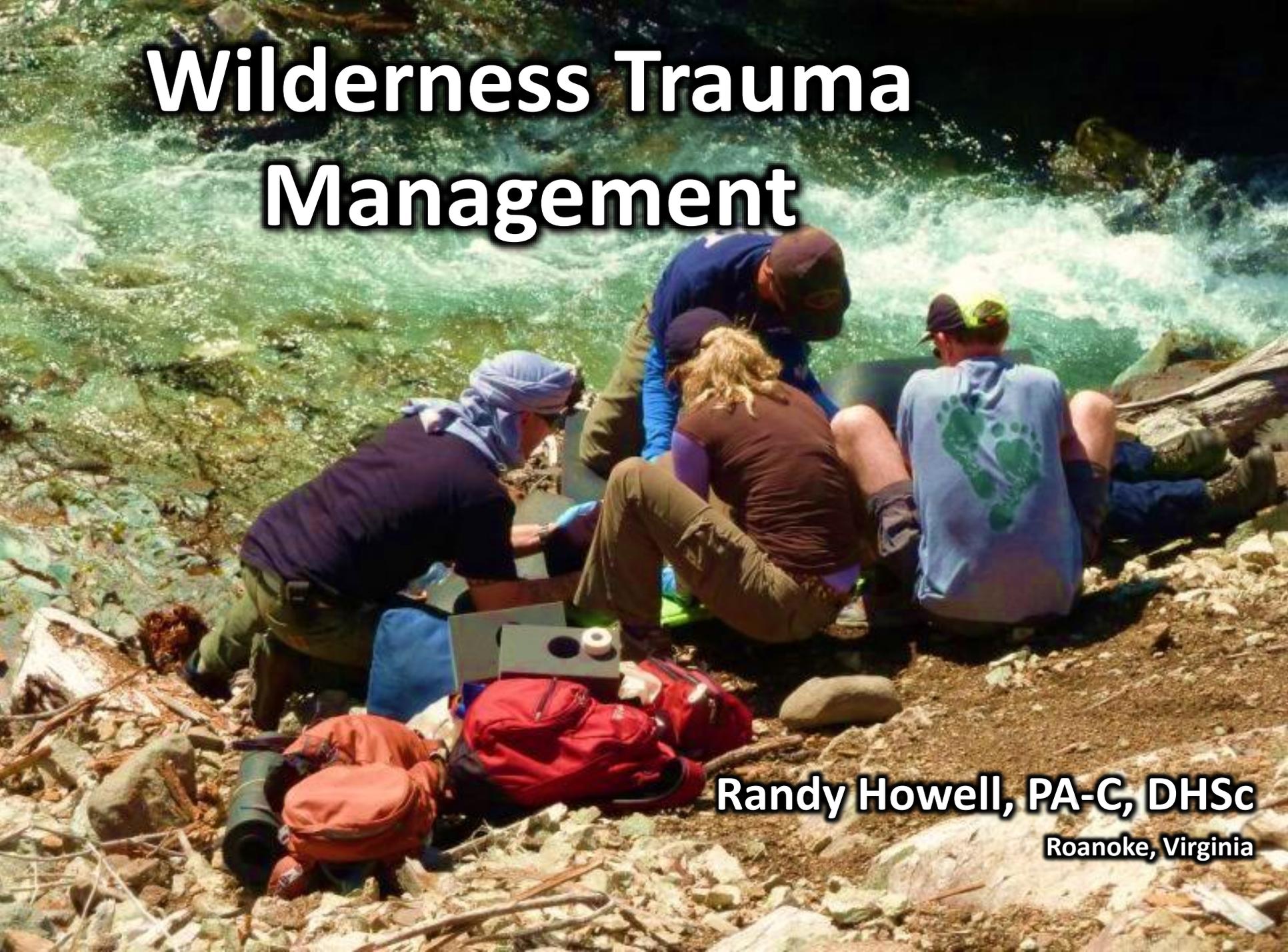


Wilderness Trauma Management

A group of five people are sitting on a rocky bank next to a rushing river. They are wearing outdoor gear, including hats, jackets, and backpacks. One person is using a laptop. The scene is outdoors, with a large log and rocks in the foreground. The river is turbulent and white with foam. The background is a steep, rocky bank.

Randy Howell, PA-C, DHSc

Roanoke, Virginia



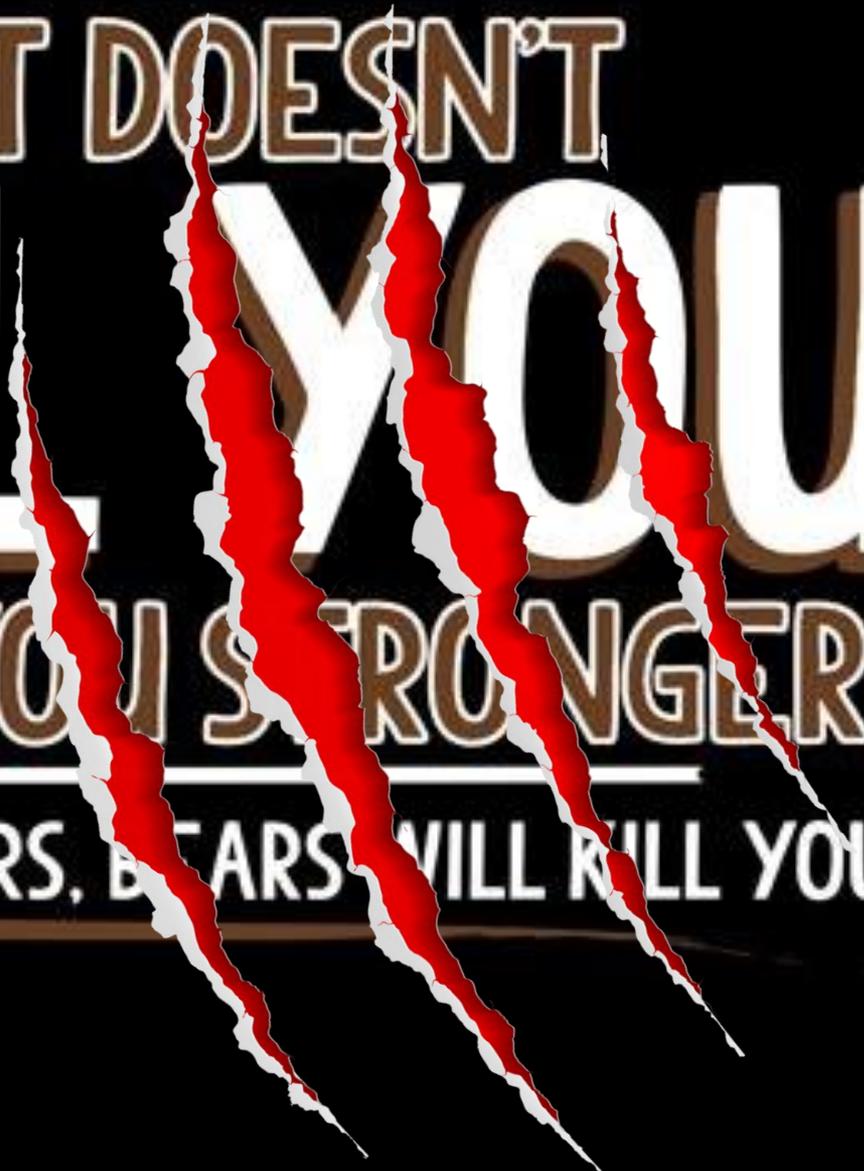
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Financial Disclosure



WHAT DOESN'T
KILL YOU
MAKES YOU STRONGER

EXCEPT FOR BEARS, BEARS WILL KILL YOU.

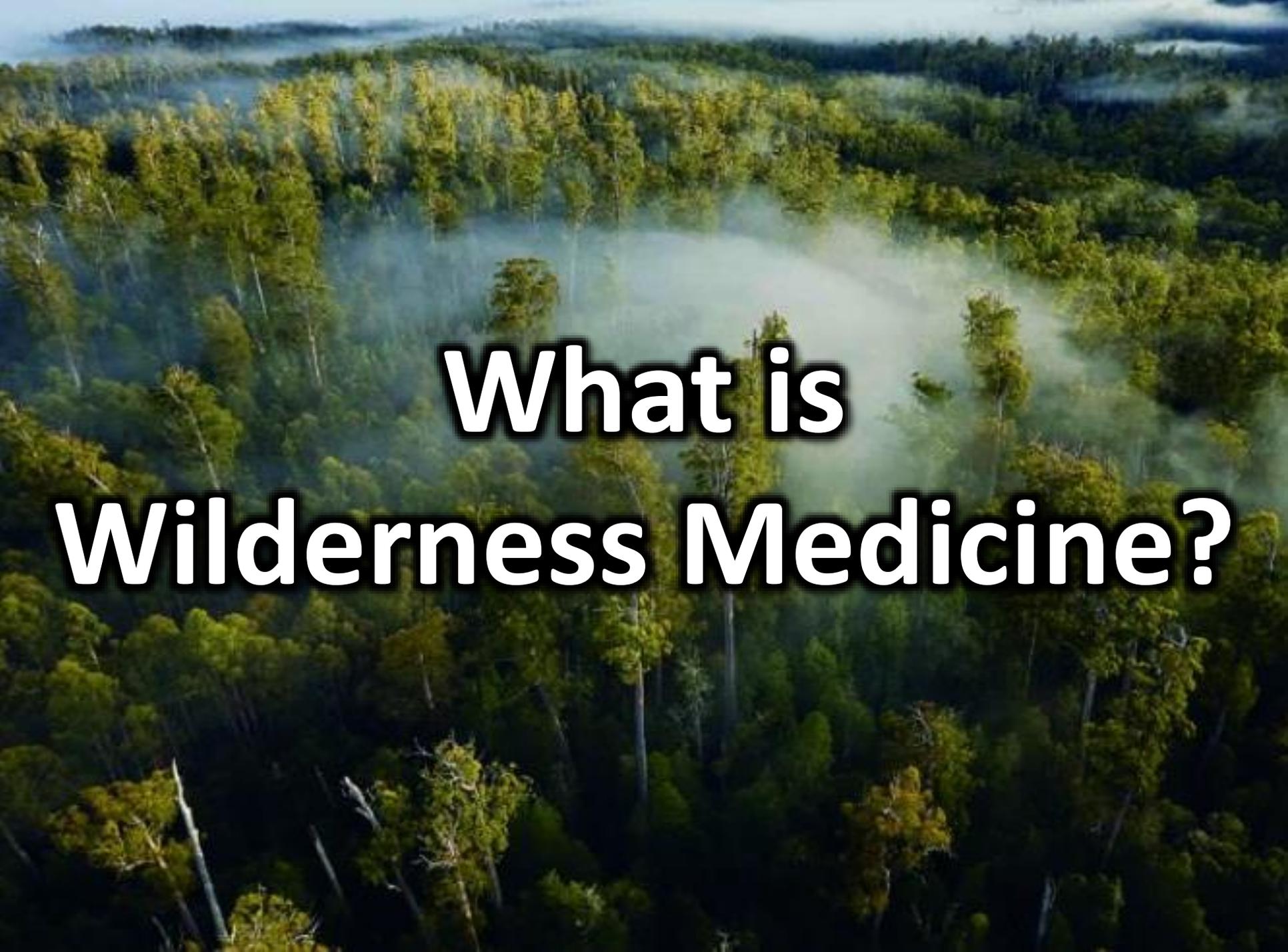




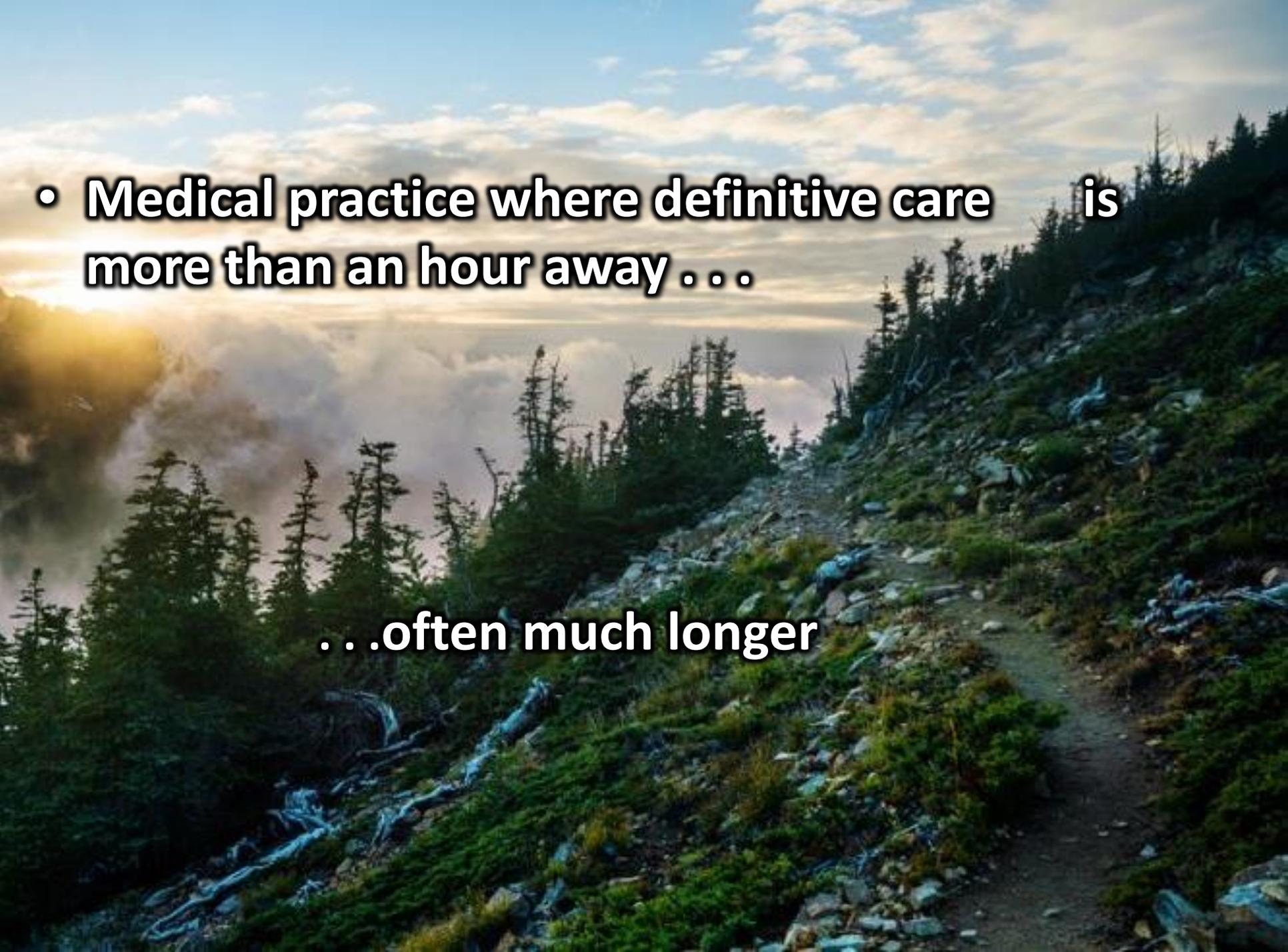
Advanced Wilderness Life Support



MEDICFORCE
first aid for all

An aerial photograph of a dense forest with a thick layer of mist or fog rising from the trees. The trees are mostly green, with some showing early autumn colors. The mist is most prominent in the center and lower right, creating a soft, ethereal atmosphere. The text is centered over the image.

What is Wilderness Medicine?

- 
- **Medical practice where definitive care is more than an hour away . . .**

. . .often much longer



– unfavorable environmental factors

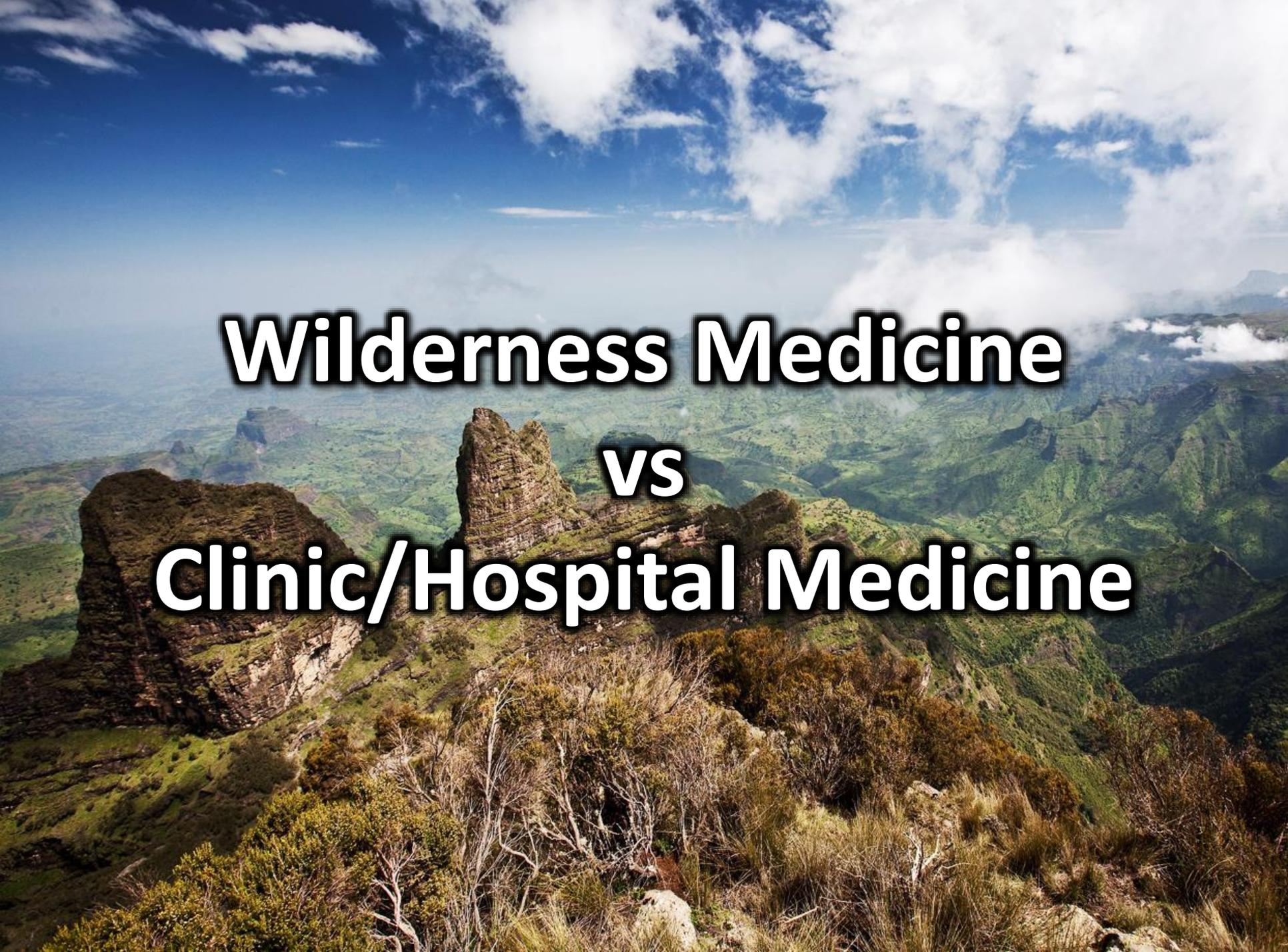
– difficult patient access

– limited resources

– unique injury & illness patterns

A wide-angle, high-angle photograph of the Grand Canyon. The canyon's layered rock formations are visible in various shades of red, orange, and brown, extending far into the distance under a sky with scattered white and grey clouds. The text is overlaid on the center of the image.

**Level of Care
should NOT define
Quality of Care**



Wilderness Medicine
VS
Clinic/Hospital Medicine

Improvisation!

- diagnostics
 - medications
 - procedures
 - extrication
 - evacuation
- 
- A group of people are shown in a forest setting, engaged in what appears to be a field exercise or training. Several individuals are carrying large blue bags or packs on their backs, secured with straps. One person in the foreground is wearing a dark jacket and a grey beanie, while another is in a blue polo shirt. The ground is covered in dry leaves and twigs, and the background shows trees and foliage. The overall scene suggests a practical application of improvisation in a field environment.



Types of Wilderness Medicine



Recreational Medicine



Expedition Medicine



Disaster Medicine



Rural Medicine



Global Medicine



SERVICES ORGANISES

MEDICINE INTERNE
PEDIATRIE
CHIRURGIE
GYNECOLOGIE
M...
L...
P...

RECEPTION



CENTRE MEDICO CHIR

OFFICE CHRETIEN POUR LE

WHY?









Stupid.

Joel "Doesn't That Idiot Know Better?!" Bashore, PA-C

TRAUMA IN THE WILDERNESS









NORISKNOFAIL

M

Will Stewart



05/04/2018 11:57:01

ATLS?

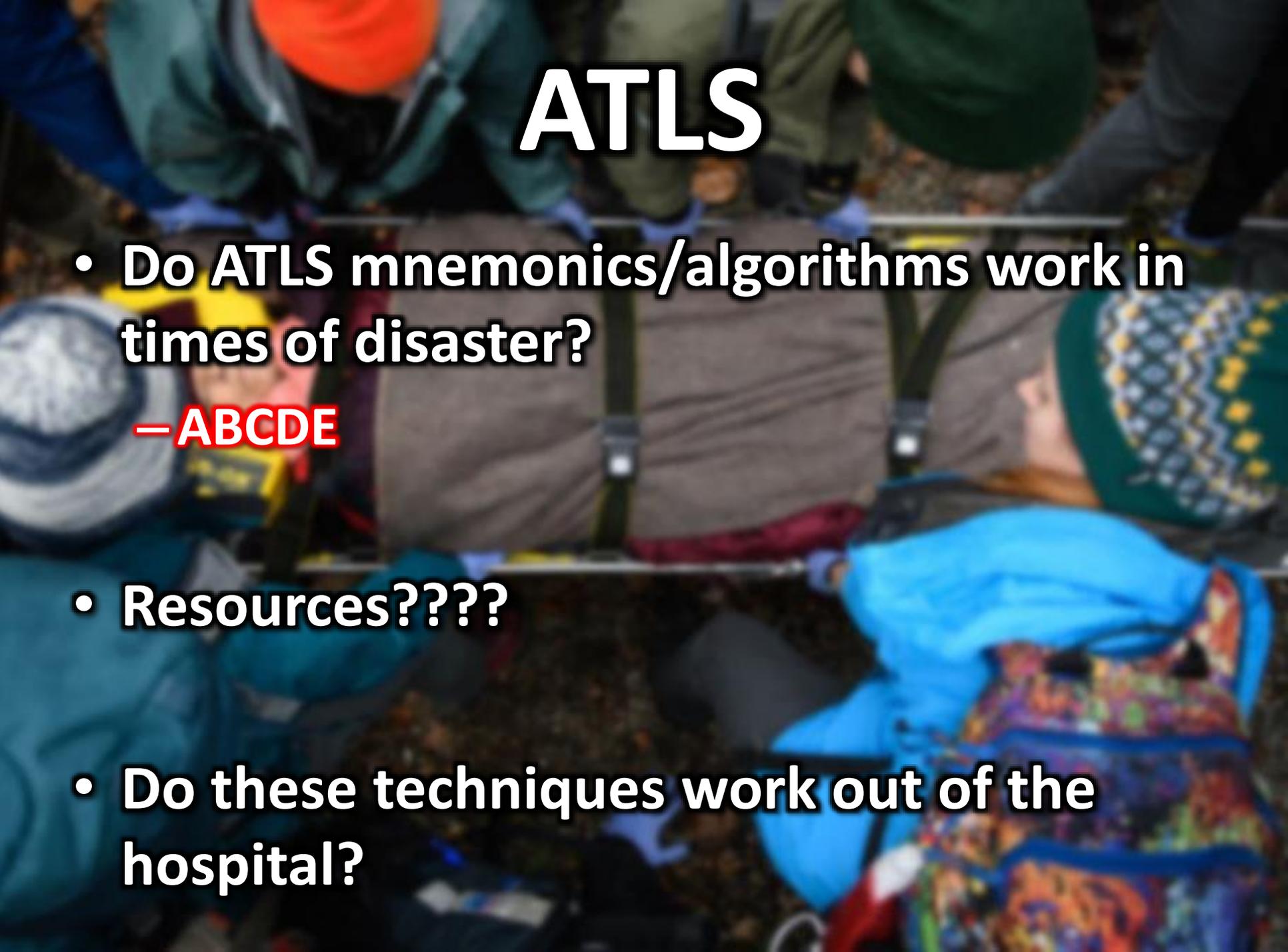
MARCH?

CAB?

$A^3B^3C^3$?

ABCDE?

ATLS

The background image shows a medical team in a disaster setting. Several people are visible, some wearing blue scrubs and others in more colorful, patterned clothing. They appear to be working together, possibly providing medical care or preparing equipment. The scene is somewhat chaotic, with various items and equipment scattered around.

- Do ATLS mnemonics/algorithms work in times of disaster?
 - ABCDE
- Resources????
- Do these techniques work out of the hospital?

BRIEF REPORT

Effect of Advanced Trauma Life Support (ATLS) on the Time Needed for Treatment in Simulated Mountain Medicine Emergencies

Franck G Billmann, MD, PhD, FACS; Claude Burnett, MD; Stefanie Welke; Therezia Bokor-Billmann, MD

From the Department of General and Visceral Surgery (Dr Billmann); and the Department of Thoracic Surgery (Dr Bokor-Billmann), University Hospital Freiburg, Freiburg, Germany; the Department of Surgery, USA Health Center, Vicenza, Italy (Dr Burnett); and the Department of General Surgery, St. Vincentius Kliniken, Karlsruhe, Germany (Ms Welke).

Table 1. Demographics of participating physicians

<i>Variable</i>	<i>ATLS (n = 15)</i>	<i>Non-ATLS (n = 15)</i>	<i>P</i>
Sex ratio (M:F)	6:9	5:10	0.42 ^a
Age (years), mean \pm SD	40.0 \pm 4.8	40.3 \pm 4.0	0.83 ^b
Experience			
Working on trauma center, n(%)	5 (33.3)	6 (40.0)	0.63 ^a
Working as mountain rescuer, n(%)	8 (53.3)	7 (46.7)	0.77 ^a
Working in emergency department, n(%)	4 (26.7)	5 (33.3)	0.89 ^a
Years since mountain medicine diploma, mean \pm SD	4.9 \pm 2.1	5.5 \pm 1.7	0.35 ^b
Years of clinical experience, mean \pm SD	12.3 \pm 3.2	13.1 \pm 3.3	0.29 ^b

^a χ^2 test.

^b Student's *t* test.

Table 2. Median time spent to manage the simulated trauma cases at an altitude of 3600 m in both groups of physicians (ATLS and non-ATLS)

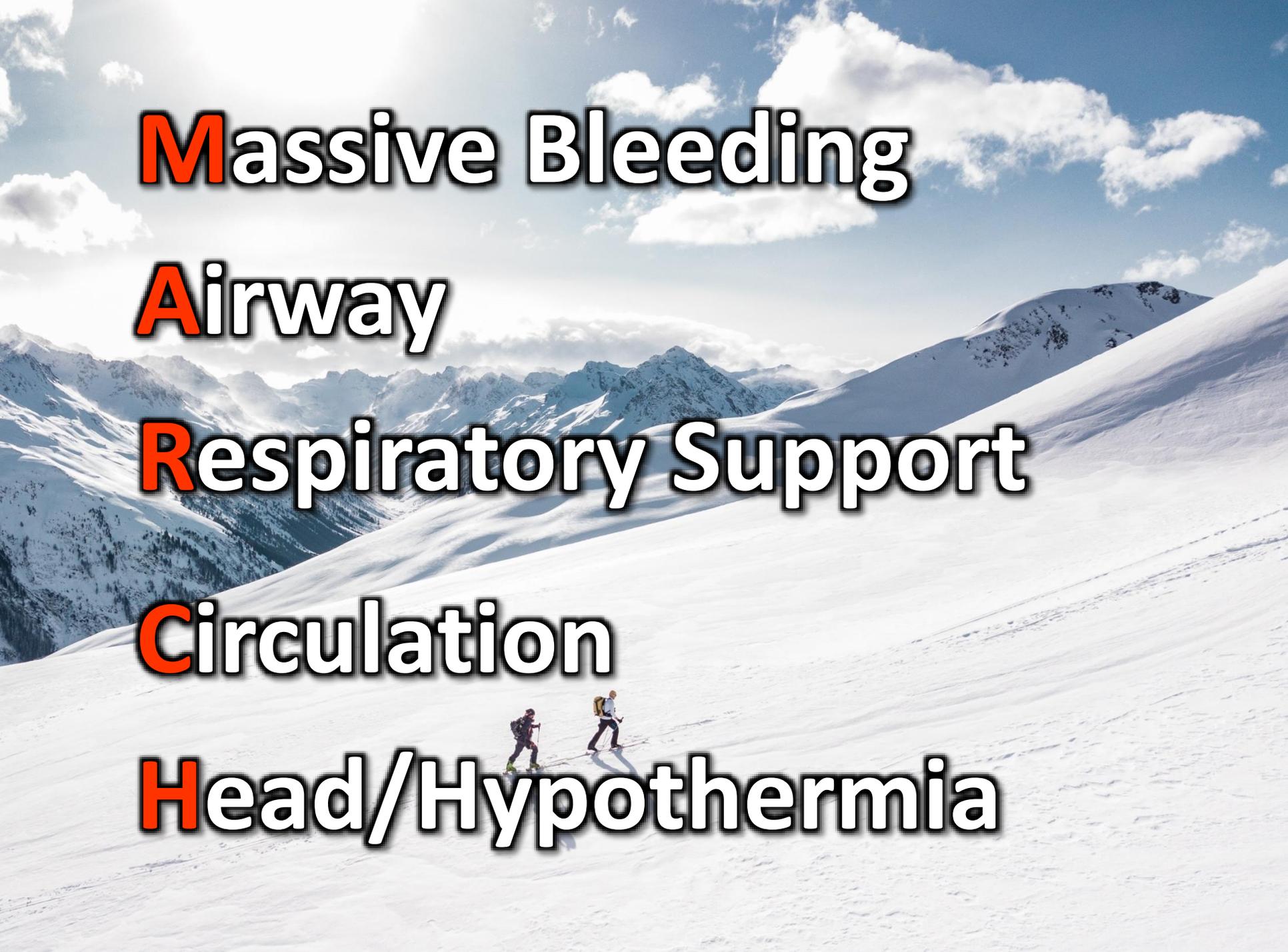
<i>Simulated trauma case</i>	<i>ATLS group (min)^a</i>	<i>Non-ATLS group (min)^a</i>	<i>p^b</i>
Airway and cervical spine	10.40 (3.44)	14.76 (4.30)	.044
Breathing	12.25 (3.32)	16.68 (3.58)	.045
Circulation	10.33 (2.63)	15.68 (3.11)	.023
Environment	6.22 (2.63)	5.36 (1.91)	.730
Combination	14.32 (3.51)	18.33 (3.91)	.001

^a Values are median (SD).

^b Student's *t* test; statistically significant when $P < .05$.

MARCH



A scenic view of a snow-covered mountain range under a blue sky with scattered white clouds. In the lower center, two hikers are visible on a snowy slope, one slightly ahead of the other, both wearing backpacks and using trekking poles. The overall atmosphere is bright and clear.

Massive Bleeding

Airway

Respiratory Support

Circulation

Head/Hypothermia

Massive Bleeding

- **Terminal process!**
- **MUST be interrupted!**

Massive Bleeding

- Detect
- **Direct pressure**
- Devices
- Don't Dilute
 - depending on resources
- Pelvic binders

Airway

- **100% mortality rate for patients without an airway**
 - **BLS saves lives!**
- **Jaw thrust**
- **OPA/NPA**

Airway

- **Endotracheal intubation/RSI**
 - depending on resources
- **Cricothyroidotomy**
 - depending on resources

Respiratory Support

- **Rescue Breathing**
- **Thoracic Trauma**
- **Sucking chest wound**
- **PTX**
- **Supplemental O₂**
 - depending on resources

Circulation

- Evaluate overall circulatory status
- Pulse, mental status
 - BP?
- Volume stabilization/resuscitation
 - depending on resources

Head

- Evaluate mental status & changes
- FOCUSED neuro exam
- Keep in mind:
 - hypoxia
 - hyperventilation
 - hypotension

HYPOTHERMIA

The background of the slide is a photograph of a winter landscape. It shows a dense forest of evergreen trees covered in snow, with snow-covered mountains in the distance. The overall color palette is dominated by various shades of blue and white, creating a cold and wintry atmosphere.

Lethal Triad

Lethal Triad

HYPOTHERMIA



HYPOTHERMIA

A close-up photograph showing a person lying down, possibly on a stretcher or gurney. They are wearing a grey knit beanie with a blue band that has white text on it. Several pairs of hands are visible, pulling a blue jacket over the person's head and shoulders. The scene suggests a medical or emergency response to hypothermia.

Protect!!!

A photograph showing a person lying on a stretcher, being covered with a blue blanket by several people in blue scrubs. The person's eyes are closed, and they appear to be unconscious or sedated. The scene is likely in a hospital or emergency room.

HYPOTHERMIA

Intentionally.

Deliberately.

Aggressively.

A³B³C³

- **Assess**

- **Airway**

- **Alert**

- **Barriers**

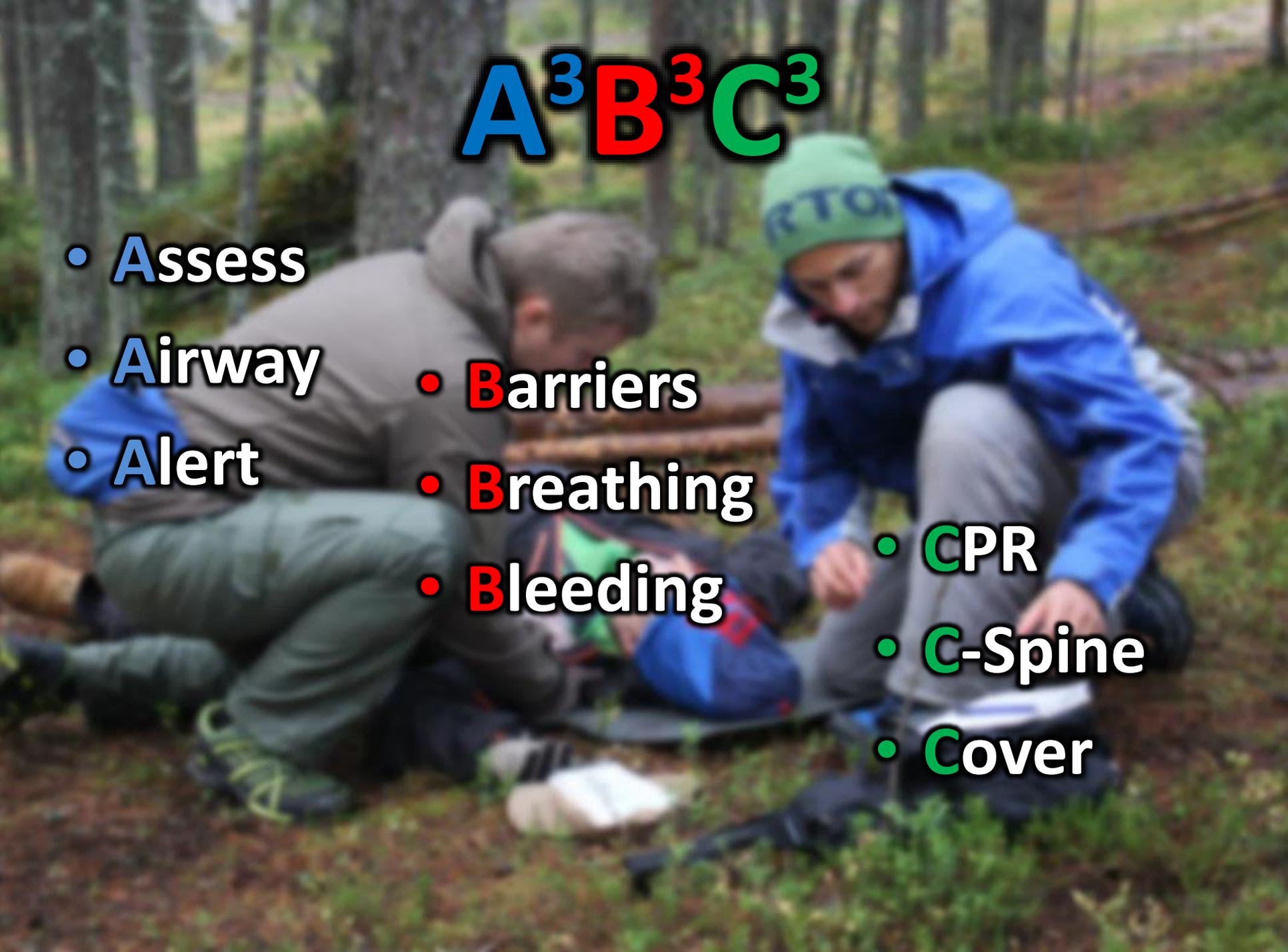
- **Breathing**

- **Bleeding**

- **CPR**

- **C-Spine**

- **Cover**



A³B³C³

- **Assess**

- **Airway**

- **Alert**

- Barriers

- Breathing

- Bleeding

- CPR

- C-Spine

- Cover



Assess Scene for Safety



Assess Scene for Safety



Assess Scene for Safety



Assess Scene for Safety



Airway



Airway



Airway

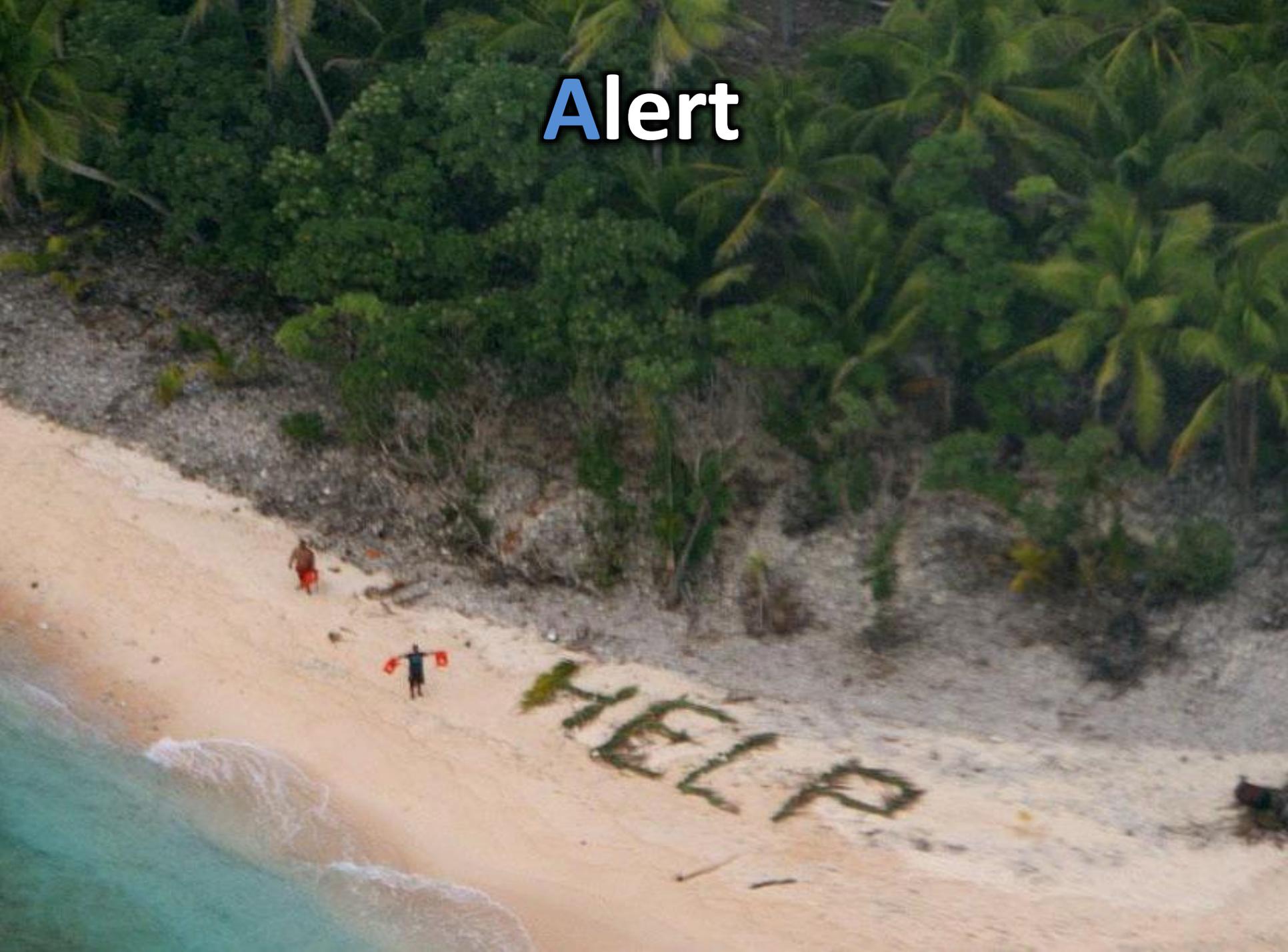


Surgical Cricothyrotomy in the Wilderness: A Case Report; Wilderness & Environmental Medicine 2012

Airway



Alert



Alert



Best first-aid kit!

Alert

- If necessary to send for help.
- Send the fastest, least-trained person.....





Alert



John D. McCann



Flares, fires & mirrors

A³ B³ C³

- Assess

- Airway

- Alert

- Barriers

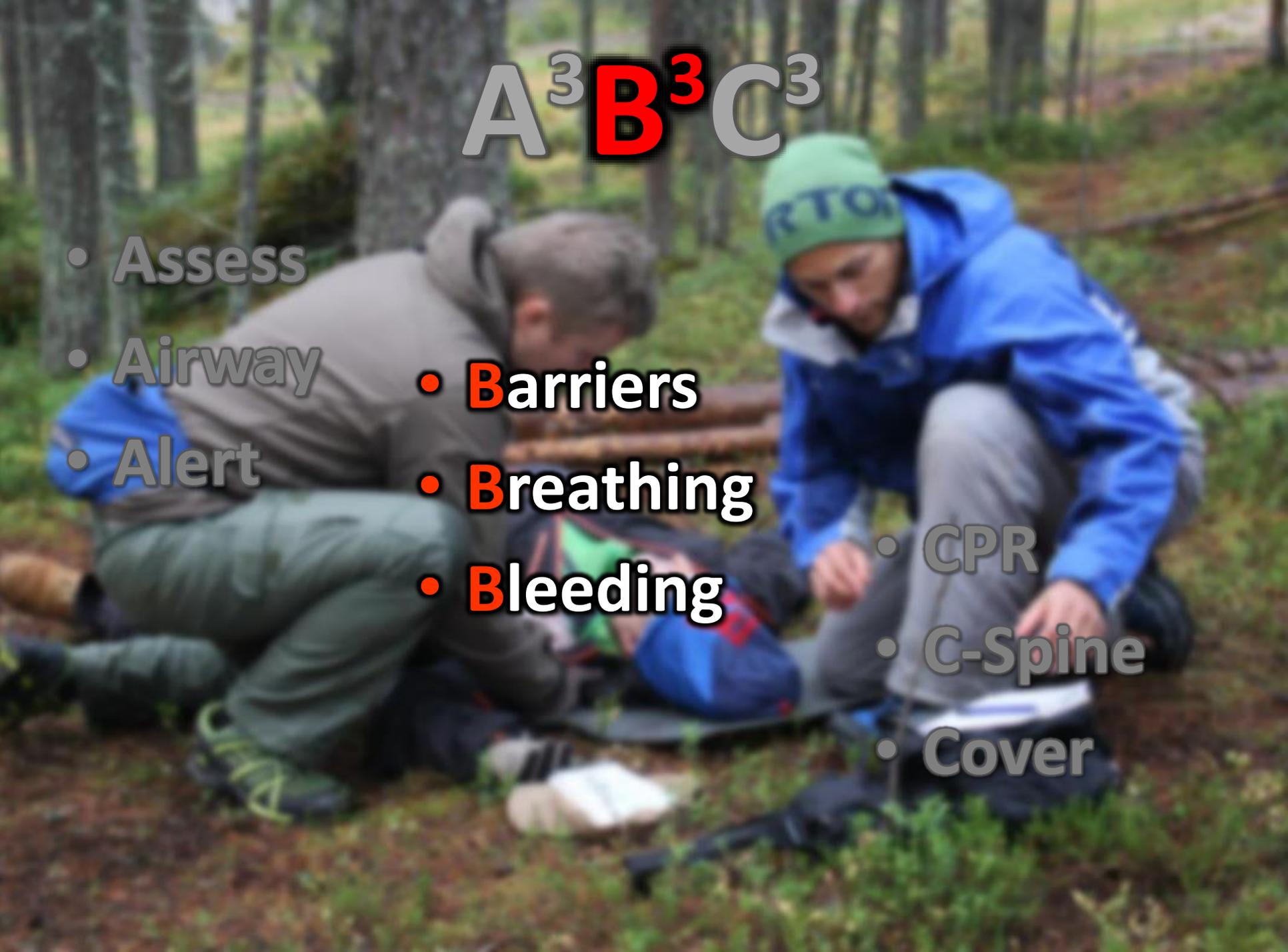
- Breathing

- Bleeding

- CPR

- C-Spine

- Cover



Barriers



Barriers



Breathing



Rescue breaths!

Thoracic injuries



Decompression!

Thoracic injuries



3-sided dressing, petrolatum/abx ointment, AND ...

Bleeding



Pressure dressings, tourniquets, pelvic binders

Pressure dressing



Gold standard! Venous. Low-risk

Tourniquets



Common Tourniquet.



Tourniquets



Tourniquets



Tourniquets



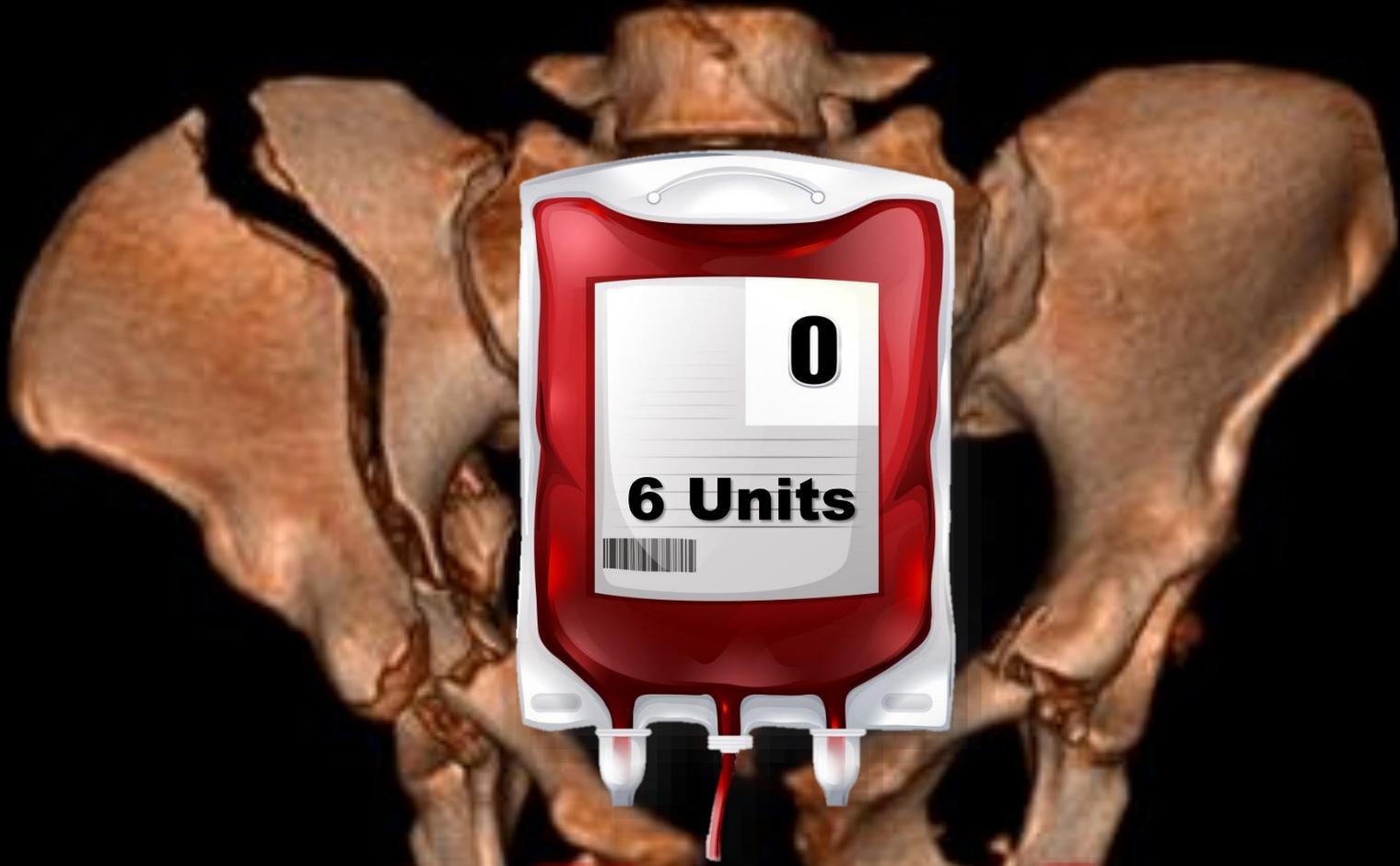
- **Life-threatening arterial bleeds**
- **2 hours**
 - as long as 16hrs documented!
- **Width sufficient to stop flow**
 - 4cm

Tourniquets

A photograph showing a person in a blue shirt lying on the ground. A tourniquet is applied to their upper arm. Another person is kneeling beside them, adjusting the tourniquet. The ground is covered with brown mulch.

- As **DISTAL** as possible
- Release and re-tighten **DISCOURAGED**
- **Tighten until arterial bleeding stops!!!!**

Pelvic Fracture



3 liters!

Pelvic Binder



Over greater trochanters!

Pelvic Binder



- **Improvised binders**
 - Sheet, clothes, backpack

A³B³C³

- Assess
- Airway
- Alert
- Barriers
- Breathing
- Bleeding
- CPR
- C-Spine
- Cover



CPR

A woman with blonde hair, wearing sunglasses and a red puffy jacket, is leaning over a man lying on the ground. She appears to be performing CPR. The background is a blurred outdoor setting with trees and dry grass.

- **EARLY COMPRESSIONS!**

- **30:2**

- **Compression only?**

C-Spine

A photograph showing a person in a blue jacket and a white cap providing first aid to a person lying on a stretcher in a wooded area. The person on the stretcher is wearing a blue jacket and a white cap. The person in the blue jacket is leaning over the stretcher, and the person in the white cap is standing behind it. The background shows a lake and trees.

- **Improvisation!**

- Rolls of clothes/gear
- Stuff sacks
- SAM splint
- Life jacket

- **Do your best!**

Cover

- **BARRIER** between ground/patient
- **Remove wet clothing /cover**



Following Initial Stabilization



- **Secondary Survey**
- **Stabilizing other injuries**
- **Extrication/transport**

Secondary Survey

A group of people in outdoor gear are gathered around a patient lying on a stretcher in a wooded area. One person is pointing towards the patient, while others are looking on. The scene is outdoors with trees and a stream in the background.

- **Expose patient**
- **Distracting injuries**
- **Obtain history (SAMPLE)**
 - **Be nosy!**
 - **Look through gear**

Musculoskeletal

- Fracture/Dislocation?
- Neurovascular intact?
- Reduce?

Long bone fractures



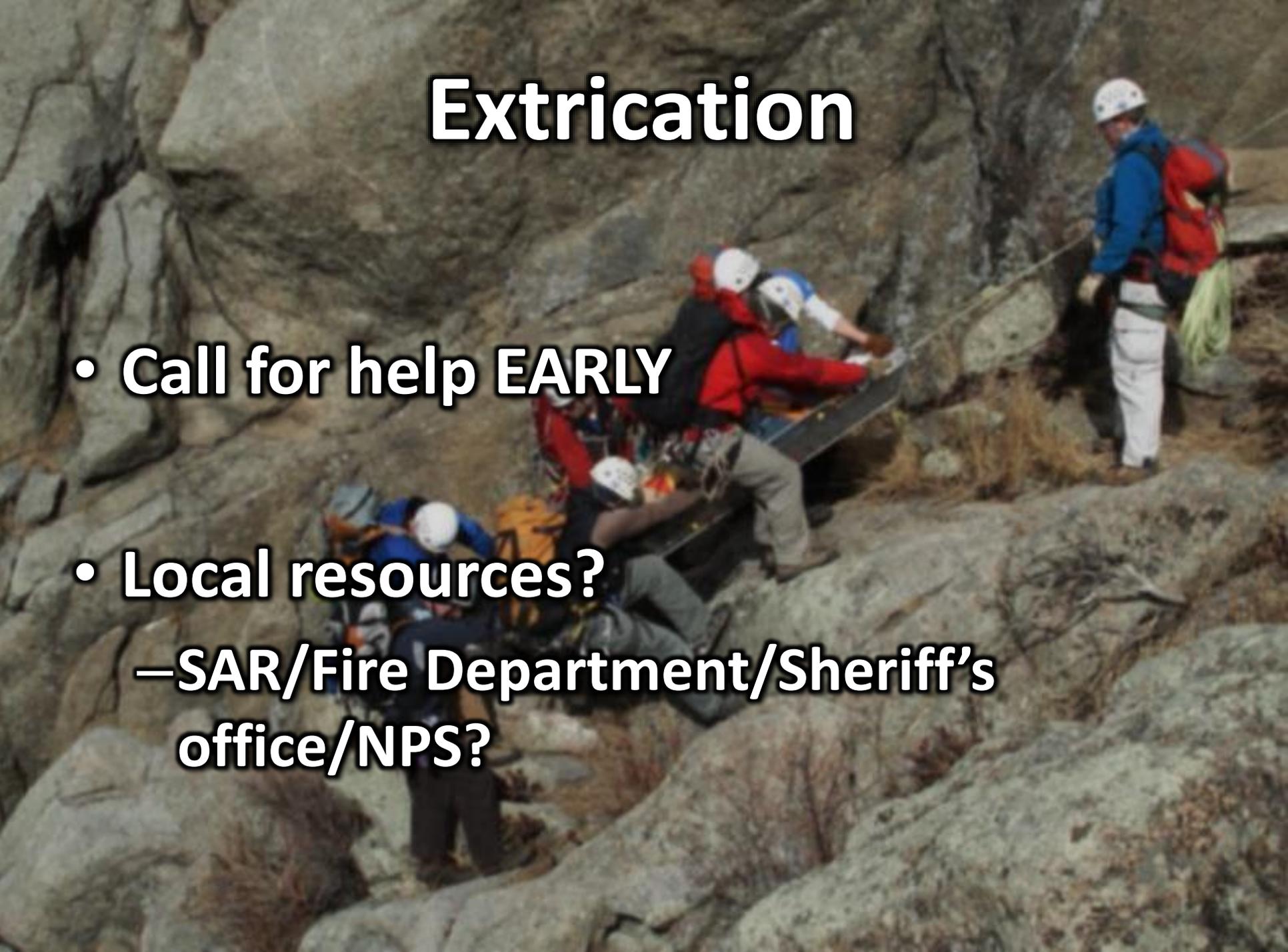
- Crooked \Rightarrow straighten \Rightarrow immobilize

Long bone fractures

- Poles/sticks/water bottles/sleeping pads
- SAM Splint
- **Well padded!**
- Cravats/Webbing/Rope
- Open fracture? (peek and shriek)
 - Cover wound
 - Stabilize/splint
 - ABX



Extrication



- **Call for help EARLY**
- **Local resources?**
 - SAR/Fire Department/Sheriff's office/NPS?

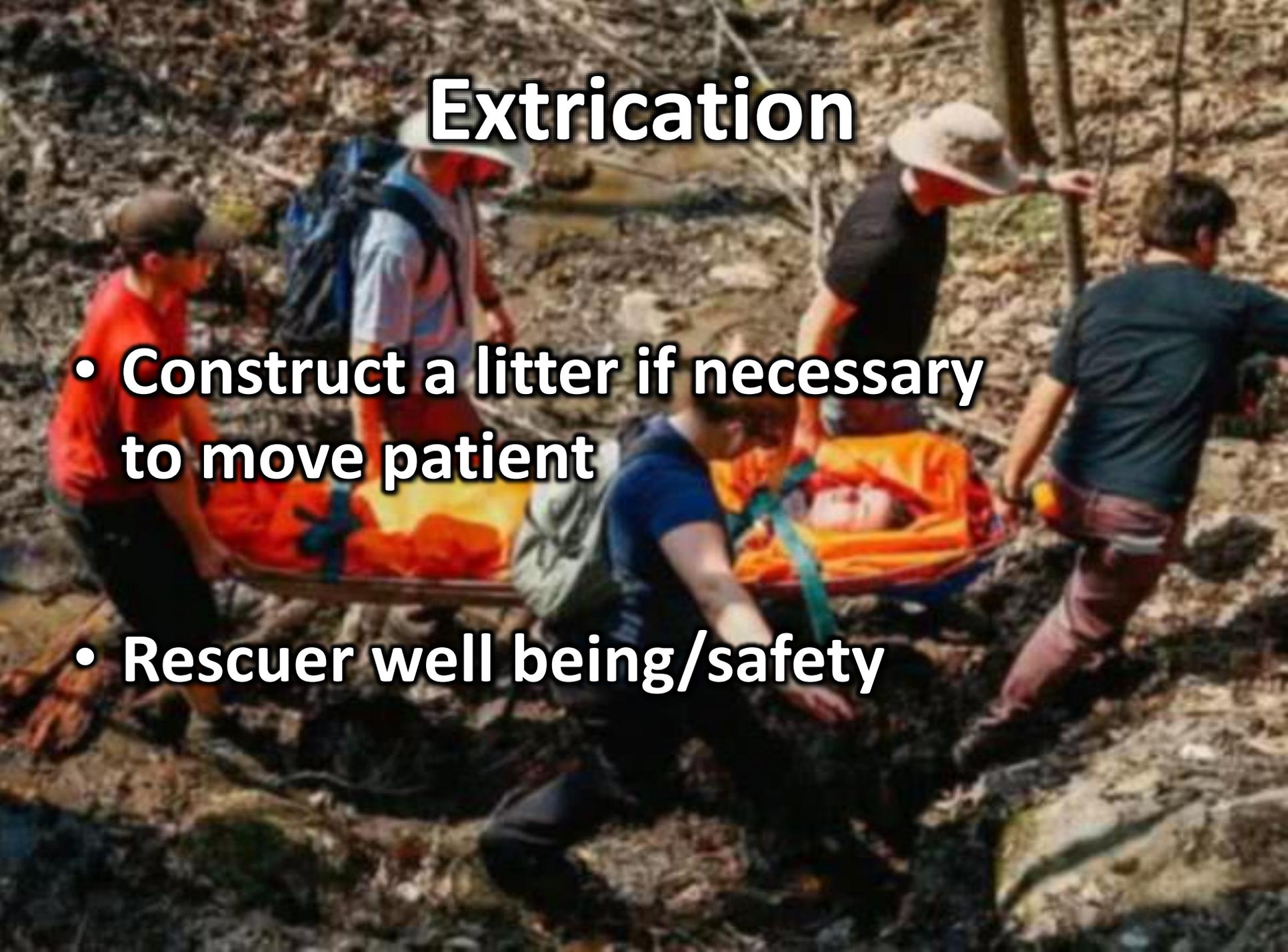
Extrication

- If help on the way, stay put
- Let the patient help you!



Extrication

- Construct a litter if necessary to move patient
- Rescuer well being/safety



Trauma Kit

- **Barriers: gloves/mask**
- **Occlusive dressing**
- **Large angiocath**
- **OPA/NPA**
- **Tape/gauze**
- **Space blanket**



Trauma Kit

- Duct tape!
- Kerlix/trauma bandage
- QuikClot
- Tourniquet
- Ace wraps
- Cravats
- SAM splint

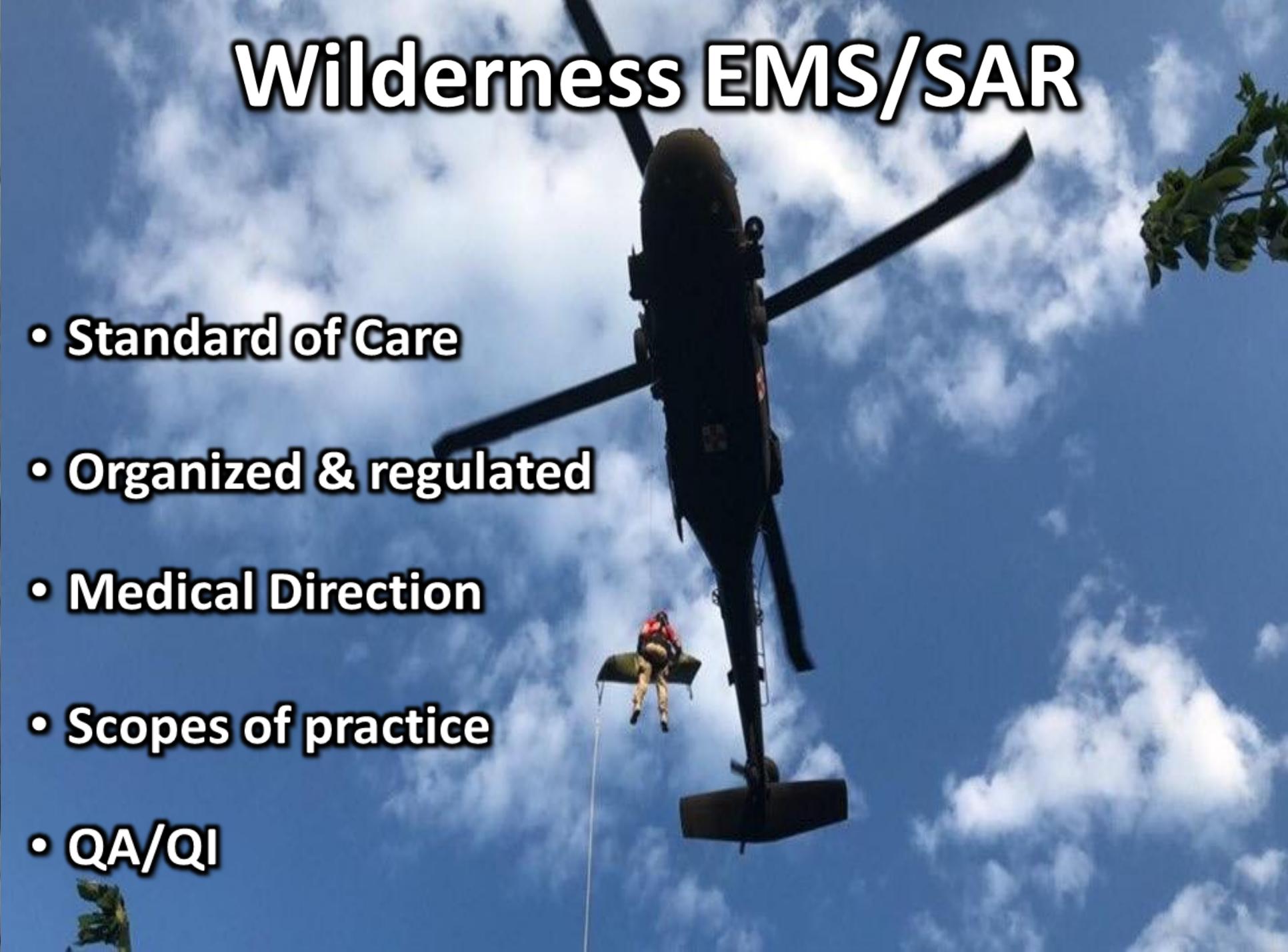


Trauma Kit Considerations

- **Medications:**
 - TXA
 - Pressors
 - Analgesics/ketamine
 - Fluids
- **Support:**
 - Advanced airway equipment
 - PTX/chest tube
- **Diagnostics:**
 - Ultrasound
 - Monitoring
 - Istat



Wilderness EMS/SAR



- **Standard of Care**
- **Organized & regulated**
- **Medical Direction**
- **Scopes of practice**
- **QA/QI**

Wilderness EMS/SAR



TAKE HOME?





TAKE HOME?

**PROTECT yourself
and your team**

A white, octagonal takeout container is shown from a slightly elevated angle. The container is open, and inside, there is a colorful meal consisting of what appears to be noodles, vegetables, and possibly meat, all coated in a sauce. Two wooden chopsticks are stuck into the food. The background is a blurred wooden surface.

TAKE HOME?

**Identify and control
hemorrhage EARLY**



TAKE HOME?

BLS saves lives!



TAKE HOME?

Mobilize help EARLY!



TAKE HOME?

**PROTECTION from
the environment**

TAKE HOME?

IMPROVISATION!!



A white takeout container filled with food, with chopsticks sticking out of the top. The container is placed on a wooden surface. The text "TAKE HOME?" is overlaid at the top, and "Set realistic expectations" is overlaid in the middle.

TAKE HOME?

**Set realistic
expectations**



TAKE HOME?

Level of care doesn't
define **QUALITY** of care

**I DON'T ALWAYS
CHASE AND KILL
THINGS.**



**BUT WHEN I DO
IT'S BECAUSE
THEY ARE
THINGS...
AND I AM
A BEAR.**



**STAY FAST
MY FRIENDS.**





**Special
Thanks...**



Jessie Gehner MD
Carilion WM Fellowship , 2017



Joel Bashore, PA-C
Carilion Emergency Medicine



**David Fifer, MS, NRP, FAWM
EKU, RedStar**

Thank you!



Snake River, Idaho; Jul 2017

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