



Better Medicine
In
Bad Places.



Optimizing Trauma
Outcomes in Austere,
Humanitarian and Disaster
Settings



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MSc Forensics (cand.)





Faculty / Moderator: NO CONFLICTS

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**CNPT, FP-C, TP-C, CCRN-K, CCRN (CMC), CFRN, CEN, CPEN, etc
(lab rat, bouncer, nuclear engineering student, super
secret squirrel, lab rat...ICU/Flight/ED/ Ebola(WHO)/
50+ Medical Missions/ NASA (PRN), etc...)**

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Agenda:

We are going to FLY! BUT!

Be a CLINICIAN....NOT a Technician and

....



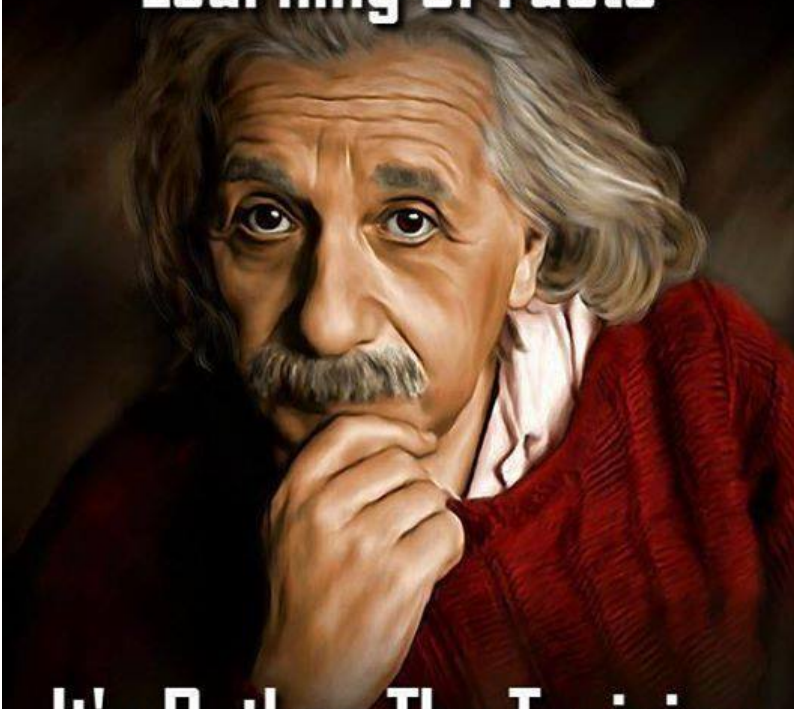
Sometimes you need to talk to a two year old just so you can understand life again.

~ Unknown

ALWAYS ask..... WHY !!!!!!!!

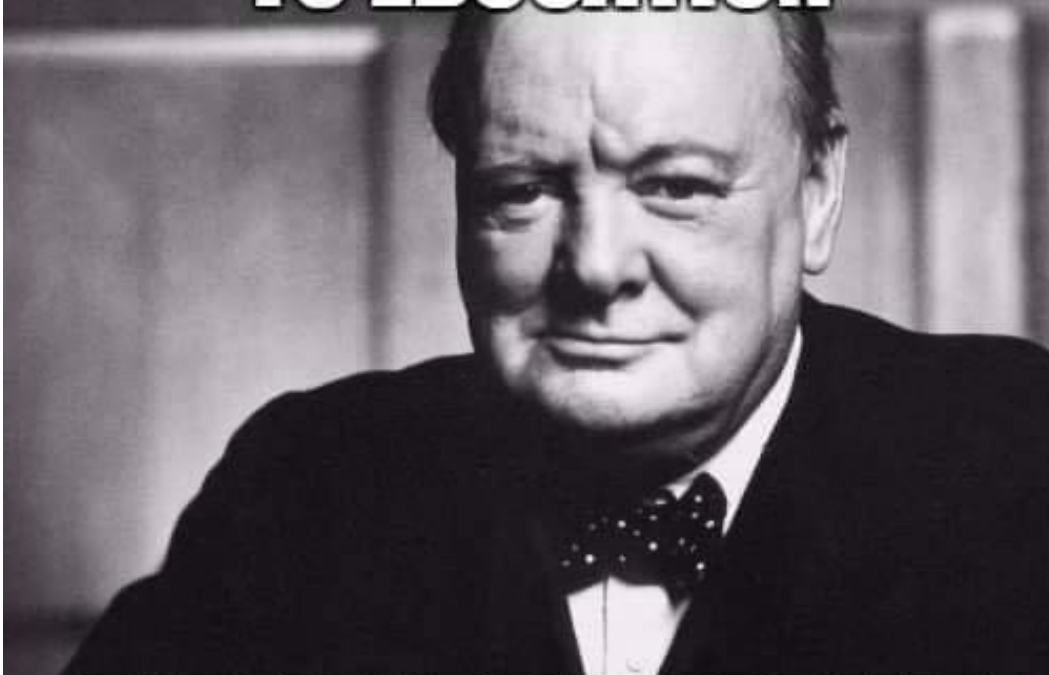
4 y/o Engineer.... PERFUSION / CPP!

**Education is Not The
Learning of Facts**



**It's Rather The Training
of The Mind To Think**

**WHEN IT COMES
TO EDUCATION**



**THE MOST IMPORTANT
THING IS APPETITE**



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**“IF EVERYONE IS
THINKING ALIKE,
THEN SOMEBODY
ISN'T THINKING.”**

**- GENERAL GEORGE S. PATTON
(1885-1945)**





Begin With The End In Mind...
Failing to Plan
Is
Planning to Fail.





Trees vs Forest: Specific Skillset Vs. Big Picture Mission Planning



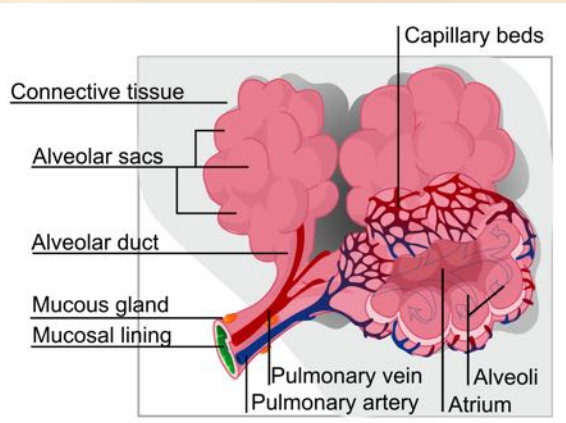
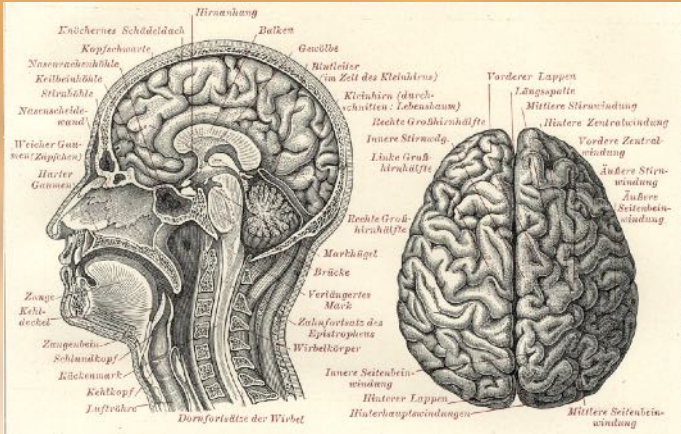


Big Picture Mission Planning:
Multivariate, a few examples:
Power / Fuel / Solar
Vents / O₂ Concentrators
Sterilization, Etc.



Table 1: Mechanisms of Blast Injury

Category	Characteristics	Body Part Affected	Types of Injuries
Primary	Unique to HE, results from the impact of the over-pressurization wave with body surfaces.	Gas filled structures are most susceptible - lungs, GI tract, and middle ear	- Blast lung (pulmonary barotrauma) - TM rupture and middle ear damage - Abdominal hemorrhage and perforation - Globe (eye) rupture - Concussion (TBI without physical signs of head injury)
Secondary	Results from flying debris and bomb fragments	Any body part may be affected	- Penetrating ballistic (fragmentation) or blunt injuries - Eye penetration (can be occult)
Tertiary	Results from individuals being thrown by the blast wind	Any body part may be affected	- Fracture and traumatic amputation - Closed and open brain injury
Quaternary	- All explosion-related injuries, illnesses, or diseases not due to primary, secondary, or tertiary mechanisms. - Includes exacerbation or complications of existing conditions.	Any body part may be affected	- Burns (flash, partial, and full thickness) - Crush injuries - Closed and open brain injury - Asthma, COPD, or other breathing problems from dust, smoke, or toxic fumes - Angina - Hyperglycemia, hypertension





Stopping the Bleed and Stabilizing: Tourniquets, Tranexamic acid (TXA), AbNormal Saline, Physiologic Fluids,





Stopping the Bleed:

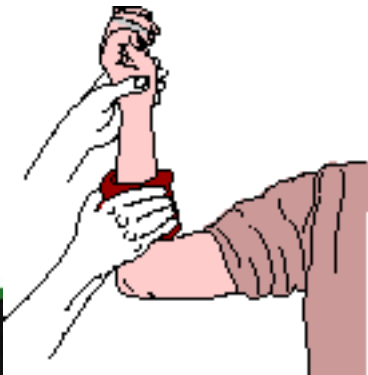
1. STOP BLEED!

2. Replace What was lost... Whole blood, but what about supply?





Tourniquets:
Direct Pressure Done
Right. $P = F/A$, FlipFlop
vs Spike Heel...ET vs
Whole Hand.





Pearls: Envenomation

Crotalidae/Viperidae

Symptomatic Management

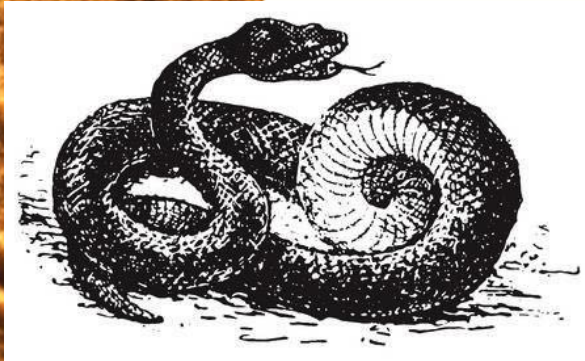
Calm, Cro-Fab Do NOT

Compartmentalize! (no tourniquet!)

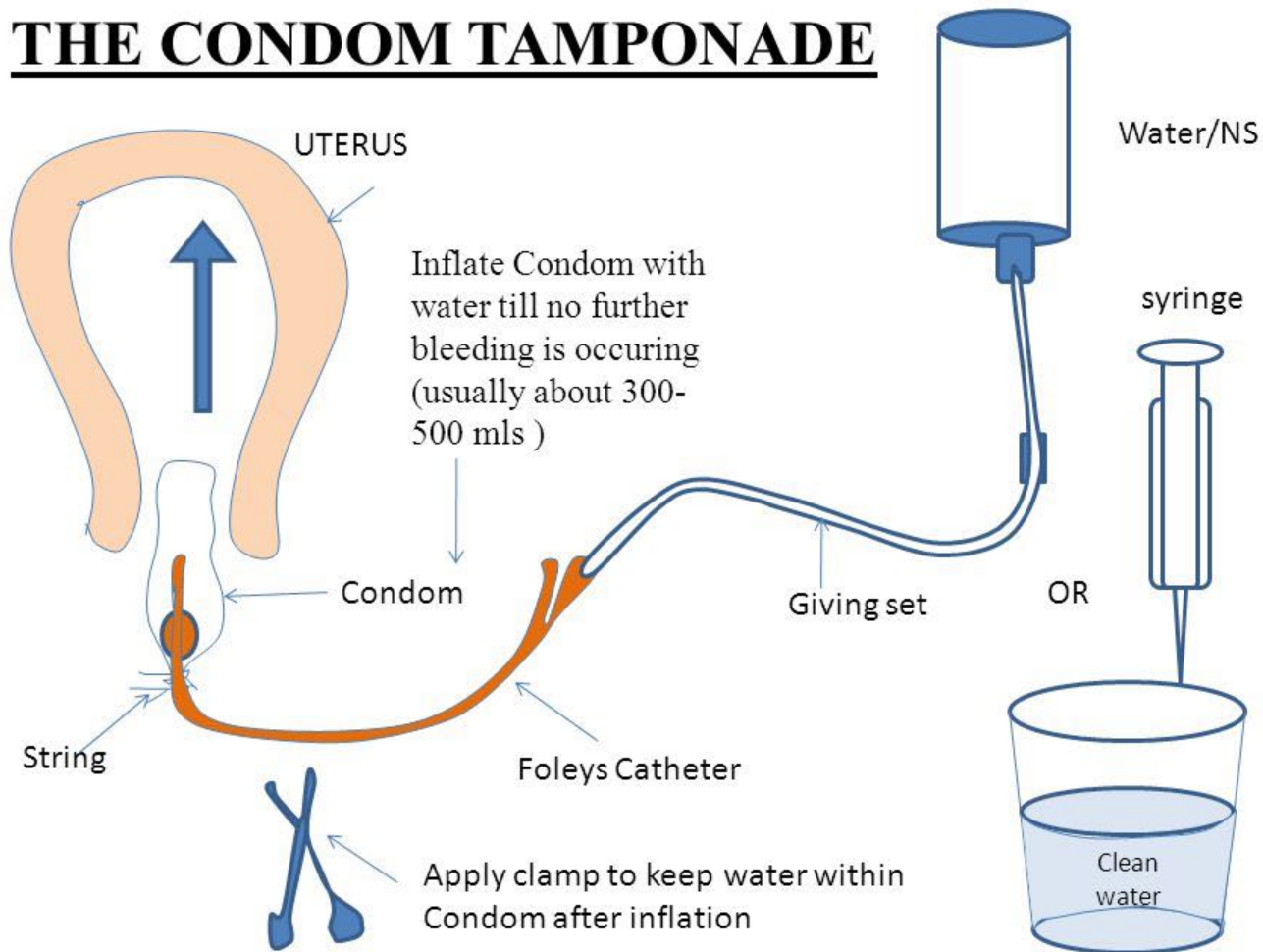
Antivenom: Anaphylaxis: Monitor
for and Tx accordingly.

What about Elapidae? PPPPPP!

**Know
BEFORE
you go!**



THE CONDOM TAMPONADE





Tranexamic acid (TXA):
Lysine Analog. Prevents
Clot Breakdown. WHO
Essential Medication.





Tranexamic acid (TXA): CRASH, (Lancet) MATTERS, WOMAN, etc.

<https://www.jems.com/2018/01/01/is-txa-a-lifesaving-drug-that-s-too-cheap-to-bother-using/>



How is it given?⁶⁻⁷

Loading dose bolus:



Followed by intravenous infusion:



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Replace What Was Lost: AbNormal
Saline, Physiologic Fluids.
NUMEROUS Trials. (SMART)
Consider Unseen Endpoints (AKI,
etc)





Stopping the Bleed and Stabilizing: Freeze Dried Plasma, Transfusions, TRALI, TRIM, and more...



Freeze Dried Plasma,



France, Israel,
SOF,
THOR, etc...





Get Smart:
TCC/TECC
PFC, etc.
TNCC, ATLS, etc.
are good, but derivative.
Stay Dynamic.



CBC: O2 Delivery Rules of

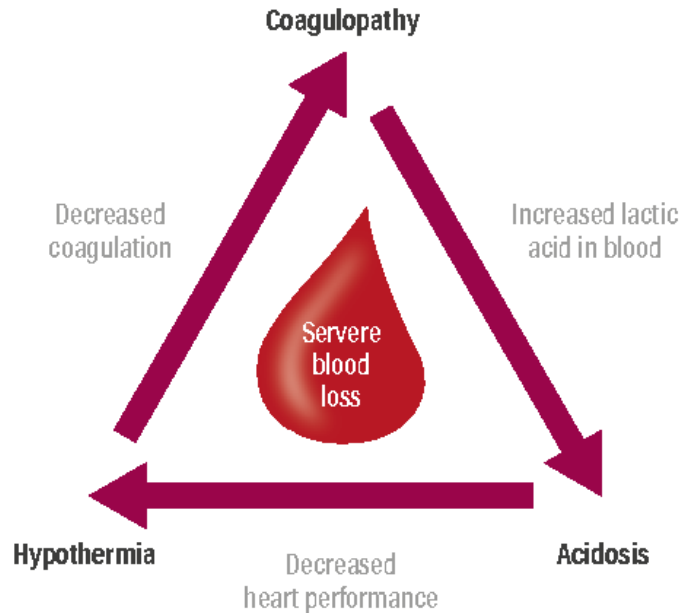


Cell Type	Normal Ranges
RBCs	5
Hgb	15
HCT	45

1. Immune Reaction/Sensitization
2. Infection (Bacterial/Viral)
3. Iatrogenic Coagulopathies: Pede Tubs/POC
 - Pressure
 - Hemodilution
 - Ca²⁺ chelation
4. K⁺
5. TRALI, TACO, TRIM, etc

The Trauma Triad of Death.

Figure 1. The triad of death





Field Amputations: Pray for
the Best, plan for the worst.
Life before Limb.





Fight The Pain...

Multimodal Locals, Regionals

POCUS

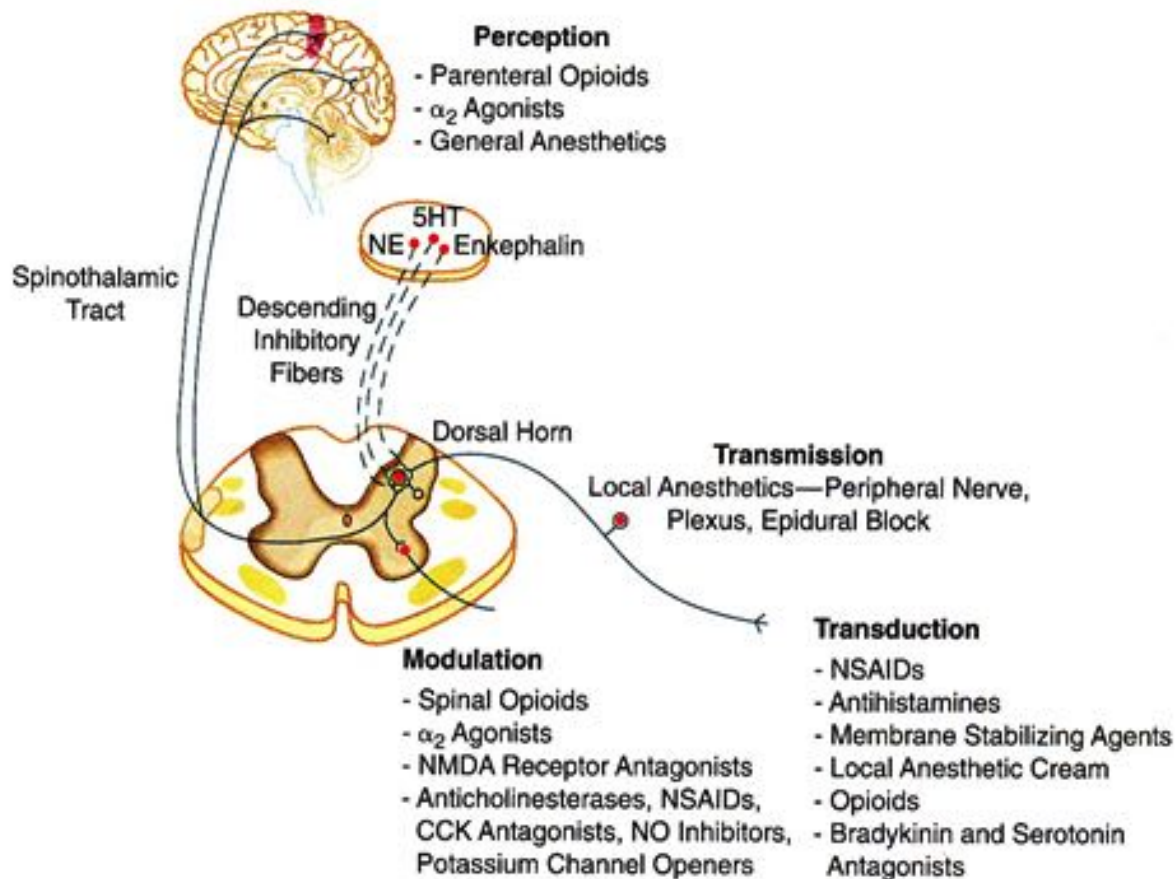
MARAA



Military Advanced Regional
Anesthesia and Analgesia

M A R A A







Know Before You Go: PPPPPP

How are you going to get it In?

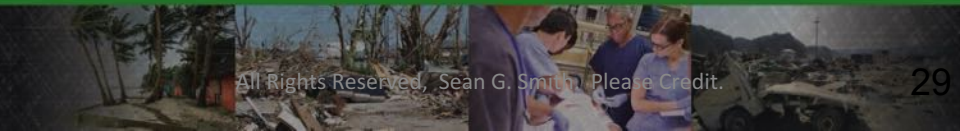
Alternate Routes:

IntraOsseus

IM

IN

Pressure Bags. "real" and improvised.





Know Before You Go: PPPPPP

Rx: NaHCO₃, Thiopental, etc

Needle Decompression/ Chest Tubes...

Pulse Oximeters and etCO₂ as ICU monitors, Etc...



What would you think if I told you that you really only needed to remember Just TWO concepts For Shock?

1. PERFUSION is ALWAYS the RIGHT answer!
(followed by Situational Awareness)

CPP = MAP- ICP

2. CO= HR x SV

(every variable we have discussed essentially comes down to SV:
Warm, Pink, Sweet: Electrolytes, acidosis, temperature, glucose.)



Transport, Trauma Surgery, and Training: Triage, Transport, Telemedicine, and Therapy. Building Capacity and Trauma Systems Where There Are None...





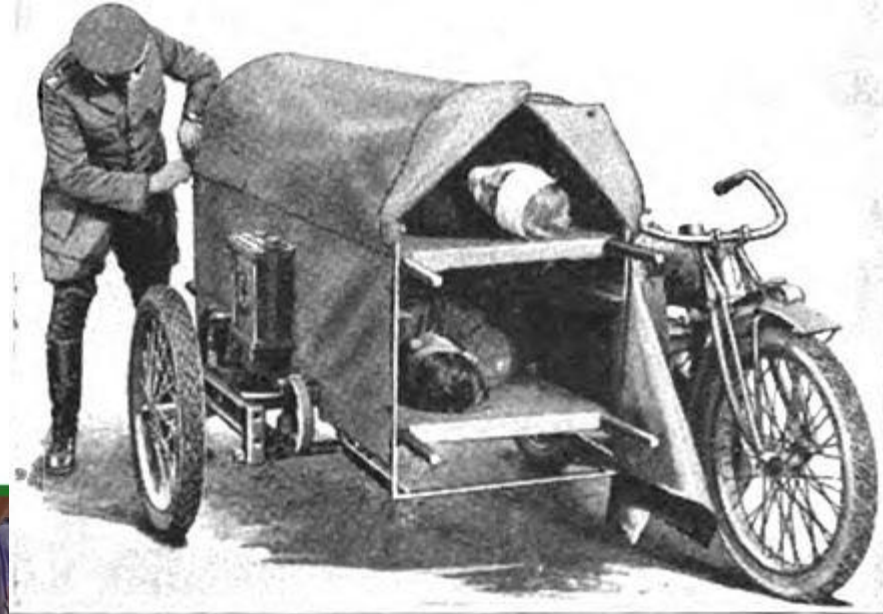
Transport, Trauma Surgery, and Training: Triage: SMART, ESI, etc





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Transport, Trauma Surgery, and Training: Transport: Israel, etc.





Telemedicine: Devices, Apps... Power/ BANDWIDTH! Training / Consult PeriOperative EMS

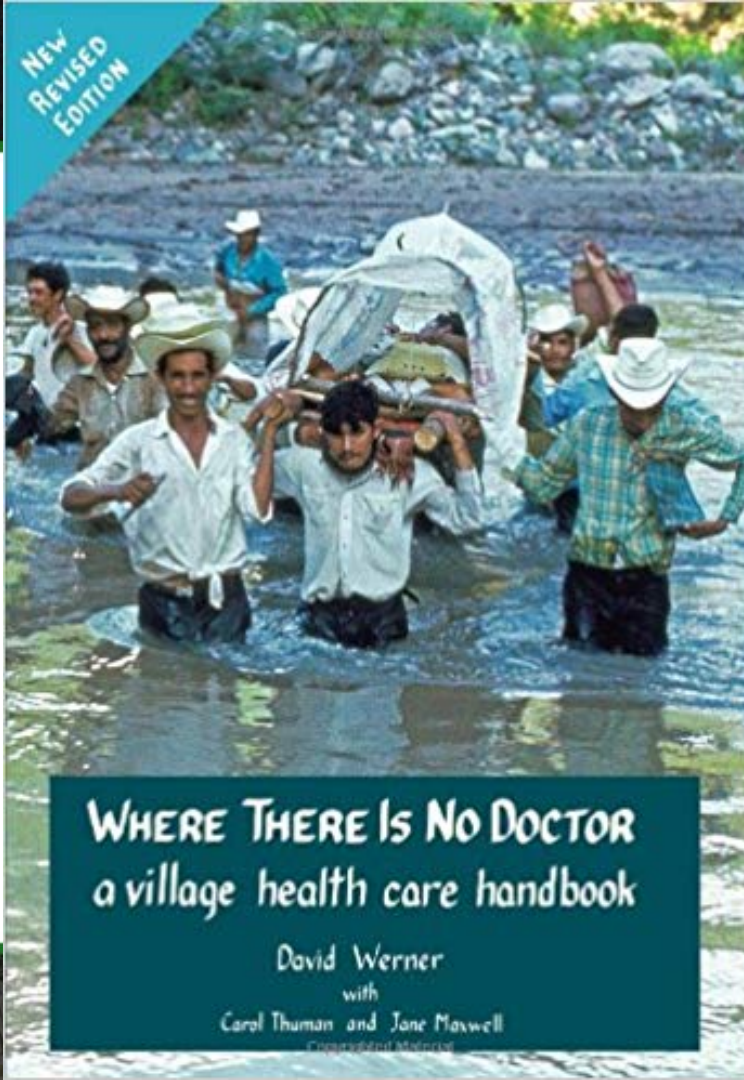




Training: Self and Others: PTC, CALS, HomeGrown/Bespoke EG: Burns-Breaks-Bleeds-Babies



Training:



Training:

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From Hesperian Health Guides, the publishers of
Where There Is No Doctor

Helping Health Workers Learn

A book of methods, aids, and ideas
for instructors at the village level.



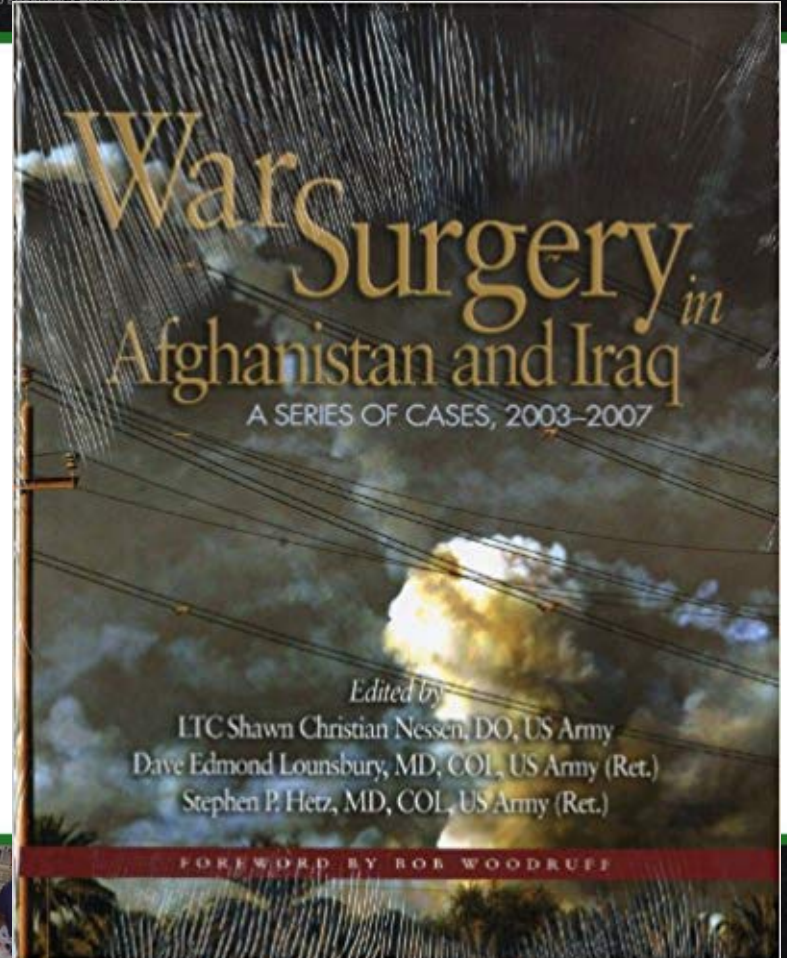
David Werner and Bill Bower

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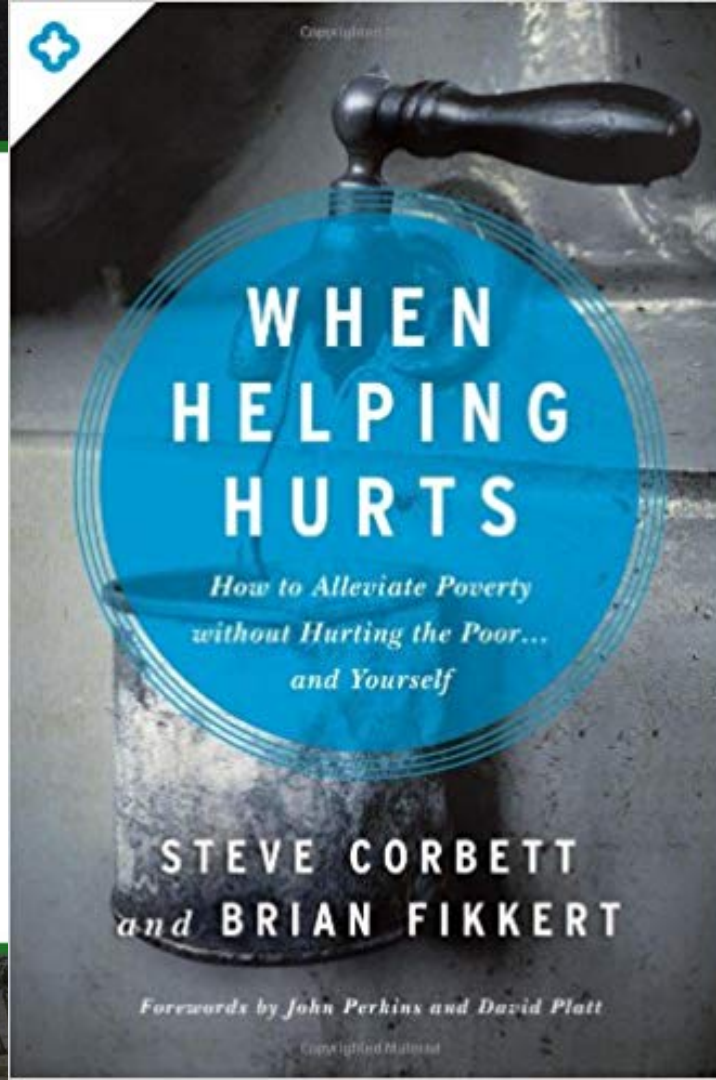


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Training: Self and Others



Training:





Point of Care Ultrasound
(POCUS). E-FAST, Regionals,
Training for Locals. Many
advantages over other imaging
modalities. Good ROI.





Medical Records, Follow Up:

Open MRS





Follow Up, Prosthetics, Physical /Occupational Therapy





Psycho-Social Considerations for
both Patient and Provider.
WHO (Pre/Peri),
CISD(peri/post), etc.






Stress Management

CISD: Critical Incident Stress Debriefing. Small group of those exposed to same traumatic event. Occurs 24 -72 hours after.

CISM: Critical Incident Stress Management (Bigger Picture). Mitigates negative mental and physical health sequelae from traumatic events.(pediatric code, aircrew fatalities, etc.) Individual counseling may be needed.

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Stress Management

CISD: Critical Incident Stress Debriefing.

Small group of those exposed to **same traumatic event.**

Occurs **24 -72 hours after.**



Stress Management

CISD: Critical Incident Stress Debriefing.

1. Assess (audit) the impact
2. Identify immediate issues
3. Defusing
4. Predict events and reactions
5. "Systematic Review" Look for maladaptive behaviors or responses to the crisis or trauma;
6. "Closure"
7. Debriefing /"re-entry" process.





Conclusion/Contact

1. E-Mail
2. Social Media
3. Save The Date.

11-14 May 2021
Tokyo, Japan





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f Sean Smith 🔍

Sean Home Create



Sean Smith

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Intro

Humanitarian, RN-Medic, Educator-Author-Consultant: Flight/CCT/ER/ICU, Resource Limited Environments

- Board of Directors at Look At Us Alliance
- Ambassador at AACN American Association of Critical-Care Nurses
- Owner-Operator at Critical-Care Professionals International, PLLC
- Board of Directors at World Association for Disaster and Emergency Medicine
- Flight Nurse-Paramedic at Vector

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Sean Smith [...](#)

7 May at 21:33 · [🌐](#)

<https://www.afro.who.int/news/who-hero-laid-rest>



Questions, Comments, Concerns ??????

Again,
Thank You.... Thank You Very Much....!
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