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Large Scale Combat Operations, Public Health, Musculoskeletal Injuries and YOU, the Clinician

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Aberdeen, Md.

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Presenter



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LTC Shay Lopez serves as the Injury Prevention Branch (IPB) Chief for the Defense Centers for Public Health - Aberdeen (DCPH-A), Maryland. She supervises and manages epidemiologists, health scientists, and contractors and is responsible for editorial review, consultation, and liaising with all military Services.

LTC Lopez commissioned in 2008 as a second lieutenant (2LT) undergoing Army Officer Basic Leadership Course (ABOLC) in order to attend the Army-Baylor Doctoral in Physical Therapy (DPT) Program at now Joint Base San Antonio (JBSA). She earned her Doctor of Physical Therapy in 2011 and immediately began her first assignment as a first lieutenant (1LT) and hospital staff physical therapist (PT) at Fort Knox, Kentucky.

LTC Lopez served in the United States Army for the past 16 years, holding various clinical, leadership, consultative, and management positions for the Defense Health Agency (DHA), Medical Command (MEDCOM), and United States Regular Army and Special Forces. Her military awards and decorations consist of Joint Services Achievement Medal (JSAM), Army Commendation Medals (ARCOM), Army Superior Unit Award (ASUA), Meritorious Unit Commendation (MUC), Army Achievement Medals (AAM), the Parachutist Badge and German Armed Forces Badge, Gold (GAFB-G).



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Learning Objectives



At the conclusion of this activity, participants will be able to:

1. Differentiate between operational medicine and military medicine.
2. Explain public health and the role of public health within injury prevention in the U.S. military.
3. Define LSCO (Large Scale Combat Operations), BI (Battle Injury), and DNBI (Disease Non-battle Injury).
4. Describe Musculoskeletal Injury (MSKI) in the U.S. military.
5. Analyze the provider's clinical context and the context of military patients in relation to military operational medicine.
6. Support injury prevention and mitigation strategies for common military-related health issues.



Polling Question



Are you as a clinician engaged in Operational Medicine?

- A. Yes
- B. No



Operational Medicine



Operational medicine refers to the branch of medicine that focuses on **providing medical support and care in operational or tactical settings**. It primarily deals with the medical needs and challenges faced by **military personnel deployed in combat** or other operational environments. Operational medicine **encompasses various aspects**, such as preventative medicine, trauma care, emergency medical services, medical evacuation, and deployment health support (Cooper University Health Care, 2025).

Operational medicine plays a key role in developing and **maintaining combat power**. Its mission is to **maintain the health** of the Army and to conserve its fighting strength (ATP 4-02.7, 2016).

	CONUS	OCONUS
Treatment Facility	Hard Structure	Variable
Consultant availability	Relative virtual and in person	Variable
Diagnostic capabilities	Available	Limited and Variable
Rx availability	Available	Limited and Variable
Environmental Hazards	Controlled	Variable, not controlled
Disease Risks	Controlled	Variable, not controlled
Injury Risk	Controlled	Variable, not controlled



Polling Questions



Have you heard of or are you familiar with LSCO?

- A. Yes
- B. No



Military Operational Medicine



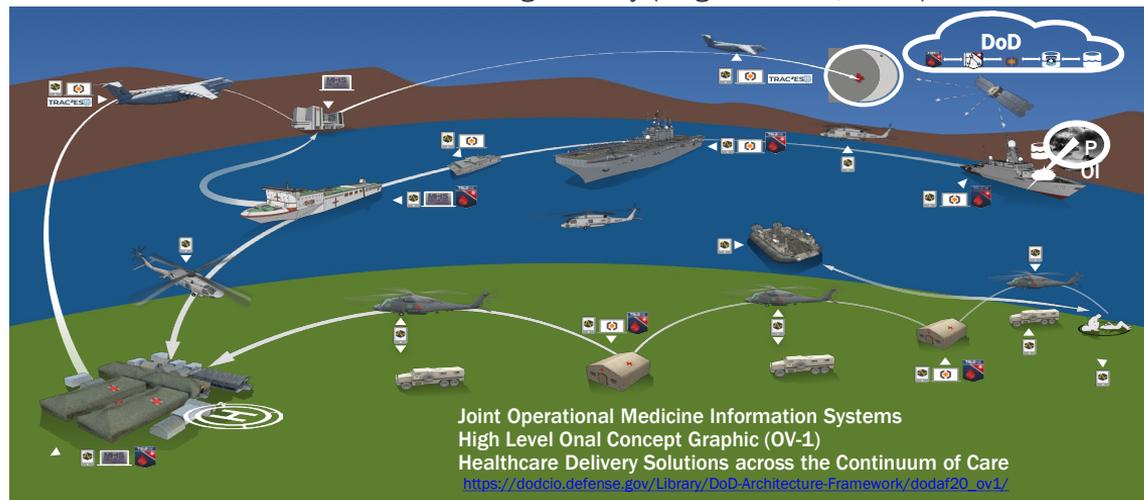
Iraq & Afghanistan Wars

- Medical evacuation for DNBI (Disease Non-battle Injury) were higher than battle injury rates.
- Leading diagnostic categories for medical evacuations were nonbattle injury, battle injury, and mental health.
- Leading causes of medically evacuated nonbattle injuries were sports/physical training, falls, and military vehicle accidents (Hauret et al., 2016).

Large-Scale Combat Operations (LSCO)

Estimates for LSCO suggest casualty rates the likes not seen since World War II, requiring the joint force and the Military Health System to reimagine triage, combat casualty care, medical evacuation, force health protection (FHP), and prolonged casualty care to minimize the risk to force.

Additionally, if the U.S. military does not gain and maintain air superiority to readily evacuate casualties from the battlefield the inability to resuscitate, rehabilitate, and reconstitute soldiers will increase risk to mission and to strategic victory (Izaguire et al., 2025).

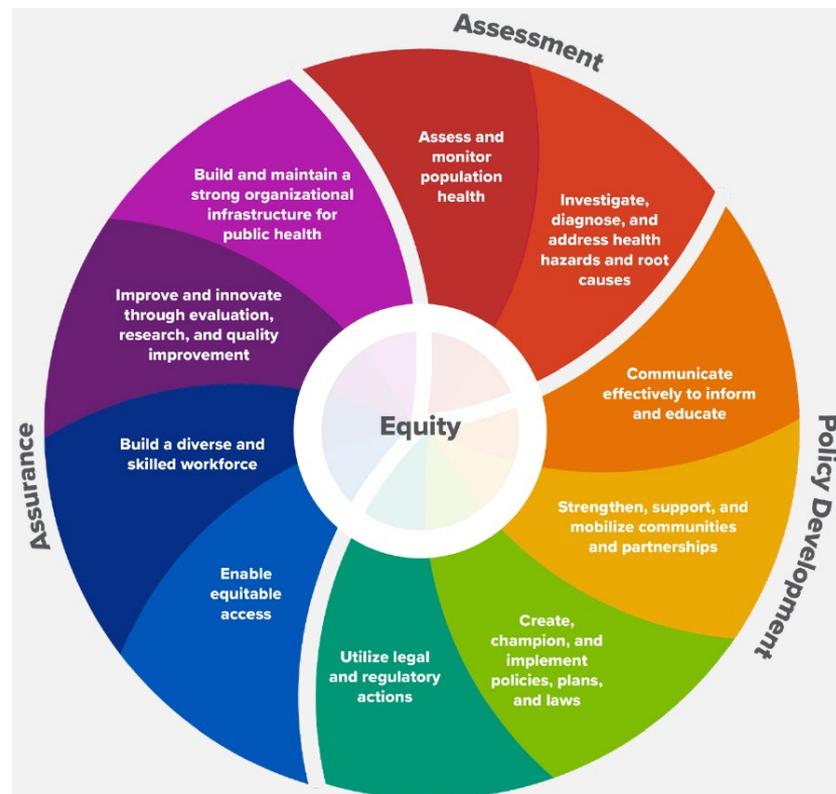




Public Health



- The first U.S. public health agency was the Marine Hospital Service (MHS), formed in 1798 to care for sick and injured seamen. The agency consisted of a series of hospitals with personnel who provided medical care.
- Public health aims to promote health, protect population health, and prevent disease and injury through the core functions of assessment, policy development, and assurance (CDC, 2025).
- Public health is the science of protecting and improving the health of people and their communities (DHA-PH, 2025).





Polling Question



Is battle injury (BI) and disease non battle injury (DNBI) something you already think about as part of your job?

- A. Yes
- B. No



U.S. Military Operational Medicine – PH: BI, DNBI

Revolutionary War

1775-1783

War of 1812

1812-1815

Mexican War

1846-1848

Civil War

(Union Forces Only)

1861-1865

Spanish-American War

1898-1901

World War I

1917-1918

World War II

1941-1946

Most died of
disease non battle
injury (DNBI)
causes other than
battle injury (BI)

Korean War

1950-1953

Vietnam Conflict

1964-1973

Persian Gulf War

1990-1991

Iraq & Afghanistan

Wars

2003 - 2021

Most died of
Battlefield Injuries
(BI)

Most died of DNBI
(transportation and
accidents)

Most died of
Battlefield Injuries
(BI)

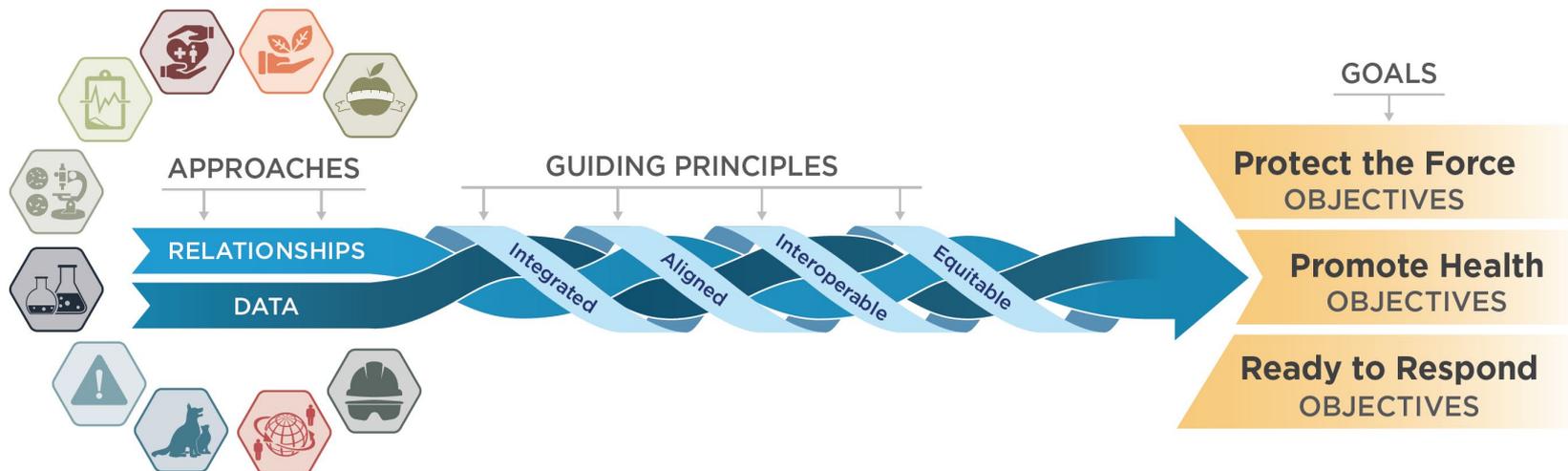
Large-Scale Combat Operations

U.S. forces will face adversaries' anti-access/ area denial (A2/AD) efforts focused on denying our deployment into theater and preventing our freedom of action once deployed (TRADOC PAM 525-92).

World War II was the first war in which there were more American battle casualties than deaths from other causes, such as accidents, disease, and infections (Blum, 2020).



DHA Public Health Strategic Framework



Defense Health Agency – Public Health

- Defense Centers for Public Health – Aberdeen
- Defense Centers for Public Health – Dayton
- Defense Centers for Public Health – Falls Church
- Defense Centers for Public Health – Portsmouth



Polling Question



Do you use injury or other data in reports as part of your job?

- A. Yes
- B. No



DCPH-A Injury Prevention Branch Surveillance, Evaluation and Prevention



*Adapted from: <https://www.cdc.gov/public-health-gateway/php/about/original-essential-public-health-services-framework.html>



Polling Question



Do you see evaluation and treatment of injury as part of your job?

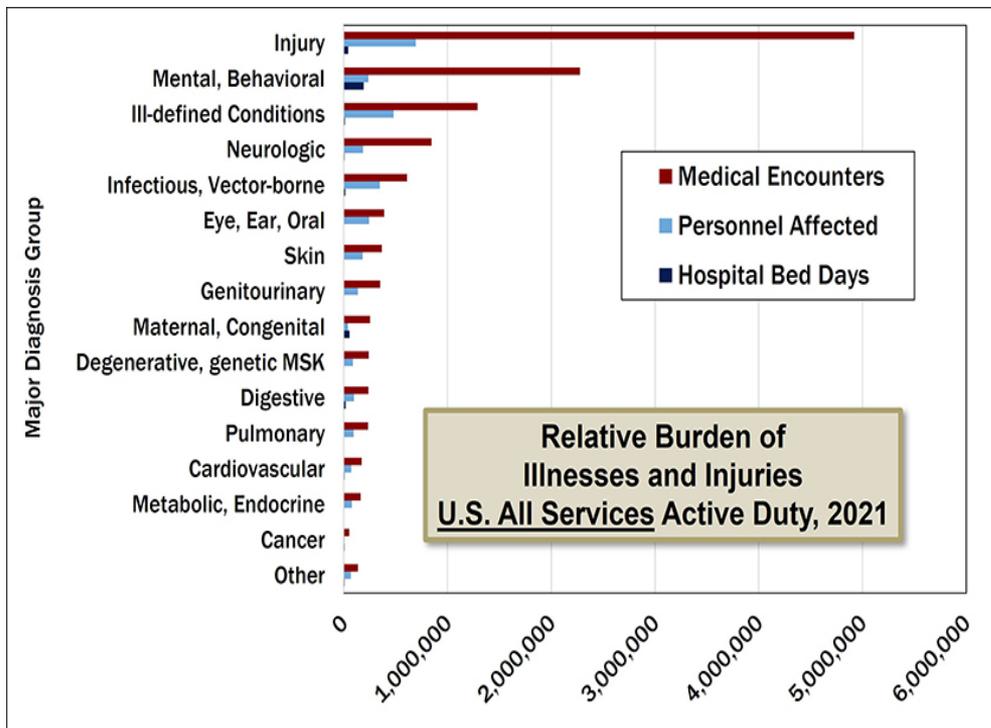
- A. Yes
- B. No

Are you surprised injury is the top burden to Military Readiness?

- A. Yes
- B. No



Injury: #1 Burden to Military Readiness



An injury is **damage to the body from an external source** (e.g., mechanical, environmental, radiation, or electrical) either suddenly (**acute traumatic injury**) or gradually (**cumulative microtraumatic injury**) (Hauschild et al., 2017).

Examples of musculoskeletal tissues affected: bone, cartilage, muscle, tendon, fascia, joint, ligament, bursa, synovium.

In 2018, > 2/3 of injuries were **cumulative microtraumatic**, or overuse injuries (Chervak et al., 2023).

<https://ph.health.mil/topics/discond/ptsaip/Pages/default.aspx>



Estimated evacuation rate / 1,000 per year ²⁶	Division / Combined Joint Task Force (PAR 25,000) ²⁷	Brigade Combat Team (PAR 5,000)	Battalion / Squadron (PAR 1,000)	Company / Battery / Troop (PAR 100)
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Observed OIF & OND Evacuations, Jan 2003-Dec 2011 ²⁸			# of projected evacuations by clinical category in future conflict, per year				
Clinical Category	#	% of DNBI					
Battle Injury ²⁹	8,944	---	7.07	176.6	35.3	7.1	0.7
Musculoskeletal System	8,257	16.3	6.52	163.1	32.6	6.5	0.7
Non-battle injury / Poison	7,542	14.9	5.96	149.0	29.8	6.0	0.6
Behavioral Health	5,892	11.6	4.65	116.4	23.3	4.7	0.5
Ill-defined conditions	5,065	10.0	4.00	100.0	20.0	4.0	0.4
Nervous System	2,684	5.3	2.12	53.0	10.6	2.1	0.2
Digestive System	2,592	5.1	2.05	51.2	10.2	2.0	0.2
Genitourinary System	1,794	3.5	1.42	35.4	7.1	1.4	0.1
Circulatory System	1,512	3.0	1.19	29.9	6.0	1.2	0.1
Other Conditions	1,062	2.1	0.84	21.0	4.2	0.8	0.1
Neoplastic Conditions	1,006	2.0	0.79	19.9	4.0	0.8	0.1
Skin Conditions	980	1.9	0.77	19.4	3.9	0.8	0.1
Respiratory System	882	1.7	0.70	17.4	3.5	0.7	0.1
Infectious Diseases	753	1.5	0.59	14.9	3.0	0.6	0.1
Endocrine Systems	616	1.2	0.49	12.2	2.4	0.5	0.0
Breast Conditions	502	1.0	0.40	9.9	2.0	0.4	0.0
Pregnancy	268	0.5	0.21	5.3	1.1	0.2	0.0
Congenital Conditions	161	0.3	0.13	3.2	0.6	0.1	0.0
Hematologic Conditions	122	0.2	0.10	2.4	0.5	0.1	0.0
Total	50,634	100.0	40.00	1,000.0	200.0	40.0	4.0

Legend	
Red	>3.0 projected events
Orange	1.0 – 3.0 projected events
Yellow	0.5 – 1.0 projected events
Green	<0.5 projected events

²⁶ Proportional evacuation estimate is based on expected all-cause evacuation rate of 0.04 events / 1,000 personnel. See Medical Surveillance Monthly Report, Vol 17, No 2, Feb 2010.
²⁷ PAR = Population at risk
²⁸ Medical Surveillance Monthly Reports, Vol 19, No 2, Feb 2012
²⁹ Battle injury evacuation rate is DIRECTLY related to level of combat intensity - the estimates reflected in this chart are drawn from OIF and OND. Future conflicts may/may not share the same level of combat intensity.

(Figure from Capability Development Integration Directorate, Prolonged Care in Support of Conventional Military Forces: Capabilities Based Assessment [U.S. Army Health Readiness Center of Excellence, 14 April 2017])

Figure. Summary of Battle Injury, Disease, and Nonbattle Injury Determination from Operation Iraqi Freedom and Operation New Dawn with Correlation to Personnel at Risk During LSCO

**Deployed data:
 #1 Med Evac
 reason JAN
 2003 – DEC
 2011 → MSKI**

<https://www.armypress.army.mil/journals/military-review/online-exclusive/2025-ole/conservative-fighting-strength-in-lsco/>



Polling Question



Thinking quickly about it (select one):

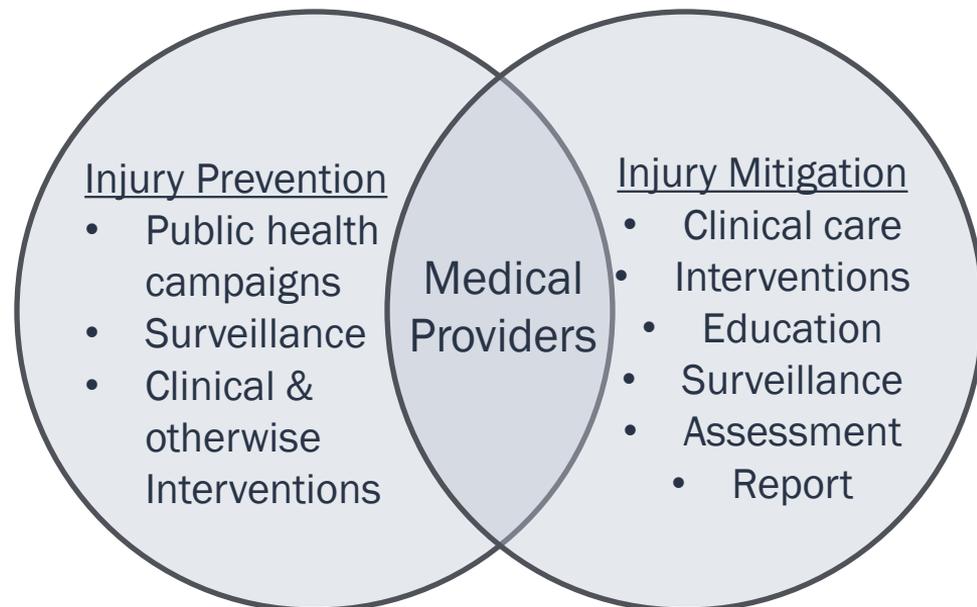
- A. I work in injury prevention
- B. I work in injury mitigation
- C. I work in both injury prevention and mitigation



Injury Prevention vs. Injury Mitigation



- Prevention – Actions that prevent disease occurrence. Actions aimed at **eradicating, eliminating, or minimizing** the impact of disease and disability (Porta et al., 2014).
 - Military context: ahead of operations.
- Mitigation – Actions taken to **avoid or minimize** negative environmental, medical, or social impacts (Porta et al., 2014).
 - Military context: during operations.





TYING IT TOGETHER: MEDICAL PRACTICE, DNBI, YOU, AND OUR PATIENTS...



- MILITARY MEDICINE IS UNIQUE

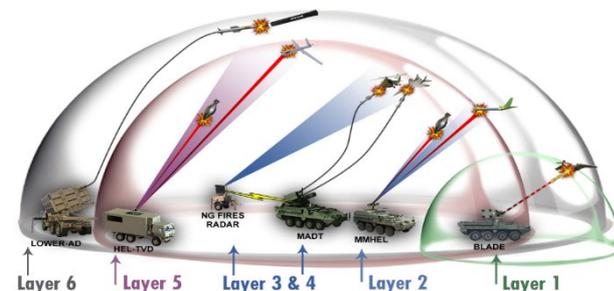
We, military medicine and medical practitioners, have much in common with civilian and even veteran medicine but with key differences..

- Needs and expectations
- Priorities
- Resources
- Practicalities
- Populations

- We are or should be in the same realigning thought processes as the Forces and the War Fighter... the last 25 years was counterinsurgency (COIN), but anticipated are Large Scale Combat Operations...



<https://www.dvidshub.net/image/161369/patrol-mahmudiyah-iraq>



<https://www.armyupress.army.mil/Journals/NCO-Journal/Archives/2020/October/Modernizing-Multi-Domain-Operations-for-Large-Scale-Combat-Operations/>



CHANGING YOUR THINKING & APPROACH

- COIN provided medevac options
- LSCO likely contested air space
- DNBI as you learned today, particularly MSKI, is a large mission drag
- Only so much available specialty care
- So, how does this change practices and perspective in your opinion?

To Conserve Fighting Strength in Large-Scale Combat Operations

MILITARY REVIEW ONLINE EXCLUSIVE - MARCH 2025

<https://www.armyupress.army.mil/journals/military-review/online-exclusive/2025-ole/conserves-fighting-strength-in-lsco/>

Clinical Category	#	% of DNBI	Estimated evacuation rate / 1,000 per year ¹	Division / Combined Joint Task Force (PAR 25,000) ²	Brigade Combat Team (PAR 5,000)	Battalion / Squadron (PAR 1,000)	Company / Battery / Troop (PAR 100)
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Polling Question

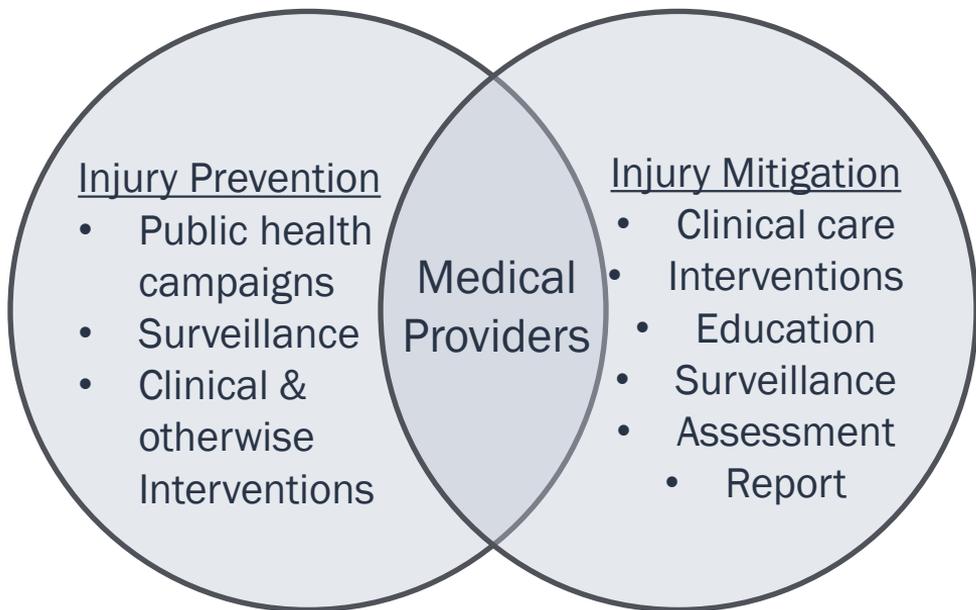


Now having been given a little more information, did your answer change on if you work in injury mitigation, prevention, or both?

- A. Prevention
- B. Mitigation
- C. Both



YOUR MILITARY CLINICIAN ROLE(S), CAPABILITY, CAPACITY AND RESOURCES



- Injury or possibility of MSKI is ALWAYS present
- Your environment of care
- Expectations vs. data informed decisions
- DNBI/BI experience
- Military Health System (MHS)
- Force Health Protection (FHP)
- Medical adjacent
- Programs



Summary



-
- Operational medicine
 - Public Health
 - Large Scale Combat Operations versus Counter Insurgency
 - Musculoskeletal Injury
 - Injury Prevention and Mitigation
 - Military Medical Providers...



Key Takeaways



- What Operational Medicine may mean
- Changing strategic pictures and perspectives
- Prevention and mitigation go together
- Your Lens and assets



<https://www.dvidshub.net/image/9306354/86th-air-wing-immersion-424th-air-base-squadron>



Question & Answer



Learn more about
DHA Public Health
Injury Prevention:



DHA Public Health and Injury Prevention email:
dha.apg.Pub-Health-A.mbx.injuryprevention@health.mil

Defense Health Agency (DHA), Defense Centers for Public Health – Aberdeen (DCPH-A)
<https://ph.health.mil/topics/discond/ptsaip/Pages/default.aspx>

To contact DCPH-A visit: <https://ph.health.mil/Pages/Contact.aspx>

Defense Public Health Training Related Injury dashboard:
<https://carepoint.health.mil/sites/APH/PHPMO/Pages/AD-Training-Related-Injuries.aspx>

Army Office of the Surgeon General:
[Injury Rates: Landing Page - Tableau Server \(health.mil\)](#)
(see All Army, MRC, and Facility tabs)
(<https://bitab.health.mil/#/views/InjuryRates/Tables?iid=1>)



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3. Under the “Get Started” tab, scroll down to a session you attended and select “Claim credit.”
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