

# Lessons Learned from the War in Ukraine

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# Acknowledgements, include

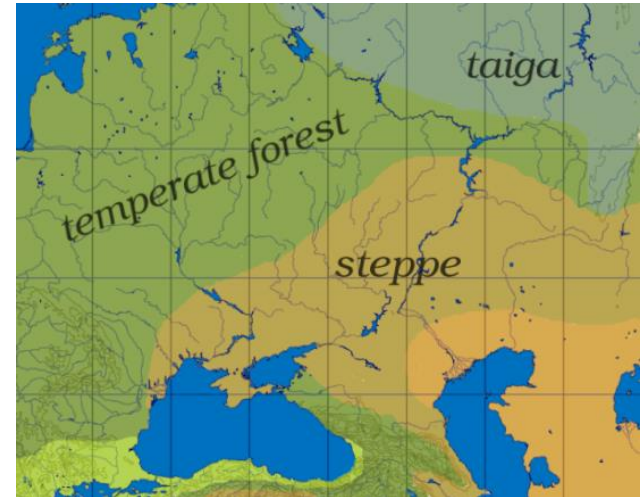
- Mark Arnold
- Mykhailo Badiuk
- Olesandr Biletskyi
- Olena Biletskyi
- Ivan Bohdan
- Frank Butler
- Leopoldo Cancio
- Warren Dorlac
- Jennifer Gurney
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- Pamela Lane
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- Nataliia Koroleva
- Chris Meador (ARCOS)
- Harold Montgomery
- Zahar Plekhtar
- Collen Ryan
- Olena Sorokina
- Ukrainian Medical Military Academy
- Ukrainian Ministry of Defense
- US Department of Defense
- American College of Surgeons
- American Burn Association
- National Association of Emergency Medical Associations
- US Institute of Research
- Ukrainian Medical Association of North America Foundation
- World Federation of Ukrainian Medical Associations

# Ukraine

Central-Eastern Europe: part of the East-European plain

Climate: moderately continental, except in Southern

Crimea: subtropical, Mediterranean



[http://en.wikipedia.org/wiki/File:Political\\_Caspian\\_climate.png](http://en.wikipedia.org/wiki/File:Political_Caspian_climate.png)

<http://www.worldatlas.com/webimage/countrys/eupoliticalg.htm>



# Ukraine

Inhabited for at least 44,000 years

- 988: Prince Volodymyr the Great - brought Christianity to Ukraine
- 1060: Princess Anna of Kyiv - first queen of France as regent.
- 1917 – 1922: Independent - Ukrainian People's Republic
- 1930 -1933: Man-made famine (Holodomor)
- 1941: Independent Republic
- 1945: Soviet republic (USSR)
- 1986: Chornobyl nuclear power plant accident
- 1991: Independent Republic – today's Ukraine
  - 1994: Budapest Treaty
  - 1996: Constitution adopted
- 2013: Russia provokes unrest in Kyiv
- 2014: Russia begins occupation of Crimea, Luhansk and Donetsk
- 2022: Russia invades Ukraine

<http://www.bbc.com/news/world-europe-18010123>

[http://en.wikipedia.org/wiki/Declaration\\_of\\_Ukrainian\\_Independence,\\_1941](http://en.wikipedia.org/wiki/Declaration_of_Ukrainian_Independence,_1941)

2013



2013

GETTY IMAGES

2014

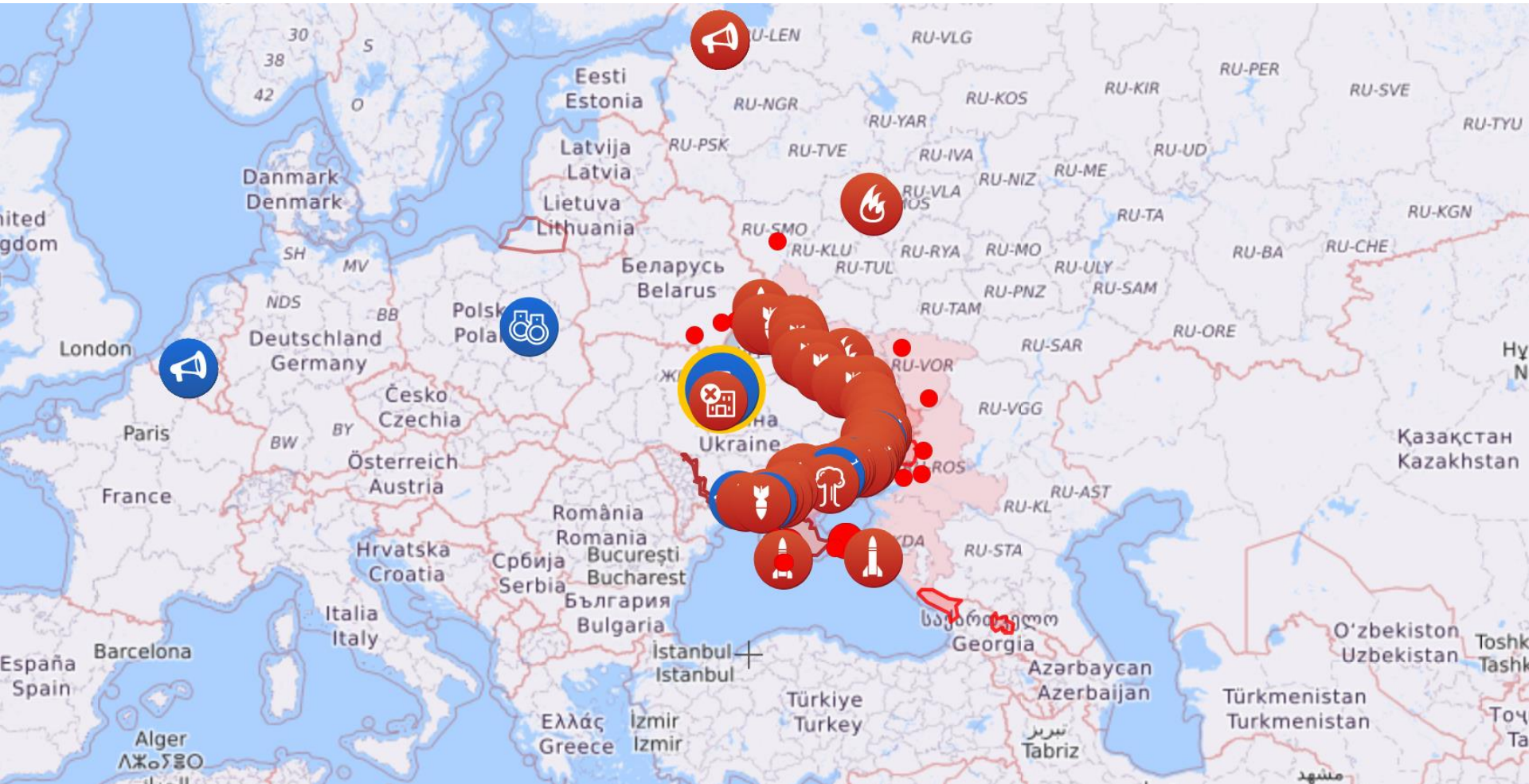


2014

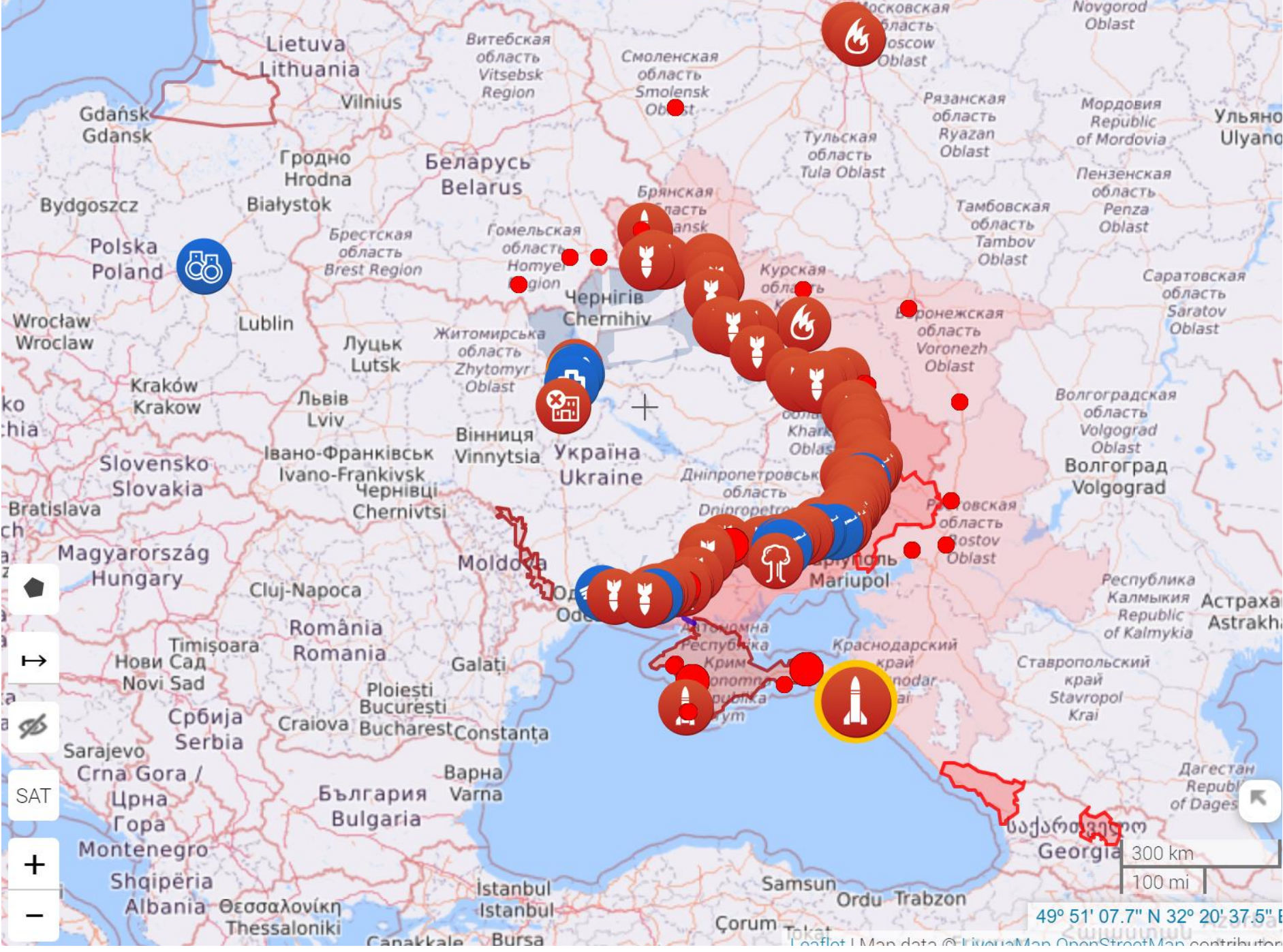




# Countrywide invasion since February 24, 2022



<https://liveuamap.com/en/2023/16-june-2-wounded-in-kyiv-region-as-result-of-russian-missile>



49° 51' 07.7" N 32° 20' 37.5" E

Leaflet | Map data © OpenStreetMap contributors



№1 ПОТРІБНІ:  
ТАЛЕЗОБЕТОННИХ  
10 000 - 22 000 ГРН  
(067) 247 11 05

Street damage and deaths from Russian cruise missile attack on Kyiv

# Lessons Learned

- Respond rapidly, with problem focused approach, to deliberately surge capacity and continuously improve quality,
- Share: reach out to and expand networks,
- Triage,
- Stay open, creative, flexible,
- Innovate
- Vigilantly build resilience and resistance
  - nationwide

# Rapid Response

Activated network of

- World Federation of Ukrainian Medical Associations (WFUMA)
- National Association of Emergency Medical Technicians (NAEMT) instructors in Ukraine

Determined needs and capabilities

Began on-line (zoom) training Tactical Combat Casualty Care for All Service Members (TCCC-ASM) on 2/28/22

# Rapid Response

2/28 – 6/03/2022

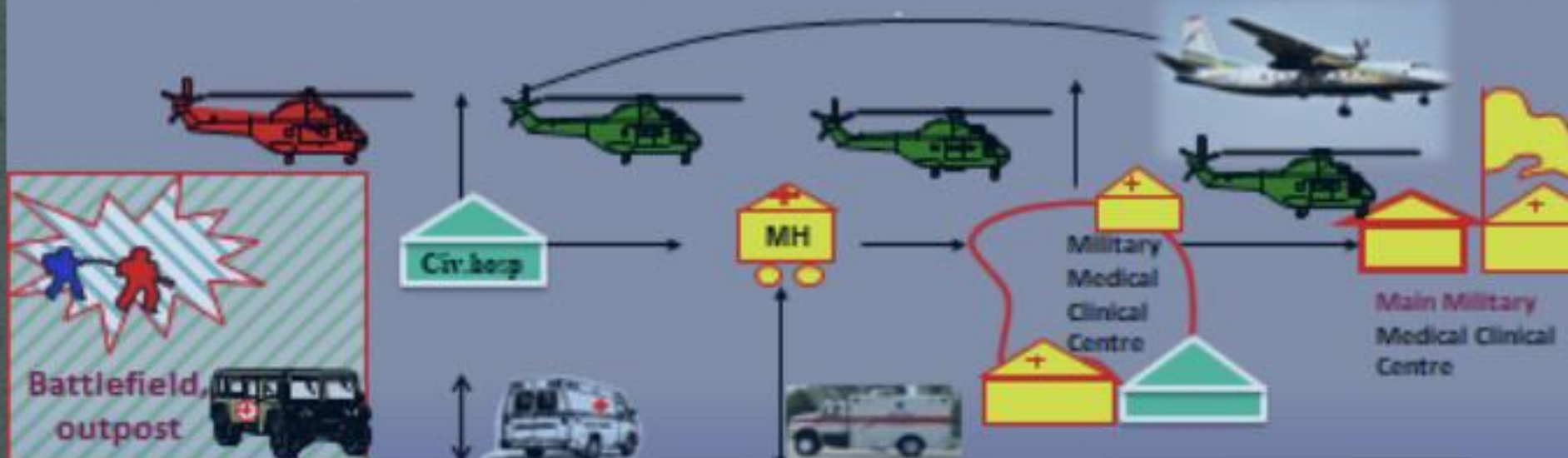
- ~7000 military and civilian attendees
- Zoom meetings: number meetings; number participants
  - TCCC-ASM: n= 30; 3504
  - Stop the Bleed (STB): n = 15; 904  
with commercial and improvised tourniquets
  - All Hazards Disaster Response (AHDR): n = 1; 558
  - US-ISR: weekly military burn lectures: n = 10; 715
  - ABA: weekly burn lectures: n = 12; 767
  - ACS-COT: weekly military trauma lectures: n = 10; 522

# Rapid Response

- 6/06 – 12/31/2022
  - 2-week cycles of AHDR / STB / PHTLS / TCCC-ASM
  - Military and civilian instructor-candidate bound attendees
- 4/16 – 2/07/2023 Ukrainian MOD
  - Injury specific weekly quality improvement conferences with national military and international speakers.
- Ukraine achieved an integrated military – civilian, rural-urban health care space, including ICU train transports, countrywide Burn Navigator network of 9 burn centers.
- Frontline medic feedback: role 3 to role 1.

# MEDICAL SUPPORT FOR ATO/JFO – ROLES (UA)

Firstaid (Role 1 NATO)	Pre-medical (Role 1 NATO)	First medical (Role 1,2 NATO)	Qualified medical (Role 2-3 NATO)	Specialized medical (Role 3 NATO)	Specialized medical treatment (Role 4 NATO)	Relief (Role 5 NATO)
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1 hours

4-6 hours

Up to 24 hours

Prehospital (UA)

Hospital (UA)

Roles – “levels” (UA) of medical support



3 4 5 role

3 role

1 - 2 role



КЛАСИ ПОЗНАЧКИ

ВМУ, військово-медичні клінічні центри (регіони)

земельні мобільні госпіталі

три реабілітації

медичні заклади МОУ

маршрути евакуації автомобільним транспортом

маршрути евакуації залізничним транспортом

маршрути евакуації повітряним транспортом

2014



2022



# Frontline mortality? 12 issues\*

1. Care under Fire (CUF) Extrication
2. Threat –zone specific care unclear
3. Tourniquets
4. Airway opening
5. Needle decompression
6. Vented occlusive dressings
7. Triage
8. Medics targeted
9. Personal protective equipment
10. Medic training by non-medics or by EMS
11. Course quality
12. Aseptic technique

\* Informal communications

# Issue 1 - CUF extrication

- For example:
  - 1 combatant injured in lower extremities,
  - 3 approach to rescue and are injured in head / chest,
  - Total injured = 4.
- Line use & casualty instruction for self care unclear.

# Issue 2 – Threat Zones

Red (CUF), yellow (TFC), green (TEC)

- Specific care unclear.
- MARCH potentially applied in red / red-yellow zone.
- Some training focuses on MARCH, rather than TCCC red (CUF), yellow (TFC), green (TEC) zone care.

# Issue 3 - Tourniquets

- Overused (on less than life threatening bleeding),
  - Prolonged use (not converted),
  - Misused (released for pain).
- 
- There appears to be need for clearer guidance on indications for manual pressure, compression and tourniquet placement in CUF as well as tourniquet conversion in TFC.

# 4 - Airway opening

- Head tilt used
- Nasal pharyngeal airways (NPAs) too short, airways blocked with blood and debris: NPA useful when beyond tongue.
- Head tilt beyond neutral might contribute to airway obstruction with soft tissue:
- 2017/2018 TCCC guidelines referred to neutral head position, chin lift & jaw thrust.



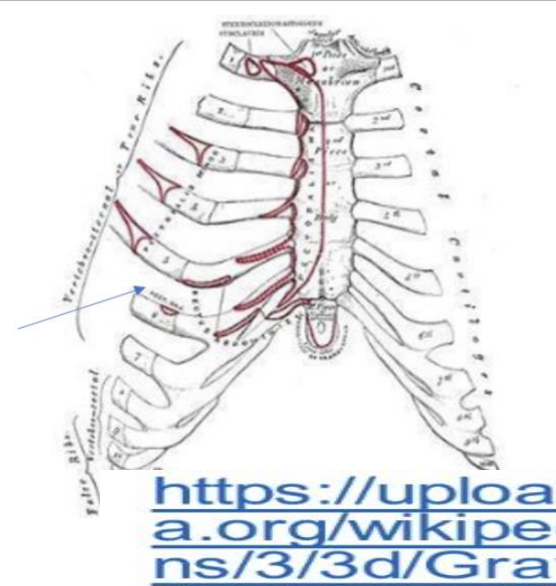
# Issue 5 – Needle Decompression

Needle decompression: sometimes performed

- Without respiratory indication: no shortness of breath (SOB)
- Not inserted in 2-3 intercoastal space (ICS), or 4-5 or 5-6<sup>th</sup> ICS
- Needle can go too far medially - into pericardium or heart.
- Understandably, when blood returns through the needle, it may be difficult to know if the needle is in a hemopneumothorax, the pericardium, heart, liver or spleen.

Pectoralis major origin from 6th rib laterally - an easily identified anatomic constant - not used as guide for needle placement. Due to rib curvature following the inframammary fold may lead to needle placement lower, at about rib 7-8.

- <https://county.milwaukee.gov/files/county/emergency-management/EMS-/Standards-of-Care/PSNeedleThoracostomy>
- <https://mobilephysiotherapyclinic.in/pectoralis-major-muscle/>
- <https://ascbs.org/imf1.html>



## Issue 6 - “Vented” Occlusive Dressing

- Fall off or plug when wound is bleeding, e.g., from intercostal (IC) vessels.
- Compressive dressings are 100% occlusive - lead to tension pneumothorax.
- Finger pressure to compress IC bleeding & 3 - side dressing (rather than commercial occlusive) might be helpful to control bleeding & pneumothorax.

# Issue 7 - Triage

7. Triage is resource dependent with goal to save all as possible.

- Surge capacity resources limited.

# Issue 8 - Evacuation

Red zone - medics targeted.

Yellow zone - evac vehicles bombed.

Some medics rescue at night, using night vision aids.

Camouflage from heat seeking drones and weapons limited.

# Issue 9 – Personal protective equipment (PPE)

Medics need PPE to protect self & casualty

- from contamination,
- from weather,
- from drones.

# Issue 10 – Medic training

Medics are being trained by non-medics.

Invasive procedures performed without PPE increases infection risk.

# Issue 11 – Course quality

Some TCCC MP courses are conducted

- without a schedule/ course plan,
- with TCCC videos in place of some lectures, while other lectures appear freestyle rather than to follow instructor guides;
- skills session demonstrate skills, but each learner may not have opportunity to try the skill.

# Issue 12 – Aseptic Technique

Non-aseptic techniques employed, e.g., packing a cleansed wound with packing material that was sterilely packaged, but is handled with non-sterile gloves, or bare hands, allowed to contact random (not sterile) surfaces ... then wrapped in compression dressing, despite antibiotics, may contribute to mitigatable wound infection, tissue loss, sepsis ...

Many videos demonstrate such technique, disclaimers may not impact learner.



# Response

- Develop Mobile Military Medical Training Command



**Purpose:** Establish a quality mobile combat medic training capability for the Ukrainian military to improve the proficiency of pre-hospital medical care, save lives, and improve patient outcomes.

05/26/2023: UMMA Letter of Support and Request

06/12/2023: 30 new instructor candidates trained.



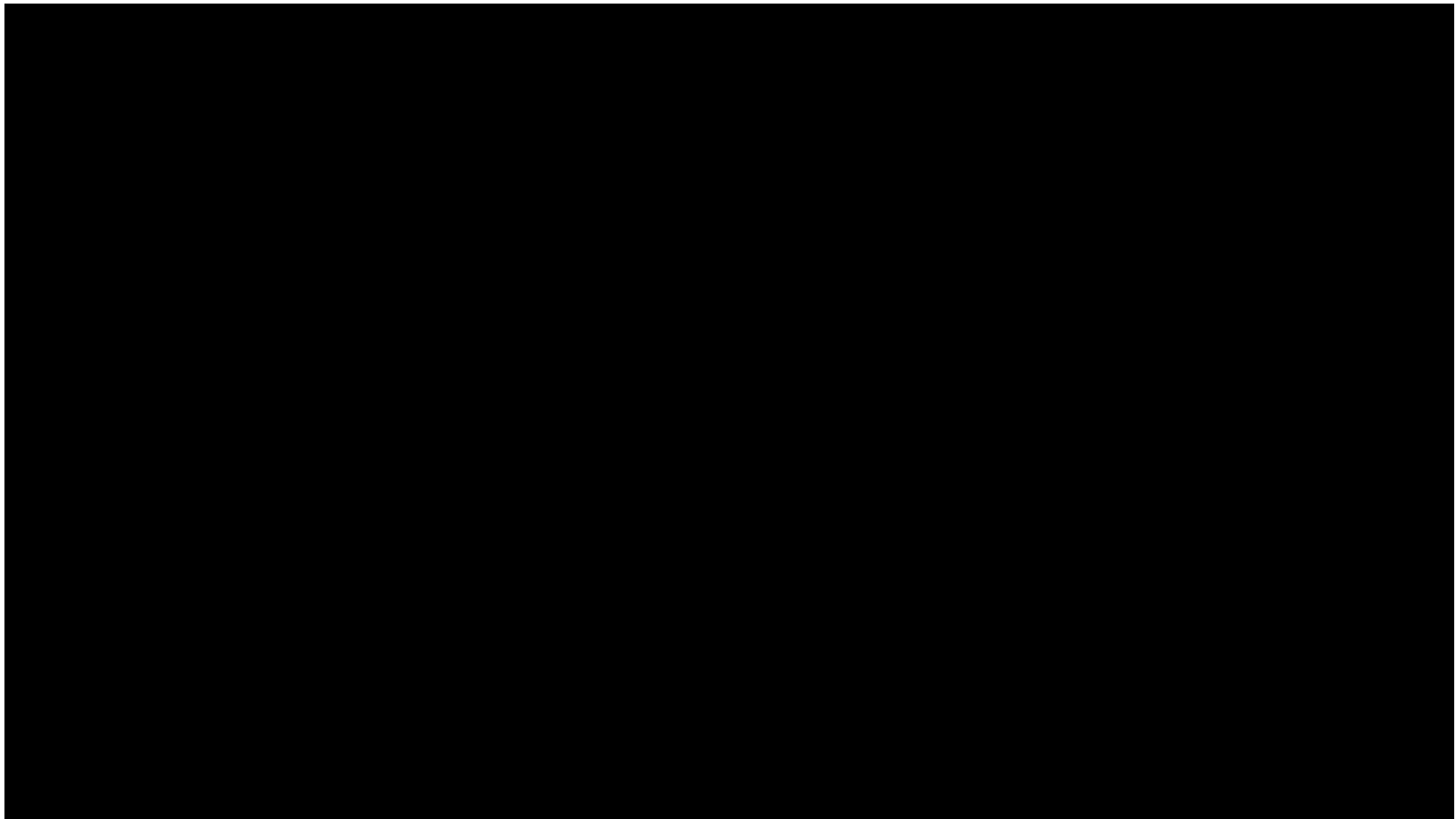
# Post-Kakhovka Dam Destruction



© Nina Liashonok/Ukrinform/ABACAPRESS/IMAGO

Without the Kakhovka reservoir, large irrigation canals on the left bank of the Dnipro can no longer be fed with water

Image: Nina Liashonok/Ukrinform/ABACAPRESS/IMAGO



# Key Points

- Build community resistance nationwide
- Respond rapidly with problem focused approach for deliberate surge of capacity
- Mindful quality improvement,
- Share: reach out to and expand networks,
- Triage,
- Stay open, creative, flexible,
- Innovate

A large field of yellow flowers, likely rapeseed, stretches across the foreground and middle ground. The sky is a clear, bright blue. In the background, a line of green trees is visible, and a faint, semi-transparent silhouette of a mountain range is overlaid on the sky. The text "Thank you!" is centered in the upper half of the image.

Thank you!



