MILITARY READINESS AND NATIONAL SECURITY THREATS POSED BY Rising Antimicrobial Resistance

Partnership to Fight Infectious Disease

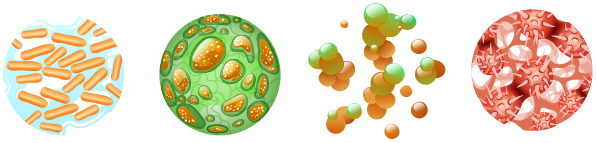
Antibiotics rank among most life-saving technologies for combat-related injuries by experts.[1] Yet, U.S. Military Experts Warn: *"FDA approved medical countermeasures* to address these problems, to include infectious disease prophylactics and treatments for nonimmune adult populations as well as combat wound infections, *are currently unavailable or insufficient for military use."*[2]

HIGH RISK OF INJURY PLACES MILITARY PERSONNEL AT GREATER RISK OF INFECTION

U.S. military personnel deploy worldwide, often to areas with limited health infrastructure. Human conflicts drive antimicrobial resistance (AMR) globally and threaten the health of troops, people living in areas of conflict, and people treated in hospitals along with infected military personnel and other patients. Wounds caused by weapons are a notable breeding ground for multidrug resistant (MDR) pathogens, given the injuries often involve metal fragments as well as organic matter from the environment in which the injury occurs.

- Infection is the leading cause of death among hospitalized burn victims who survive more than **72 hours** after injury.[8]
- Blast wounds carry a high risk of infection because of contamination from pathogens present in debris, dirt, and shrapnel spread across multiple injuries. Service members developing infections from blast injuries have a higher risk of developing secondary infections and are less likely to return to duty.[9]
- A Department of Defense study of infection in warfighters wounded in combat found infection occurred in **14%** of patients with an open bone fracture and **52%** of patients with an amputation.[10]

> *In the two decades since U.S. military doctors saw superbugs in returning vets — and in the decade since the CDC first described the urgent need to confront the issue — governments around the world have failed to make superbug prevention a priority . . . In that way, AMR has become the climate change of medicine."* [3]



PRESENT & PAST CONFLICTS DEMONSTRATE RISKS FROM MULTI-DRUG RESISTANT PATHOGENS AND NEED FOR POLICY CHANGES TO IMPROVE FORCE READINESS

AFGHANISTAN & IRAQ

- Infection rates in battlefield injuries from Operation Enduring Freedom (Afghanistan) and Operation Iraqi Freedom were **10 to 30 percent**, with an average evacuation time to a surgeon of **45 to 90 minutes**. More severe injuries were associated with increasing rates and complexities of infection. The Army predicts that with delays in evacuation time to receiving care infection rates will increase dramatically.[4]
- Leg wounds, particularly involving bone fractures, are especially vulnerable to infections and can lead to amputations. In one study of soldiers with open thigh bone fractures, **27 percent** developed deep infections. More than one in five of those affected had an amputation within **24 months** of injury due to infection.[5]

UKRAINE

- The superbugs driven by war also impact civilians. The deputy medical director of a children's hospital in Ukraine has reported that two thirds of the patients hospitalized due to Russia's war had hospital-acquired infections and MDR strains of bacteria as of November 2022.[6]
- In addition, transfers to civilian hospitals spread resistant pathogens. German hospitals which screened patients transferred from Ukraine found **34 multidrug-resistant Gram-negative cultures** in **17 percent** of the patients.[7]

MILITARY PERSONNEL ARE AT HIGHER RISK FOR DRUG-RESISTANT INFECTIOUS DISEASES OUTSIDE OF AREAS OF CONFLICT, AS WELL.

- Acute diarrheal illnesses among deployed military personnel increases the need for healthcare services, results in major losses of work hours, and adversely affects operational readiness. In close quarters, these diseases can spread quickly. Increasing rates of antimicrobial resistance of bacterial pathogens is a significant concern.[11]
- The military is a high-risk population for sexually transmitted diseases, including gonorrhea. Gonorrhea is becoming increasingly resistant to antibiotics globally and is now considered by the CDC as an "urgent health threat".[12]

AS POLICYMAKERS CONSIDER THE STEPS NECESSARY TO ENSURE FORCE READINESS AND PROTECT TROOPS, A ROBUST PIPELINE OF NOVEL ANTIBIOTICS IS ESSENTIAL. THIS REQUIRES POLICY CHANGES TO ADDRESS FAILURES IN THE ECOSYSTEM CURRENTLY RESPONSIBLE FOR DEVELOPING NEW ANTIMICROBIALS – NAMELY, THE PASTEUR ACT.

1. CG Blood, JC Puyana, et al. An Assessment of the Potential for Reducing Combat Deaths through Medical Techonologies and Training. J Trauma. 2002;53(6):1160-1165. https://pubmed.ncbi.nlm.nih.gov/12478044/
2. U.S. Army Medical Research and Development Command, Military Infectious Diseases Program. https://mrdc.health.mil/index.cfm/program_areas/medical_research_and_development/midrp_overview
3. E Cahan. Could a Conflict-Borne Superbug Bring on Our Next Pandemic? Rolling Stone Jul 21, 2024. https://www.rollingstone.com/politics/politics-features/war-zone-conflict-bacteria-pandemic-1235064261/
4. U.S. Army Medical Research and Development Command, Military Infectious Diseases Program. https://mrdc.health.mil/index.cfm/program_areas/medical_research_and_development/midrp_overview
5. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4586048/
6. N Petrosillo, E Petersen, et al. Ukraine War and Antimicrobial Resistance. The Lancet. 23(6):P653-654. June 2023. https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(23)00264-5/fulltext
7. S Yaacoub, C Truppa, et al. Antibiotic Resistance among Bacteria Isolated from War-Wounded Patients at the Weapon Trauma Training Center of the International Committee of the Red Cross from 2016 to 2019. BMC Infect Dis. 2022;22:257. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8922823/
8. AM Lachiewicz, CG Hauck, et al. Bacterial Infections after Burn Injuries: Impact of Multidrug Resistance. Clin Infect Dis. 2017;65(12):2130-2136. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5850038/)
9. US DOD Blast Injury Research Coordinating Office. Factors Influencing Infections after Combat-Related Extremity Trauma. Apr. 4, 2023. https://blastinjuryresearch.health.mil/index.cfm/news_and_highlights/research_highlights/FY19/infection_factors)
10. Ibid.
11. Walter Reed Army Institute of Research. Diarrheal Diseases. https://afrims.health.mil/Research-Focus-Areas/Diarrheal-Diseases/#:~:text=Acute%20diarrhea%20in%20deployed%20military,and%20adversely%20impacts%20operational%20readiness
12. CDC. Drug-Resistant Gonorrhea: An Overview. https://www.cdc.gov/gonorrhea/hcp/drug-resistant/index.html#:~:text=Drug%2DResistant%20Gonorrhea:%20An%20Overview,new%20drugs%20for%20gonorrhea%20treatment.