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Atherton Disaster and
Preparedness Team

Beyond Basic First Aid in a Large-Scale Disaster

June 2021 Advanced Training
Barbara Kostick, M.D.



Agenda



- Supplies, communication & triage (review)
- The five most common injuries in large-scale disasters
 1. Burns
 2. Fractures
 3. Bleeding
 4. Head trauma
 5. Shock
- For each injury, we'll discuss possible symptoms & interim treatment



Grab Your Supplies...



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Go Bag With First Aid Kit



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First Aid Basics Handout
Presented by Dr. Paul Jamieson in January 2021



Go Bag

The A.D.A.P.T. Go Bag is designed for Area Coordinators and other neighborhood leaders to use in the field after a disaster. It includes the supplies listed below.

<p>Storage: Backpack with wheels and storage compartments</p> <p>Identification: Hard hat (laboratory green) (2017) Safety vest (high-visibility neon) Lanyard and ID card holder</p> <p>Field Safety: Safety goggles Shut nozzle (2017, tool) Nitrile gloves (2 pair) Heavy-duty work gloves Earplugs</p> <p>Night Operations: LED flashlight with batteries LED headlamp with batteries Glow stick (12-hour) Whistle with lanyard</p> <p>Weather Protection: Poncho Survival blanket</p> <p>Shut-Term Nutrition: Water pouch Power bar</p> <p>Light Search & Rescue: Pry bar (37") Multi-tool Gas shut-off tool (2 in 1 tool) Shut-tight (22 yards) Grease pencil (Sears/Roebuck's, chalk) "Cactus" laminate tape (200") Nosepad, pen & pencil</p>		<p>20. Alcohol Supplies 21. Tweezers 22. Scissors 23. Sterile saline for eyewash or wound irrigation 24. Cold pack 25. Medications 26. Aspirin 27. Advil 28. Tylenol 29. Pepto-Bismol 30. Benadryl 31. Sugar tablet 32. Antibiotic ointment 33. Electrolyte concentrate like powdered Pedialyte or Glucosade 34. Vaseline 35. Baking Soda 36. DEET 37. Tincture for poison oak/hy 38. Aloe 39. Hydrocortisone 40. Arnica 41. Epsom Salts</p> <p style="font-size: x-small;">Dioxin sanitizer wipes, Isopropyl Alcohol, N 95 lens), face shield, latex-free gloves.</p>
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For more information about Atherton emergency preparedness and response, please visit www.getreadyatherton.org.

A.D.A.P.T. | 150 Watson Ave., Atherton CA 94027 | www.getreadyatherton.org

Download supply lists from ADAPT's Resource Library:
www.getreadyatherton.org/resource-library

Communicating with an Injured Person



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First:

- Introduce yourself by name
- Ask if you can help
- Get history of injury

Then:

- Triage (how severe is the problem?)
- Treatment (what do we do about it?)



Today's focus

Always:

- Protect yourself and your teammates
- Sustain calm manner in the midst of the chaos



Communication Exercise



Hello, my name is _____.

I'm an emergency preparedness volunteer.

How may I help you?

Can you tell me what happened?

Triage



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- Process of evaluating patients to determine the extent of their injuries and the appropriate medical care.
- What to evaluate?

Ambulation

(Can they walk?)



Respirations

(How fast are they breathing?)



Perfusion

(How fast does nail bed color refresh?)



Pulse

(What is their heart rate?)



Mental Status

(Are they alert & responsive?)



Triage Process = START

Simple Triage And Rapid Treatment



1. Use your voice to identify the “walking wounded”
 - “If you can hear me, walk toward the sound of my voice”
2. Then, evaluate remaining survivors and assign colors
 - Spend < 2 minutes per victim. Do not treat!

MINOR

- Follows simple commands and
- < 30 breaths/minute and
- < 2 sec capillary refill and
- **Walking**

DELAYED

- Follows simple commands and
- < 30 breaths/minute and
- < 2 sec capillary refill and
- **Can't walk**

IMMEDIATE

- Can't follow simple commands **or**
- > 30 breaths/minute **or**
- > 2 sec capillary refill **or**
- Breathing but unconscious

Common Injuries in Large-Scale Disasters



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1. Burns

2. Fractures

3. Bleeding

4. Head trauma

5. Shock

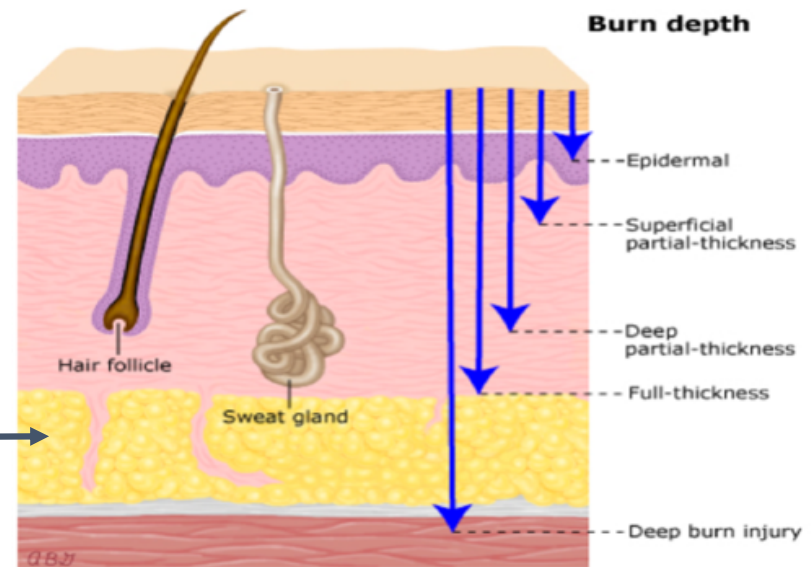


Evaluating Thermal Burns (Heat/Fire)



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- Skin damage
 - Blisters?
 - Discoloration?
- Injured tissue
 - Superficial (minor)
 - Partial thickness
 - Full thickness
- Pain
 - With or without pressure?



Source: UpToDate, "Treatment of Minor and Thermal Burns"



Thermal Burns – Treat or Transport?



- **When to treat:**
 - For partial thickness burns, treat if < 5-10% of body is burned
 - For full thickness burns, treat if < 2% of body is burned
- **When to transport:**
 - Deep partial thickness burns
 - Burns on the face or involving a joint
 - Patient under 10 years old
 - Possible smoke inhalation
 - Circumferential burn or co-morbidities



Thermal Burns – Treatment

Question:

What do we use to cool the burn?

- A. Ice chips
- B. Saline and ice together (4:1)
- C. Ambient temperature saline
- D. Water, like a good white wine, best served chilled (not cold)@ 550°F



Thermal Burns – Treatment



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1. Cool

- Remove any unattached clothing and jewelry
- Cool with gauze soaked in cool water (up to 30 min)

2. Clean with mild soap

3. Dress partial thickness burns

- With non-adherent gauze (eg Adaptic), or with Bacitracin, then gauze
- Add layer of fluffed gauze, roll w/ elastic bandage (eg Kerlix)
- Change daily in the field



Thermal Burns – Additional Info



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- Fingers and toes need fluffed 4x4 sterile gauze between each digit
- Superficial burns do not need antibiotic ointment, only a non-adhering dressing (eg Adaptic)
- For pain relief, patient may want to continue cooling with clean gauze and water but the same 30 min total time applies. ASA or NSAIDs as needed for pain.
- Keep burn blisters intact to provide a moist environment for the tissue to heal
- Change daily in the field. If blisters have "popped" remove the dead skin with a clean scissors. Evaluate as you dress the area, re-assess the degree of burn.



Thermal Burns – Additional Info



- Do not put any ointment on burns that will be transported to hospital/burn center
- For superficial burns, aloe and honey may help and not impair wound healing
- At daily dressing changes, look for signs of infection, increasing depth of the burn, and scarring or contracture of tissues
- Infected colonization will need hospital care. Questionable healing should also be evaluated by medical personnel.
- Epithelialization (part of wound healing) should be starting by 48 hours



Common Injuries in Large-Scale Disasters



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Fractures – Symptoms

- How to evaluate:
 - Get history of the injury
 - Examine skin around wide area for breakage or puncture wound
 - Avoid passive range of motion
 - Examine fracture and adjacent area for neurovascular compromise (eg loss of sensation)
 - **CHECK PULSE distal to injury**
 - **Check motor and sensory function distal to injury**
 - **Check distal skin color and temperature**
- If you can, determine the fracture type
 - Describe the fracture (at least the area or bone involved)
 - Displaced vs non-displaced?
 - Open or closed?
 - Medial or lateral?



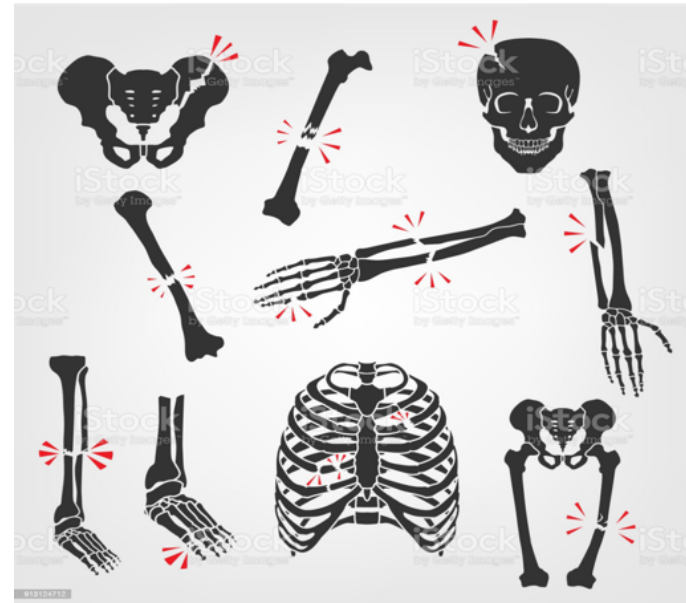
Fractures – Treatment



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- Fractures need **splinting** to:
 - Protect from further injury
 - Provide pain relief (plus ice)
- When doubt if there is a fracture, splint until further diagnostic procedure is available



Fractures – Additional Info (Red Flags)



- Always evaluate for neurovascular (nerve, artery, vein) compromise first, before moving patient
 - General rule is “splint it where it lies” but if neurovascular compromise, reposition and recheck for improvement
- Pelvic fractures (die from internal bleeding)
- Compound fractures & Acute Compartment Syndrome (ACS) (see next slides)



Recognizing Compound Fractures



- Broken bone with a break in the skin barrier
 - Type 1: Puncture wound (≤ 1 cm) with minimal contamination and minimal muscle injury
 - Type 2: Laceration (>1 cm) with moderate soft tissue damage
 - Type 3: Extensive soft tissue damage with severe crush injury of muscle and massive contamination



Recognizing Acute Compartment Syndrome (ACS)



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- Significant extremity pain that may be "out of proportion" to apparent injury that increases rapidly over a few hours.
- Pain exacerbated by **passive** stretch of muscle within the compartment.
- Excessive or disproportionate increase in extremity girth. Tense firm "compartment."
- Compartment-specific neurovascular findings (eg, reduced sensation, muscle weakness, diminished pulses).



Acute Compartment Syndrome



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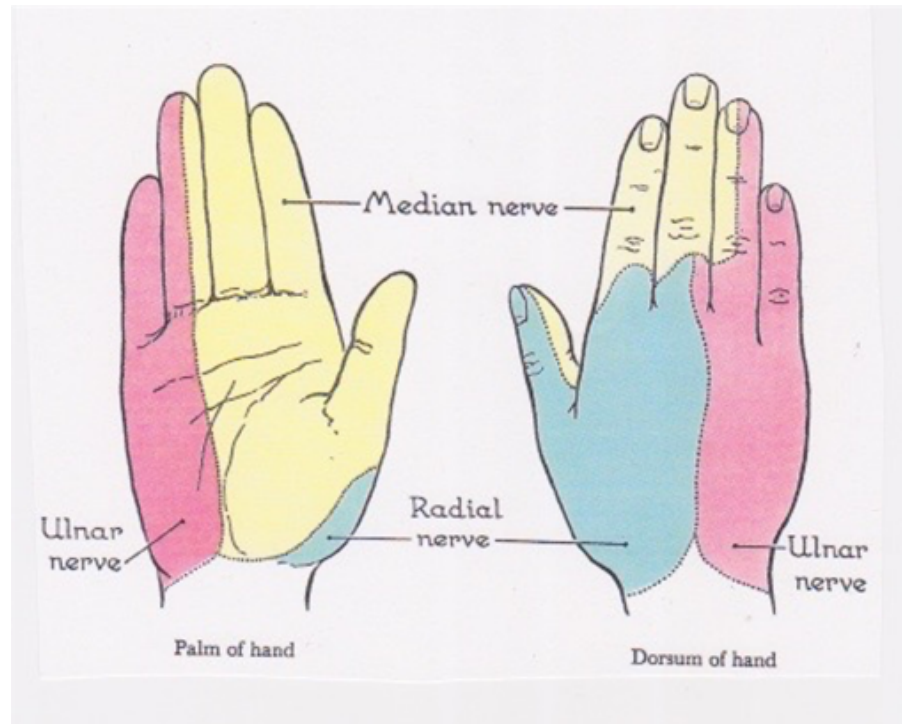
- Risk factors:
 - Long bone fracture, leg and forearm
 - Athletic and male
 - Prolonged ischemia and rapid reperfusion
 - Hematoma at fracture site
 - Crush injury
- ACS can occur in an area of tissue (muscle, bone, NAV) surrounded by thick fascia. The trauma disrupts these tissues and the pressure rises. If not recognized and treated, the tissues become ischemic and die.
- Impending ACS is what we need to recognize
 - “Physical examination alone has limited sensitivity and specificity for ACS.”
 - “Serial (regular) examinations are important in patients at risk.”
- Pressure increasing, tissue perfusion reduced, but not sufficient to cause muscle damage



Fractures – Advanced Evaluation

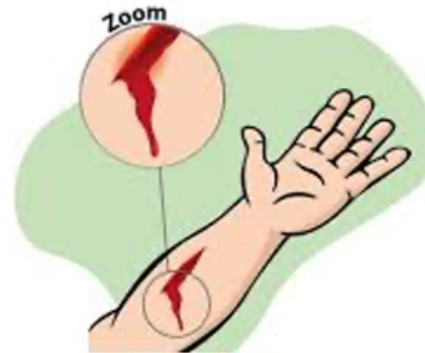


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Common Injuries in Large-Scale Disasters

1. Burns
2. Fractures
- 3. Bleeding**
4. Head trauma
5. Shock

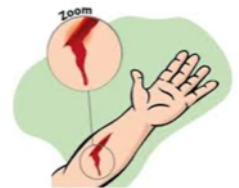


Bleeding



- **Symptoms:** Spurting red (arterial), leaking or pooling in darker maroon (venous), or oozing from capillaries
- **Immediate care:** Apply direct, firm pressure on the site of bleeding and elevate wound above heart (even while transporting, resting)
- **Ongoing care:** Continue direct pressure for at least 5 minutes, recheck, if still bleeding continue pressure

Wear your gloves!



Uncontrolled Bleeding

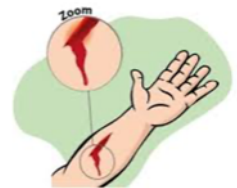


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- **Symptoms:** Still bleeding, mental status confused, lethargic or agitated, blood pressure lower, pulse higher, breathing rate higher
- **Immediate care:** If symptoms worse, one may have to apply tourniquet. It is more likely to save a life than to cause loss of a limb.
- **Ongoing care:** If stable, continue monitoring, elevation, dressing. If symptoms worse, time for transfer to med facility.

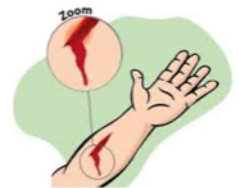
Wear your gloves!



Blood Loss – Additional Information



- Average person has 5 liters (5.2 quarts) of blood
- **15%-40% blood loss:** Heart rate >100 , BP slightly low, respirations 20-30, mental status is anxious, becoming confused
- **$>40\%$ blood loss:** Patient is critical, heart rate >140 , respirations > 35 , lethargic



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What is Closed Head Injury?

- Closed head injury happens when a person hits their head on a hard surface or when an object hits and hurts the head but doesn't go through the skull.
- This can result in a fracture of the skull or face, brain injury or swelling, bleeding in or around the brain
- A mild closed head injury is a concussion



Closed Head Injury Symptoms & Signs



Loss of consciousness (LOC): if a person does not wake up quickly, or blacks out several minutes/hours after a head injury, this can mean there is bleeding in the brain.

Other signs include:

Headache, nausea
Feeling tired or sleepy
Mood or behavior changes
Seizures

Swelling, bleeding, or bruising on the scalp
Dizziness, confusion or memory problems
Trouble walking or talking



What is Traumatic Brain Injury (TBI)?



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- TBI is an alteration in brain function, or other evidence of brain abnormality, caused by an external force such as:
 - The head striking an object
 - Acceleration/deceleration of the brain without direct external impact
 - A foreign body penetrating the brain
 - The force from a blast/explosion
 - Other forces yet to be defined



Primary Traumatic Brain Injury



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- Skull fracture
- Epidural hematoma (EDH)
- Subdural hematoma (SDH)
- Subarachnoid hemorrhage (SAH)
- Intraparenchymal hemorrhage
- Cerebral contusion (bruise on the brain)
- Intraventricular hemorrhage



Primary Traumatic Brain Injury

TBI diagnosis depends on medical imaging. In the field, we recognize signs and symptoms so we can get the person transported to a medical facility.

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- Epidural hematoma (EDH)
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TOTAL

BODY

SHUT

DOWN

Shock in the Injured Patient



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- Most common cause: loss of circulating blood volume from hemorrhage.
- Other contributing factors: inadequate oxygen supply, mechanical obstruction, neurologic dysfunction (high spinal cord injury) and cardiac dysfunction.
- Hemorrhagic shock is a common and frequently treatable cause of death in injured patients and is second only to traumatic brain injury as the leading cause of death from trauma.



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Shock – Symptoms

- Symptoms depend on the cause of impending shock state
 - Cold, clammy hands and feet
 - Pale or blue tinged skin
 - Weak, fast pulse, may be irregular
 - Fast, shallow breathing
 - Low blood pressure
 - Altered mental status: confusion, not oriented
- Remember your triage procedure: **breathing, heart rate, perfusion and mental status**



Prehospital Shock Treatment

- Recognize trauma-related shock early. At first it may be compensated, especially in young healthy people.
- Maximize oxygenation and airway
- Stop the blood loss,
- Keep patient warm,
- Elevate legs,
- Identify immediate threats to life (crush or penetrating injury, heart, lungs, head).



Shock – Additional Information



ATLS Definition of Hemorrhage

- **Class II Moderate:**
 - 15-30% blood loss, tachycardia (heart rate is 100-120), tachypnea (breaths are 20-24), SBP minimal
 - Skin cold and clammy, capillary refill may be delayed
- **Class III Moderate: needs transport to medical facility**
 - 30-40% blood loss, hypotension (SBP<90) 20-30% below presentation level, tachycardia (heart rate>120)
 - Skin cold and pale, capillary refill delayed (finger tip squeeze >2sec)

ATLS = Advanced Trauma Life Support

SBP = Systolic Blood Pressure

Shock – Ongoing Care

- **Maintain log of vital information** to quickly recognize changes
- **Maintain blood pressure**
 - Penetrating trauma - systolic BP 90
 - Blunt or crush trauma - keep BP a little higher; worry is spinal cord injury, traumatic brain injury
- **Monitor by pulse OX** to keep O2 Sat > 94%
- **Keep heart rate 60-100 bpm**
- **Urine output at least once every 8-12 hrs**
- **Fluids - oral about one measured teaspoon ever**



Afterwards

Using your knowledge of evaluating, monitoring and treating people, **YOU** made a difference. You remained calm for the patients in the midst of this chaos. You made thoughtful, evidence-based decisions.

Thank you for this service!



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BUT still some work to do.

