRLA

Know normal, baseline of your patient, improvement of condition, deterioration of condition, primary survey,

- For example: A heart failure person has a high weight and congested lungs. You give lasix, now the weight drops and the lungs clear up and urine output increase

Know what normal is: weight, no fluid retention, heart issues, BUT know s/s of specific disease your patient has and how would you treat it. So, know the “normals” for what the patient has and if they improved with treatment

Be able to prioritize patients

- Red: IMMEDIATE
- Yellow: DELAYED
- Green: MINIMAL
- Black: EXPECTANT (dead)

Know how to color code triage patients and actions for those colors:

- **Red-** Immediate (life threatening injury)
 - Can progress rapidly if treatment is delayed
 - **First** priority
 - Example: sucking chest wound, airway obstruction secondary to mechanical cause, shock, hemothorax, tension pneumothorax, asphyxia, unstable chest or

abdominal wounds, incomplete amputations, open fractures of long bones, 2nd and 3rd degree burns of 15%-40% of total body surface area, incomplete/stabilize fractures

- **Yellow**-Delayed (non-ambulatory, serious, non-life threatening)
 - Severe or extensive abdominal - not discharging
 - Eye prolonged - will not be able to see (may still be able to walk)
 - Injuries are significant and require medical care but can wait hours without threat to life or limb
 - **Second** priority-commonly non ambulatory with certain exceptions
 - Example: wounds without evidence of significant hemorrhage, soft tissue injuries, maxillofacial wounds without airway compromise, vascular injuries with adequate collateral circulation, genitourinary tract disruption, fractures requiring open reduction, debridement, external fixation, most **eye** and central nervous system injuries
- **Green**-Minimal (walking, wounded)
 - Can be discharged
 - Injuries are minor and treatment can be delayed hours to days
 - Move away from the main triage area
 - **Third** priority- typically on their feet, not always
 - Example: upper extremity fractures, minor burns, sprains, small lacerations without significant bleeding, behavioral disorders or psychological disturbances
- **Black**-expectant (morgue/pulseless non breathing)
 - Injuries are extensive and unlikely to survive even with definitive care
 - Separate from others but do not abandon
 - Comfort care
 - **Last** priority
 - Example: unresponsive, penetrating head wounds, high spinal cord injuries, wounds involving multiple anatomic sites and organs, 2nd and 3rd degree burns in excess of 60% of body surface areas, seizures or vomiting within 24 hours after radiation exposure, profound shock with multiple injuries, agonal respirations, no pulse, no blood pressure, pupils fixed and dilated

Understand consent in emergency care and standard care

- Implied if critical condition for minors
- Implied consent in emergent situation
- Parents are there then they give consent if minor is like a “green patient”

- Ariel says it is better to code than not to code in a triage situation

Office of emergency management: responsible for determining if additional resources to initiate 1st responders are needed

What does the American red cross do?

Individuals – set up washing machines and blood drives

Typical volunteers, helping individuals, or one individual family

Nurses do not contact them, they are not the first people you call but they can be involved when the environment is more safe or stable

What is an emergency plan? Outline of how things are supposed to go

Joint commission

- Requires hospitals to create emergency preparedness plans
- Must practice 2x a year “frequently”
- Can also depend on location such as fire/tornado drills

Components of the Emergency Operations Plan

- Activation response → where, how, and when the response is initiated
- Internal/external communication plan → communication to and from the prehospital arena
- Plan for coordinated patient care
- Security plans
 - Identification of external resources → resources outside of the facility are identified, including local, state, and federal resources and information about how to activate these resources
 - Plan for people management and traffic flow
 - Data management strategy → a backup system for charting, tracking, and staffing
- Demobilization response → deactivation
- After-action report or corrective plan
- Plan for practice drills
- Anticipated resources
- MCI planning

- Education plan for all of the above

What does home land security do?

- Called if the disaster event is the result of an act of terrorism

What does FEMA do?

- When local and state resources are overwhelmed (federal government)
- Called when a community determines regional abilities are unable to properly respond to the incident
- Covid and need for vents

Who can assess patients in a triage event?

- RN, Doctors/nurse practitioners, EMT
- Not Red Cross helper because they are volunteers and their tide pods won't help

Triage roles (roles and what each role does)

- Algorithm assigns ESI level
- Assessment: RN's, EMT, anyone that has been trained and need to know their scope of practice
- FEMA: Federal Emergency Management Agency, coordinates national emergency and resources when local and state are unable to.
- American red cross: provide care for needs who are volunteers and are not trained professionals. Recovery service.
- Department of homeland security: acts of terrorism, they investigate and try to find the cause. If bioterrorism is implied they will need to be contacted.
- Emergency management plan: Main plan that everyone needs to be following and can be changed according to needs.

5 Level Triage System

- Resuscitation- level 1 Example: Cardiac Arrest 15 min
- Emergent- level 2 Example: CP w/ cardiac hx 30 min

- Urgent- level 3 Example: Abdominal pain 60 min
- Less Urgent- level 4 Example: Laceration 120 min
- Nonurgent- level 5 Example: Simple rash 120 min

When can we discharge a patient?

- Stable vitals, no drains, or drips
- Depends on what specific patients are on the floor, who to remove for a higher acuity patient

Education on disaster readiness supply kit

- Backpack, clean clothing, sturdy footwear
- Pocket-knife; 3-day supply of water; 3-day supply of non-perishable food; blankets/sleeping bag/pillow; first aid kit (1 gallon/day)
- Adequate supply of prescription medications; battery operated radio; flashlight & batteries; credit card/cash/traveler's checks
- Extra set of keys and full tank of gas in the car
- Cell phone
- Toiletries
- Matches in waterproof container

PPE

- Level A: highest level of respiratory, skin, eye, and mucus membrane protection
- Hazmat suit all the things
- Level B: highest level of respiratory protection but a lesser level of skin and eye protection than level A
- Hazmat suit but not vapor tight
- Level C: respirator, hood, gloves, boots
- Level D: regular scrubs

What if you don't know what PPE to use? Highest level of PPE

Disaster preparedness and education → supply kit, education your patient/community

Shock: (e.g. massive burns, hypovolemia)

Treatments: LR (most plasma like), albumin (helps hold onto fluid)

Assessment (s/s, and after treatment): infection, sterile gloves/dressing

- Treatments: immediate intervention is to stop the underlying cause
- Assessment (s/s, and after treatment)
 - BP low, HR high, decrease perfusion.
 - Decrease pulses, decrease oxygenation.
 - Want assessment after treatment to stabilize/go back to baseline

Burns: (full-thickness, deep partial-thickness, partial-thickness, Superficial burns)

Pathophysiology:

CV:

- decrease CO
- increased workload on the heart
- increased oxygen demand
- vasoconstriction/tachycardia= decreased tissue perfusion

Pulmonary:

- Upper inhalation injury:
 - obstructive.
 - Upper airway edema.
- Lower inhalation injury
 - Hypersecretion
 - Bronchospasm
 - Loss of ciliary action
 - Severe edema
 - Atelectasis
 - Hypoxia

Fluid

- Shifts out of vessels= decreased plasma
- Permeable capillary walls
 - Third spacing
- Intravascular volume depletion (hypovolemia)

Electrolytes

- Hyperkalemia
- Hyponatremia

Kidneys

- Decreased blood perfusion
 - Decrease GFR
 - Decrease Urine
- Muscle damage
 - Myoglobin released and excreted through kidneys
 - Red urine
- AKI and kidney ischemia

Inflammation

- Coagulation necrosis to tissue and vessels
- Increased neutrophils and monocytes at site
- Fibroblasts and collagen begin repair w/i 6-12 hours

Thermoregulatory

- Loss of temp regulation
- hypothermia

Gastrointestinal

- Decreased tissue perfusion
 - Organ ischemia
 - Hypoactive/absent bowels
 - Decreased feeding tolerance
 - Paralytic ileus
 - Gastric erosion

S/S with nursing actions (LOOK IN BOOK FOR NURSING ACTIONS)

- **Parkland formula- know this!**
- What will be given as medication
- What fluids given, know I's & O's
- Wound Care
 - Clean/Debride (using scissors & forceps) during regular shower or w/ pt in bed
 - Extensive debridement done in OR
 - Daily shower & dressing change done daily
 - Utilize PPE & sterile gloves when applying ointments & sterile dressings
 - Autograft & Allograft
 - Newer biosynthetic options are now available
- Administration of medications
- Nutritional Support
 - Basal metabolic rate is 40-100x higher than normal w/ burn injury
 - Maintain NPO until bowel sounds are heard, slowly advance diet
 - Diet high in protein, carbs, fats, & vitamins

- 5,000 calories daily
 - Monitor I&Os, calorie intake, & daily weight
 - Failure to supply adequate calories & protein leads to malnutrition & delayed healing
- Emotional Support
 - Encourage patient to help with care and look at burns
 - In an acute phase, the patient may not help. This is their way of coping
 - Encourage patient to make decisions in patient's care
 - Assist client through stages of grief
 - Referrals for social workers, psychiatry, counselor, spiritual advisor
- Physical Mobility
 - Deep breathing, turning, and proper positioning
 - Specialty beds
 - PROM & AROM started on day of admission
 - Assist with ambulation as early as possible
 - Splints or functional devices
 - OT & PT

1st degree (superficial/epidermis): EX: sunburn, flashburn

- pink/red
- No blisters
- Minimal edema
- painful/tender
- Sensitive to heat
- Heals 3-6 days

2nd degree type 1 (Superficial partial thickness/epidermis and parts of dermis):Ex: Flash flame, scalds, Brief contact with hot object

- pink/red
- Blisters
- mild/mod edema
- Painful
- Heals w/i 2-3 weeks
- Minor pigment change
- Area involved- damage to entire epidermis and some parts of the dermis
- Appearance
 - Pink to red
 - Blisters

- Mild to moderate edema
- No eschar
- sensation/healing
 - Painful
 - Heals within 2-3 weeks
 - No scarring, but minor pigment changes
- Examples
 - Flash flames and scalds
 - Brief contact with hot object

2nd degree type 2 (deep partial/ epidermis & deep dermis) EX: Flames, Scalds, Grease, tar, chemicals, prolonged exposure to hot objects

- red/white
- Rare blisters
- Mod edema
- Soft & dry eschar
- Painful & sensitive
- Heals w/i 2-6 wks
- Scarring likely/grafting possible
- Area involved- damage to entire epidermis and deep into dermis
- Appearance
 - Red to white
 - Blisters rare
 - Moderate edema
 - Eschar soft and dry
- sensation/healing
 - Painful and sensitive to touch
 - Heals within 2-6 weeks
 - Scarring likely, possible grafting
- examples
 - Flame and scalds
 - Grease, tar, or chemical burns
 - Prolonged exposure to hot objects

3rd degree (Full Thickness): EX: Scalds, Grease, tar, chemicals, electrical burns, prolonged exposure to hot objects

- Area involved- entire epidermis and dermis
- Appearance
 - Red, black, brown, yellow, or white

- No blisters
- Severe edema
- Eschar hard and inelastic
- sensation/healing
 - Sensation minimal or absent
 - Heals within weeks to months
 - Scarring
 - Grafting
- Examples
 - Scalds
 - Grease, tar or electrical burns
 - Prolonged exposure to hot objects

4th Degree (full thickness including fat, fascia, muscle, and or bone): EX: High voltage of prolonged electrical burns, Flames

- Areas involved- damage to all layers of skin, extends to muscles, tendons and bones
- Appearance
 - Black
 - No blisters
 - No edema
 - Eschar hard and inelastic
- Sensation/healing
 - No pain
 - Heals within weeks to months
 - Scarring
 - Grafting
- examples
 - High voltage of prolonged electrical burns
 - flames

Burns – wear sterile gloves, sterile water with gauze when wrapping it, cover the wound, clean/dry cloth can be used as an EMERGENCY dressing. Cool water briefly to cool the wound pg.1854 in book. Do not use ice or wrap in ice or cold soaks

****Know the types of burns****

Labs (ABGs, fluid volume, potassium, H&H)

- ABG→ PH: 7.35-7.45, CO2: 34-45, HCO3: 22-26

- Fluid Volume → massive shift of fluids out of the vessels. Plasma is lost. H₂O, Na⁺, Plasma protein (albumin) move into the interstitial space and surrounding tissues causing 3rd spacing
- Elevated Hemoglobin is commonly caused by hemoconcentration resulting from fluid loss (hypovolemia). The fluid loss is total plasma water. The fluid leaves the vascular system due to the loss of the vascular permeability, which leaves the RBC in the vascular system. Which falsely makes the H&H appear high. “Up to half of the total plasma water can be lost from the vascular compartment within 2 to 3 hours after a 40% TBSA burn.”⁶ Intravascular hypovolemia and a Elevated Hemoglobin is commonly caused by hemoconcentration resulting from fluid loss (hypovolemia). The fluid loss is total plasma water. The fluid leaves the vascular system due to the loss of the vascular permeability, which leave the RBC in the vascular system. Which falsely makes the H&H appear high. “Up to half of the total plasma water can be lost from the vascular compartment within 2 to 3 hours after a 40% TBSA burn.”⁶ Intravascular hypovolemia and a

THIS PROCESS RESULTS IN INTRAVASCULAR VOLUME DEPLETION

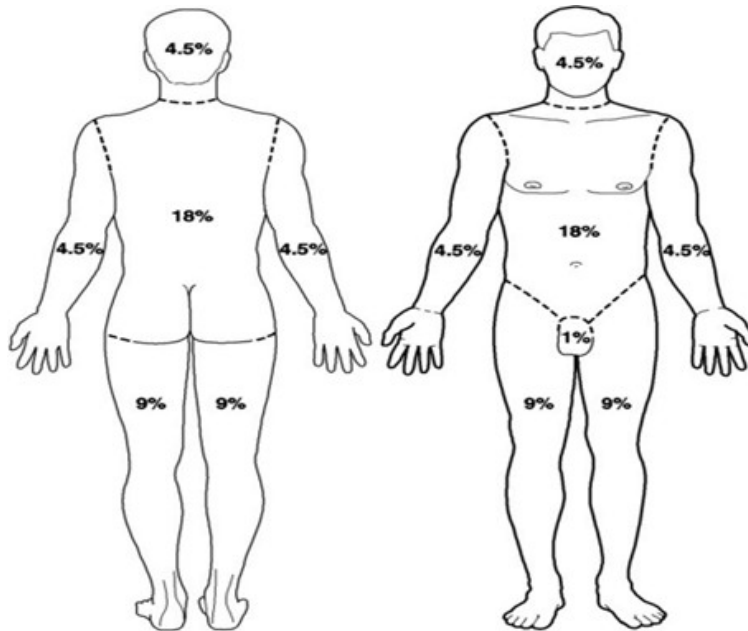
- Potassium → 3.5-5.3(will increase as they help injured cells with circulation) Sodium 135-145 (will decrease until edema formation ends)
- H&H → Hematocrit 14-18 Hemoglobin 35-48

Treatments including fluids, how to monitor each system, surgical procedures

- ❖ Lactated ringers are most plasma-like. This is the first choice of fluids. You use the rule of 9s to decide the amount of fluid needed based on the percentage of body burned.
- ❖ Escharotomy
 - Incision through the eschar
 - Relieves pressure & improves circulation
- ❖ Fasciotomy
 - Incision through the eschar & fascia
 - Relieves pressure when escharotomy does not & improves circulation
- ❖ Skin coverings
 - Biologic skin coverings
 - Autograft: patient’s own skin
 - Allograft: cadaver skin
 - Xenograft: skin from animals
 - Synthetic skin coverings
 - Biosynthetic dressings
 - Wound grafts

Prioritize care: Airway, Breathing, Circulation, Fluids, Pain

Rule of nines (what it is and do a calculation of it)- quick method to approximate the extent of burns by dividing the body into multiples of nine. The sum equals the TBSA.



- Lund-Browder Chart- most exact method of estimating the extent of the burn

Psychosocial aspects

- Provide support
- Prevent scars and contractures
- Resume activities such as work, family, and social roles

Fire safety

- Know RACE- Rescue, Alarm, Confine, Extinguish/Evacuate
- Stop, Drop, & Roll

Bioterrorism: (category, s/s—first and later, how it is transmitted, treatments/actions)

Anthrax: caused by *Bacillus anthracis*

- Transmitted: raw meat, inhalation of spore
- Odorless & invisible: can travel long distance before disseminating
- Blood test - detects anthrax
- Treatment: Penicillin, Erythromycin, Gentamicin, Doxycycline
- Precautions: not contagious, Cremation is recommended
- Vaccine has limited availability

- s/s—early: flu like, sore throat, mild fever, fatigue
- Late: Chest discomfort, SOB, coughing up blood, painful swallowing, high fever, trouble breathing, shock, meningitis.

Ebola virus:

- s/s—first and later, how it is transmitted, treatments/actions
- Spread through contact contaminated blood or bodily fluids

Sarin gas (Nerve agent)

- S/S: increased secretions, GI motility, diarrhea, bronchospasm
- Decontamination: mild soap & water / diluted bleach water (boardvitals)
- Treatment: supportive care, Benzos, Atropine, Pralidoxime

Smallpox: DNA Virus

- Transmission: Contact & droplet
 - Highly contagious - vaccine available
- Symptoms: 7-17 days after exposure
 - Fever, back pain, N/V, malaise, HA
 - 1-2 days after symptoms begin: maculopapular rash

Hydrogen cyanide

- S/S- tachypnea, tachycardia, coma, seizures, can progress to respiratory arrest, respiratory failure, cardiac arrest, death
- Decontaminated with soap and water
- Treatment: sodium nitrate, sodium thiocyanate, hydroxocobalamin
- Transmitted: air, drinking water, food, and soil containing cyanide.

Botulism: caused by *Clostridium botulinum* (serious paralytic illness)

- Contraction: inhalation, improperly canned food, contaminated wound, cannot spread person to person
- Progress to paralysis of arms, legs, trunk, respiratory muscles
 - Ingested - neuro symptoms begin 12 - 36 hrs
 - Inhalation - neuro symptoms begin 24 - 72 hrs
- Food & wound can be treated if dx early
- NO vaccine

Med Math ** know how to figure rule of 9s** know parkland baxter formula** $mL \times kg \times TBSA = 24 \text{ hr fluid}$. Given $\frac{1}{2}$ first 8 hr, $\frac{1}{4}$ hr 8-16, $\frac{1}{4}$ hr 16-24

Frost bite:

- **1st degree:** superficial. Red to pale skin
- **2nd degree:** partial thickness. Red to pale skin.
 - o May blister after a few days
 - o No long term damage
- **3rd degree:** deep tissue
 - o Hard and necrotic when rewarmed
 - o May require debridement
- **4th degree:** Deeper tissue
 - o Necrosis (complete lack of blood flow)
 - o May require amputation
- **MANAGEMENT:** maintain and restore body temp (blankets)
 - o Monitor for s/s of infection
 - o Anticipate wound care

Heat Stroke:

- Engaging in strenuous activity in hot, humid weather (can be seen in sedentary individuals)
- **S/S of heat EXHAUSTION:**
 - Hypotension
 - Tachycardia
 - Elevated temp
 - Dilated pupils
 - Mild confusion
 - Ashen color
 - Profuse diaphoresis
- **S/S of heat STROKE**
 - $>104 \text{ F}$
 - Lack of perspiration (body unable to cool itself)
 - Hypotension
 - Tachycardia
 - AMS- hallucinations, loss of muscle coordination, combative
 - Abnormal K and Na levels
- Heat Stroke death is directly r/t amount of time body temp remains elevated.
- **Management:**
 - Cool sheets/towels/blankets

- Cold bath, Ice
- Environmental control
- Rectal thermometer
- Monitor airway, VS, EKG, mental status, UO, labs
- **Prevention:**
 - Light, loose clothing
 - At least 30 SPF
 - Take cool shower/bath if overheated

Carbon monoxide poisoning

- NORMAL = 1-10
 - HA, flushing, decreased visual acuity, decreased cerebral functioning, slight breathlessness
- MILD = 11-20
- MODERATE = 21-40
- SEVERE = 41-60
- FATAL = 61-80
- Clinical manifestations
 - Blood level 11-20% mild poisoning
 - HA
 - Flushing
 - Decreased visual acuity
 - Decreased cerebral functioning/ sleepiness
 - Slight breathlessness
 - Blood level 21-40% moderate poisoning
 - HA
 - N/V
 - Drowsiness
 - Tinnitus & vertigo
 - Confusion & stupor
 - Pale to reddish-purple skin
 - Decreased BP
 - Increased & irregular heartbeat
 - Depressed ST segment on ECG
 - Blood level 41-60% severe poisoning
 - Coma
 - Seizures
 - Cardiopulmonary instability

- Blood level 61-80% fatal poisoning
 - Death
- Possible hypovolemia & shock
 - Results from fluid shifts from intracellular and intravascular space → interstitial space

Carbon monoxide detectors in house

Treatment → get them out of the environment and treat the symptoms

Kahoot

- Why is open head injury last? → brain open, in the field triaging the probability of that patient surviving is minimal