EM INDEX

EM BRIEF

Exploration. Expedition. Experience.

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Environmental Medicine Rodeo Cards

Briefing:

If participant numbers allow, and there are no empty stations, you can have the inner circle be patients moving CW, outer circle move CCW; switch rescuer/pt role every 4 minutes.

Briefing:

Pairs of cards are laid out in a line/circle.

Pair up; 1 person is pt, the other is rescuer. You have 4 minutes at each station to figure out pt's problem and discuss treatment.

If rescuer is stumped after 3 minutes pt should go over problem, tx, & other info on their card w/ rescuer.

After 4 min rescuer & pt. move on to next set of cards in the line, & switch roles so pt is now rescuer and vice versa.

BYO watch to know when it's 3 minutes.

If the rescuer gets the problem quickly; discuss it in more detail.

Only 4 minutes, so don't dilly-dally.

Write down questions for later group discussion.

If AVPU is V/P/U, act that way, only coming out to give info like vitals.

Abbreviations you should know:

CPR, PROP, ICP, TBI, LOC, PPV, IV

WFA: 1-12. WAFA: 1-16. WFR: 1-20

1. Mild hypothermia, acute onset
2. Mild hypothermia, subacute onset
3. Severe hypothermia
4. Heat exhaustion
5. Heat stroke
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EM

RESCUER

EM

PATIENT

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1. Mild hypothermia, acute onset

(Be lying down, curled up in a ball, full-body hard shivering). 15-year-old, fell overboard; 15 minutes in 10° C water

Chief complaint: Uncontrolled full-body shivering

Medical history: none

Exam: Pale, cold, wet skin

Vitals: pulse 92, respirations 16, temperature 36 deg C, skin pale/cool/wet, LOC Awake + lethargic

Treatment: Warm dry clothes, out of cold/wet/windy weather (e.g. in a shelter), hot sweet liquids, sugary foods, exercise.

Notes: Because onset is acute (rapid), patient still has sugar stores to burn so ok to exercise, burning sugar stores to generate heat.

Prevention: Appropriate clothes/gear, staying fed & hydrated, aggressive early actions.

1.

Patient: 15-year-old male, 52 kg (115 lbs), 170 cm (5’ 7”)

Setting: Lake crossing on paddling trip, 10° C (50° F) cloudy day, windy with big waves. Canoe tips over; skinny participant dumped into cool water. About 15 minutes elapse by the time student gets back into boat; the person is shivering violently.

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2. Mild hypothermia, sub-acute onset

(Be lying down, curled up in a ball, shivering hard) 40-year-old hunter, lost in woods for 2 days, 10° C outside & has been raining.

Chief complaint: Uncontrolled full-body shivering

Medical history: none

Exam: Pale, cold, wet skin

Vitals: pulse 92, respirations 16, temperature 36 deg C, skin pale/cool/wet, LOC Awake + lethargic

Treatment: Warm dry clothes, out of cold/wet/windy weather (e.g. in a shelter), hot sweet liquids, sugary foods, exercise.

Notes: Because onset is sub-acute (slower), patient may not have sugar stores left to burn. So don't have patient exercise until they have consumed sugars they can burn to generate heat.

Prevent with appropriate clothes/gear, staying fed & hydrated, aggressive early actions.

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2.

Patient: 40-year-old hunter

Setting: Got lost on autumn hunting trip for the last 48 hours. Found huddled under a log in the woods. Environment is 10° C (50° F) outside; rained lightly last night.

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3. Severe hypothermia (Be lying down, curled up in a ball, unresponsive except to come out of character to give vitals, etc., then go back into unresponsive character)

19-year-old kayaker floating for hours in 10° C water

Chief complaint: Unresponsive

Medical history: Unknown

Exam: Pale cold skin.

Vitals: pulse, respirations undetectable; temperature if taken 29° C (84° F), LOC Unresponsive

Treatment: Lift horizontally (not vertically) into rescue vessel. Hypowrap package with added heat source (e.g. hot water bottles) on thorax; urgent gentle evacuation in horizontal position; PPV w/ warmed & humidified oxygen & warmed IV if available; no chest compressions.

Prevent with appropriate clothes/gear, staying fed & hydrated, aggressive early actions. If unable to evacuate (rare), try on-site re-warming (difficult).

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3.

Patient: Nineteen-year-old

Setting: Patient is one of a group on a sea kayaking expedition, caught a mile from shore in stormy weather. Patient capsized and was floating in 10° C (50° F) for hours before rescue team arrived. Patient is floating in water next to your rescue motorboat.

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4. Heat exhaustion

18-year-old hiker in hot desert environment

Chief complaint: Headache the last hour, getting worse; recent nausea; just threw up.

Medical history: Drank 1 liter of water since 7 am. Urinated twice this morning. Lives in a cold environment, and usually sedentary, so long hikes in the hot weather are new.

Exam: Normal

Vitals: pulse, respirations, temperature normal. Skin pink, hot, sweaty. LOC Awake & unhappy.

Treatment: Stop exercise, heat exposure. Give fluids (and electrolytes) if dehydrated.

Notes: This is primarily an issue of fatigue from exercise. Dehydration may or may not be an issue. Can take 12-24 hours for complete recovery; thus, modify activity as needed.

4.

Patient: 18-year-old hiker

Setting: Day three of week-long desert Spring break backpacking trip in the desert. Have been hiking since first light at 7:30 am (in order to beat the heat), now 11:00 am. Participant complains of headache the last hour, getting worse, recent nausea, and just vomited once.

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5. Heat stroke (Be lying on your stomach, pain responsive only. Come out of character to give vitals, etc., then go back into pain-responsive state) 24-year-old on all-day endurance hike in 32° C tropical forest environment

Chief complaint: Pain responsive.

Medical history: Unknown

Exam: Unremarkable

Vitals: pulse 96, respirations 20, temperature 41°C (105°F), Skin red hot sweaty, LOC P

Treatment: Immediate and aggressive cooling; stop exertion & remove from heat; hydration & ideally evacuation.

Notes: Skin in heat stoke can be red or pale, wet or dry. Anyone with altered mental status in the heat: assume heat stroke and cool the patient aggressively. Beware of drugs that inhibit heat loss: antihistamines, vasoconstrictors (e.g. pseudoephedrine), psychotropics.

Red flags: vitals don't normalize, patient doesn't improve, red or brown or reduced urine output.

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5.

Patient: 24-year-old

Setting: All-day endurance hike on adult team-building program in tropical forest. 32° C (90° F) and high humidity.

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6. Exertional hyponatremia (excessive water intake) (Be sitting down, shaking with tremors) 34-year-old tourist not used to heat, hiking in desert heat.

Chief complaint: Altered mental status

Medical history: Drank 3 liters of water today; no food since breakfast. Nauseous & headache since mid-day. Feels weak.

Exam: Tremors

Vitals: all normal except LOC Awake & disoriented

Treatment: Restrict fluid intake. Salty snacks unlikely to give enough salt to help. Rest; evacuate if not improving. If dehydrated (rare), give fluids, but not without salts.

Notes: An over-hydration problem. Easily confused with other heat-related illness. Look at history, mechanism of injury/illness to assess. Extreme athletes particularly susceptible.

6.

Patient: 34-year-old tourist from Toronto, Canada

Setting: Hiking during warm day in late spring through a desert canyon.

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7. Near Drowning (be lying down, unresponsive except to come out of character to give vitals, etc., then go back into unresponsive character) 29 year old floating in water.

Chief complaint: Unresponsive

Medical history: Normal

Exam: Bruise on left temple

Vitals: 1st: pulse 80, respirations 4, skin pale/cool/clammy, LOC unresponsive. 2 minutes later following PPVs: pulse 80, respirations 28 + labored, skin pale/cool/clammy, LOC Awake + groggy

Treatment: Axial drag to shore, basic life support, PROP, spine immobilization, monitor for increased ICP, hypowrap as needed, evacuation.
Notes: Anticipated problems: increased ICP (from TBI or brain hypoxia), post-rescue pulmonary edema (inhaled water unwelcome in lungs & causes leakage from capillaries into lungs over 24 hours post-rescue). If patient remained conscious & was able to maintain airway, not near-drowning. Prevention is key.

7.

Patient: Twenty-nine year old female

Setting: At base of class III (moderately difficult) rapids. Boater fell out of boat, caught in recirculating hole, eventually spit out. Personal floatation device ("life jacket") has been ripped off. Found floating face-down in eddy at bottom of rapids.

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8. Lightning strike (needs rescue breathing) (be lying down, unresponsive except to come out of character to give vitals, etc., then go back into unresponsive character) 10-year-old at camp, hit by lightning

Chief complaint: Unresponsive

Med. history: Unknown

Exam: Feather-like superficial burns on skin

Vitals: Not breathing, has irregular pulse. T° normal. Skin pale/cool/wet. LOC unresponsive.

Treatment: PPVs (rescue breathing) specifically.

Notes: Consider rescuer safety in lightning incidents; bring patient to safe area as needed prior to treatment. When you 1st note thunder or lightning, get to safe macro-environment (off peak, not in open area/open water). When time between lightning and thunder 15 or 20 seconds (consult local protocols), spread out & get in safe micro-environment (low area away from prominent tall things, or in a car or similar) & if not in car/big building then crouch on insulating item like foam sleeping pad, life jacket or backpack.

8.

Patient: 10-year-old male

Setting: At camp, in rainstorm. Bystanders noted nearby lightning. Lightning hits nearby tall tree.

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9. Lightning strike (minor ground current)

12-year-old female, hit by lightning

Chief complaint: Tingling in legs

Medical history: Remembers big flash, being thrown back. Remembers entire event.

Exam: Mild bruising, tenderness on back from ground-level fall. Tingling in legs.

Vitals: Pulse, respirations, temperature normal. Skin pale/cool/wet. LOC Awake + anxious.

Treatment: Ice, Non-Steroidal Anti-inflammatory Drugs (NSAIDS, like ibuprofen) for stable musculoskeletal injury. Evacuate if significant or persistent tingling or other neurological symptoms.

Notes: Tingling sensation & hair standing on end is a sign of an imminent lightning strike. In all lightning strikes, beware of possibility of multiple victims. This was minor ground current, not direct strike or splash strike (which are more serious).

Prevention is key with lightning.

9.

Patient: 12-year-old female

Setting: Camping trip in the woods; rainstorm. Patient was out gathering firewood away from camp while others were setting up camp. Experienced tingling sensation & hair standing on end just prior to lightning strike. Lightning hit a tree about 30 meters (100 feet) away.

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10. Lightning strike (direct or splash strike)

(be lying down, unresponsive except to come out of character to give vitals, etc., then go back into unresponsive character) 41-year-old, hit by lightning

Chief complaint: Unresponsive

Med. history: Unknown

Exam: Small punctuate burns (look like cigarette burns) on body

Vitals: No pulse, no breathing. Skin pale, cool, wet. LOC Unresponsive

Treatment: CPR, evacuate.

Notes: feather-like or punctuate burns occur on some lightning victims and are usually self-resolving in a few days.

CPR in persons with intrinsically healthy heart (e.g. drowning, lightning mechanisms for cardiac arrest) may be saved with CPR, unlike arrests from trauma. Don't be near a large tree during thunderstorms! In lightning cases, treat any trauma found & hypothermia as needed.

Prevention is key.

10.

Patient: 41-year-old male

Setting: Camping trip. Subject was putting up a tarp on a large tree at the campsite as a thunderstorm moved in. Lightning strikes in immediate area moments ago.

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11. Allergy: mild allergic reaction

(be running around a bit, waving hands, shouting "Aaah! Go away!" at bees.) 16-year-old, stung by bee

Chief complaint: Stung by bee; very itchy hives on body

Medical history: Gets hives when stung by bees

Exam: Raised red bumps (hives) on abdomen, chest

Vitals: pulse 112, respirations 32, skin pale/cool/clammy, LOC Awake + anxious

Treatment: Systemic antihistamine (e.g. diphenhydramine, 25-50 mg (1-2 tabs)); observe for onset of anaphylaxis

Notes: This is not anaphylaxis (yet), as there are no signs besides hives.

11.

Patient: 16-year-old female

Setting: At camp, patient is running around, waving hands, shouting.

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12. Allergy: anaphylaxis

(be sitting on ground, panting & itching legs) 18-year-old, stung by wasp

Chief complaint: Itchy legs, abdomen; respiratory distress

Medical history: Gets hives and throat swelling when stung by bees, wasps or hornets. Just stung by wasp. Throat feels itchy, tickly & swollen.

Exam: Raised red bumps (hives) on abdomen, chest

Vitals: pulse 112, respirations 60 & labored, skin pale/cool/clammy, LOC Awake + anxious

Treatment: .3 mg epinephrine, antihistamine (e.g. 25-50 mg oral diphenhydramine), 40-60 mg prednisone esp. if extended evacuation, evacuate.

Notes: All cases of anaphylaxis should be evacuated, following administration of epinephrine. Epinephrine is the definitive treatment for anaphylaxis.

12.

Patient: 18-year-old

Setting: At basecamp, having lunch, stung by wasp.

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13. Mild temp resp. distress from submersion

(be sitting up, leaning forward, breathing hard)
25-year-old, self-rescued from boat capsize

Chief complaint: Respiratory distress

Medical history: Did not lose consciousness; did not hit head; stayed awake during swim but took in a little water.

Exam: Unremarkable.

Vitals: pulse 92, respirations 24 & coughing, temperatures normal, skin pink cool wet, LOC Awake + cooperative

Treatment: PROP (in this case, primarily **P**osition for best respiration and **R**eassurance). Since the patient was able to control his/her airway during the entire incident, little water entered the lungs. Therefore, this is not an emergency; evacuation is not necessary.

13.

Patient: 25-year-old boater

Setting: Afternoon of day-long white-water paddling trip. Boater loses control in rapids, takes an extended swim down the rapids. Climbs out of the river from the pool at the base of the rapids, found on the bank.

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14. Toxins: Pit viper (snake) envenomation

68 year old, bit by snake on ankle, south-central USA

Chief complaint: Painful, swollen, black & blue ankle

Medical history: Bitten by snake

Exam: Two small puncture wounds on outside of ankle. Ankle is painful, swollen, and has bruising coloration.

Vitals: pulse 80, respirations 20, temperature normal, skin pale/cool/clammy, LOC Awake + anxious

Treatment: Evacuate to antivenom; remove constricting articles like bracelets & rings due to swelling; splint extremity if doesn't delay evacuate; basic life support as needed. No tourniquets, ice, or suction.

Notes: Mark progress of swelling so hospital can evaluate severity. Call hospital to confirm antivenom availability and prep for patient arrival. Severe pit viper envenomations may show shock, organ failure & death, particularly w/ young, old & infirm. This happens to be a copperhead envenomation. Risk management & **prevention** are key.

14.

Patient: Sixty-eight year old male

Setting: Warm day on an early autumn deer-hunting trip, wooded area in south-central USA. Has painful ankle injury from snakebite. Snake was 76 cm (2.5 ft.), had triangular bronze-colored head and brown and rust-colored hourglass-like banding patterns, vertical eye slits, and vibrated its tail (which had no rattles) just before striking.

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15. Toxins: Black widow spider bite

41-year-old female, bit by spider 2 hours ago while cleaning a woodshed

Chief complaint: Painful abdominal cramping

Medical history: Abdominal cramping, severe pain, nausea, numbness & tingling

Exam: Red-ringed pale swollen area on forearm

Vitals: pulse 92, respirations 20, temperature 38°C (101°F), skin pink, warm, wet; LOC Awake + anxious

Treatment: Pain medications; clean wound; basic life support as needed; sedative/anticonvulsant medications like diazepam (e.g. Valium); possibly antivenom.

Notes: Prevention is key: avoid reaching ungloved into confined or dark spaces in black widow habitat. Inspect it before you use it. Bites rarely fatal.

15.

Patient: 41-year-old female

Setting: Rustic lodge setting in warm climate. Subject was cleaning out a woodshed. Subject had pinprick bite from some small creature perhaps a couple hours ago, now complaining of cramping in the abdomen, pain, numbness and tingling, getting worse since the bite.

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16. Toxins: scorpion sting

40-year-old, bit by scorpion in sleeping bag

Chief complaint: Painful area on leg.

Medical history: Painful area on leg.

Exam: Swollen red area on leg. A crushed scorpion is found in the sleeping bag.

Vitals: Normal

Treatment: Ice, cool soaks for comfort care; clean out wound; if severe symptoms, evacuate for hospital care (which may include antivenom).

Notes: Scorpions are found in warm dry areas worldwide. Rarely fatal.

Prevention is key: inspect it before you use it; use gloves. Severe envenomations may present with excitability, salivation, convulsions, paralysis & respiratory failure.

16.

Patient: 40-year-old

Setting: Geological survey in the remote desert site. Subject crawls into sleeping bag after dinner and immediately leaps out, crying "Something stung me!"

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17. Asthma, mild

16-year-old, hiking in cold air

Chief complaint: Chest feels tight; can't get a deep breath

Medical history: Asthma, cold-induced, also allergic to pine tree pollen, grass pollen. Hospitalized from asthma attack when 13 years old. Carries inhaler, which usually works.

Exam: Accessory muscles are used in shoulders, neck to help breathe.

Vitals: pulse 120, respirations 40 + wheezing & coughing, skin pale cool clammy. LOC Awake + very anxious.

Treatment: PROP, inhaler, rest. Evacuate if patient doesn't improve. Use epinephrine and prednisone if severe (respiratory failure); this is a mild case.

Notes: Can be brought on by exercise, cold air, infection, allergens. To use inhaler, shake up to 10x; hold 4 cm from mouth or use spacer; spray while patient inhales; hold for 10+ seconds; repeat after 1 minute.

17.

Patient: 16-year-old

Setting: Morning of day 2 of a 10-day mountain backpacking trip. Frosty morning, cold air, begin steep climb up switchbacks. About 10 minutes into the hike word comes from the back of the group that group member is having a problem.

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18. Asthma, severe

(Lean forward, bent over at waist, gasping for air) 21-year-old, trouble breathing while jogging

Chief complaint: Altered mental status, resp. failure

Medical History: Asthma, exercise-induced, also allergic to cat dander. Hospitalized from asthma attack when 13 years old. Tried metered dose inhaler (MDI) twice in last 3 minutes, but not effective.

Exam: Accessory muscles are used in shoulders, neck to help breathe.

Vitals: pulse 128, respirations 60+wheezing, skin pale/cool/clammy w/ lips cyanotic (bluish). LOC Awake + sleepy

Treatment: PROP, inhaler, rest. If MDI doesn't work, as in this case, trained & certified providers give epinephrine (.3 mg) & prednisone (40-60 mg) & inhaler 6-10 puffs up to 3x over next hour & evacuate.

18.

Patient: 21-year-old

Setting: Subject is on early morning jog, and falls back, complaining can't catch breath, leans forward and gasping.

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19. Frostbite

27-year-old, on winter skiing trip

Chief complaint: Soft, pale, cold numb toes.

Medical history: Diabetic

Exam: Toes are white and doughy-feeling

Vitals: Normal except pale cool skin.

Treatment: Rewarm: cover area; feed & hydrate & warm patient. Manage post-thaw blisters; don't re-freeze.

Notes: Frostbite can be superficial (frostnip), partial or full thickness (this is partial; frostnip has same treatment). Full thickness frostbite should be evacuated if possible; re-warm in recirculating 38°C (100°F) water bath if not. Tight clothing/splints, ice/metal contact, vasoconstrictors, evaporative cooling, shell/core effect & wind chill facilitate frostbite.

Prevention and early intervention are key: stay hydrated & fed; use proper clothing & equipment; dress and act appropriate to weather/environment.

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19.

Patient: 27-year-old

Setting: Winter skiing trip. -15°C (5°F), windy with 32 kph (20 mph) gusts. Patient complains toes feel numb.

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20. High altitude pulmonary edema (HAPE)

29-year-old, on mountaineering expedition

Chief complaint: Respiratory failure

Medical history: 2 days ago at 3,700 m (12,000 ft.) difficulty breathing on exertion, cough, headache & insomnia. Last night at 3,500 m (11,000 ft.) didn't eat, had headache, severe difficulty breathing, and coughing spasms. This morning weak, exhausted, with lung crackles; can't get out of sleeping bag.

Exam: Facial cyanosis (bluish cast to face).

Vitals: pulse & respirations elevated; skin pale/cyanotic; LOC Awake + disoriented

Treatment: Descent! PROP, including oxygen. Nifedipine or tadalafil. You should not have let it get to this stage. HAPE caused by traveling too high, too fast; due to lowered available oxygen at altitude blood pH (acidity) changes & fluid leaks into lungs (and head, extremities), resulting in respiratory & other problems.

20.

Patient: 29-year-old tourist

Setting: Morning of day four of mountaineering trip. 1st night camped at 3,000 m (9,800 ft.) after drive from sea level to trailhead. 2nd night camped at 3,700 m (12,000 ft.). Climber had difficulty breathing on exertion, cough, headache & insomnia. Last night descended to 3,500 m (11,000 ft.). Climber didn't eat, had headache, severe difficulty breathing, and coughing spasms. This morning found weak, exhausted, and cyanotic (bluish skin), with lung crackles; couldn't get out of sleeping bag.

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