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AMR/STI Focus Area Lead

**Public Health Division
Armed Forces Health Surveillance Branch
Global Emerging Infections Surveillance (GEIS)**

**Antimicrobial Resistant (AMR) and
Sexually Transmitted Infections (STI)**

31 January 2019



“Medically Ready Force...Ready Medical Force”

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Armed Forces Health Surveillance Branch

Health Surveillance, Analysis and Insight for Action

The Armed Forces Health Surveillance Branch (AFHSB) is the central epidemiologic resource for the U.S. Armed Forces, conducting medical surveillance to protect those who serve our nation in uniform and allies who are critical to our national security interests. Explore our website to learn about the critical role AFHSB plays in force health protection.

AFHSB

Armed Forces Health Surveillance Branch

Health Surveillance, Analysis, and Insight for Action

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GEIS Vision, Mission, and Focus Areas

- **Vision:** To mitigate the threat of emerging infectious diseases to the U.S. military through a global laboratory network.
- **Mission:** Inform force health protection decision making and enhance global health security through a global laboratory network that analyzes and provides timely, actionable infectious disease surveillance information to the Geographic Combatant Commands and partner agencies.
- **GEIS Focus Areas**
 - **AMR/STI**
 - Enteric Infections
 - Febrile and Vector-borne Infections
 - Respiratory Infections

GEIS Strategy: Ends, Ways, Means

- **End State:** Enhanced Force Health Protection (FHP) decision making across the Geographic Combatant Commands (GCCs)
- **Ways:**
 - Support a **global laboratory network** poised to prevent, detect, and respond to infectious disease threats
 - Promote **GCC regional infectious disease threat priorities** and **strategic objectives** through active collaboration
- **Means (Lines of Effort):**
 - Conduct **surveillance of militarily relevant infectious disease** threats to inform FHP decision making across the GCCs
 - Prepare to provide support to **outbreak response** in order to better understand the infectious disease threats to U.S. forces
 - Enhance **coordination and collaboration** efforts between the GCCs, GEIS partners, the U.S. interagency, and international partners to improve efficiency and effectiveness
 - Optimize **return on investment** through improved program administration and management

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How GEIS Got Started

- **NSTC-7, Emerging Infectious Disease (EID) (1996)**
 - Improve infectious disease surveillance, prevention, and response
- **Tasks DoD to:**
 - Strengthen efforts through:
 - Centralized Coordination
 - Improved Preventive Medicine, Health and Epidemiology
 - Enhanced involvement with military treatment facilities and labs that are outside the Continental US (OCONUS)
 - Ensure availability of:
 - Diagnostic capabilities of US military overseas research laboratories
 - Labs are focal point for partnership and training



GEIS Focus Area Roadmaps

Tier 1 - High user need, High operational risk

| Rank | Disease |
|------|--|
| 1 | Malaria (all types) |
| 2 | Diarrhea - bacterial |
| 3 | Dengue fever |
| 4 | Influenza (Emerging high pathogenic with pandemic potential) |
| 5 | Chikungunya/Onyong-nyong, Ross River Fever |
| 6 | Norovirus |
| 7 | Mers-CoV and other Emerging Inf. Diseases |
| 8 | Ebola hemorrhagic fever/Marburg |
| 9 | MDR Bacteria |

Tier 2 - Medium user need, Medium operational risk

| Rank | Disease |
|------|---|
| 1 | Leptospirosis |
| 2 | HIV/AIDS |
| 3 | Crimean-Congo hemorrhagic fever |
| 4 | Tuberculosis w/MDR included |
| 5 | Schistosomiasis |
| 6 | Q fever |
| 7 | Leishmaniasis - cutaneous and mucosal -visceral |
| 8 | Hantavirus hemorrhagic fever with renal syndrome/pulmonary syndrome |
| 9 | Lassa fever |
| 10 | Typhoid/paratyphoid fever |
| 11 | Rift Valley fever |
| 12 | West Nile fever |
| 13 | Meningococcal meningitis |
| 14 | Adenovirus |
| 15 | Melioidosis |
| 16 | Rabies |

Tier 3 - Low user need, Low operational risk

| Rank | Disease |
|------|--|
| 1 | Diarrhea - protozoal |
| 2 | Brucellosis |
| 3 | Diarrhea - cholera |
| 4 | Plague |
| 5 | Hepatitis E |
| 6 | Rickettsioses, tick-borne (spotted fever group) all types |
| 7 | Trypanosomiasis - American (Chagas disease) |
| 8 | Anthrax |
| 9 | Tick-borne encephalitis/Omsk HF/Kyasanur Forest disease |
| 10 | Tularemia |
| 11 | Lyme disease |
| 12 | Sandfly fever |
| 13 | Japanese encephalitis |
| 14 | Equine encephalitis (includes Eastern and Western all types) |
| 15 | Trypanosomiasis - African (Gambiense/Rhodesiense) |
| 16 | Soil-transmitted helminths |
| 17 | Venezuelan hemorrhagic fever (Guanarito) |
| 18 | Bolivian hemorrhagic fever (Machupo) |
| 19 | St. Louis encephalitis w/West Nile |
| 20 | Sindbis (and Sindbis-like viruses) |
| 21 | Argentine hemorrhagic fever (Junin) |
| 22 | Nipah |
| 23 | California group viruses |
| 24 | Yellow fever |
| 25 | Hepatitis B |
| 26 | Hepatitis A |
| 27 | Bartonellosis (Oroya fever) |
| 28 | Oropouche virus |
| 29 | Barmah Forest virus |
| 30 | Zika virus |
| 31 | Fungal Infections - invasive mold |
| 32 | Fungal Infection - dimorphic endemic |

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GEIS Focus Area Roadmaps

- Antimicrobial Resistant Infections and Sexually Transmitted Infections (AMR/STI)
- Enteric Infections
- Febrile and Vector-borne Infections (FVBI)
- Respiratory Infections



DEPARTMENT OF THE ARMY
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REPLY TO
ATTENTION OF

MCMR-RTI

14 January 2015

MEMORANDUM FOR RECORD

SUBJECT: Infectious Disease Threats to the US Military Prioritization Panel Results

1. The Infectious Diseases Threat Prioritization Panel Meeting was hosted by Military Infectious Diseases Research Program (MIDRP) at Navy Entomology Center of Excellence, Naval Air Station, Jacksonville, Florida on 22-23 September 2015. The panel was composed of subject matter expert representatives of PACOM, AFRICOM, EUCOM, CENTCOM, SOUTHCOM, SOCOM, NORTHCOM, TRANSCOM, NCMI, AFHSC, IDCPR, MIDRP, USAMRMC, WRAIR, NMRC, USAMRIID, AFPMB, Army/Navy/Air Force Surgeon General Consultants/Specialty Leaders in Infectious Diseases and Microbiology (Encl 1).
2. The purpose of this panel was to identify infectious disease threats to operational forces and prioritize their potential impact on the force considering the following factors:
 - a. Threat changes over time due to shifts in ecological conditions (e.g., climate change)
 - b. Reemergence of ID threats (e.g., pandemic flu, MDROs, rabies, Q fever)
 - c. Emergence of new threats (e.g., MERS-CoV, Chikungunya, SARS, Ebola)
 - d. Changes in operational areas (e.g., increased focus in certain areas, such as the Pacific Region)
 - e. Currently available and near-term available countermeasures and their impact on the ID threat (e.g., PPE, repellents, vaccines, drugs, diagnostics)
3. The panel proceedings included presentations of ID threats in individual COCOMs and voting on a global 1-n list (Encl 2). The global 1-n list was then reprioritized by consensus based on user need and operational risks which resulted in three tiered lists (Encl 3). Critical countermeasures were identified thru a consensus among participants.
4. The prioritized ID threat list will assist the military research community in focusing on the development of vaccine, prophylactic drugs, diagnostic capabilities, and surveillance efforts. This report supersedes the previous Infectious Disease Threat Prioritization

AMR/STI Objectives

- Inform FHP decision making across the GCCs and enhance global health security by coordinating a surveillance network to fill an existing gap, focused on resistant infections that include **wound** and **healthcare-associated bacterial infections** (HAI), and **drug resistant *Neisseria gonorrhoeae*** (GC).
- Provide **timely, accurate, and actionable data for decision makers** within the DoD and the global public health community in order to reduce risk for disease and maintain capacity to treat it.

AMR/STI Pathogens of Interest

■ URGENT:

- CRE and MDRO – regardless of species
- Resistant *Neisseria gonorrhoeae* (GC)
- *Clostridium difficile*

■ SERIOUS:

- ESKAPE pathogens (*Enterococcus faecium*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, and *Enterobacter* species)

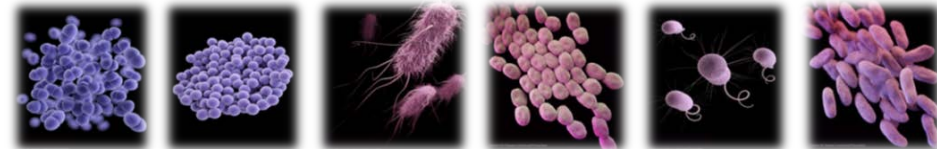
Ranked Tiered List of Infectious Disease Threats (2015)

Tier 1 - High user need, High operational risk

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|------|--|
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■ CONCERNING:

- Vancomycin-resistant *S. aureus* (VRSA)



Source: <http://www.cdc.gov/media/subtopic/library/diseases.htm>

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AMR/STI Activities

■ Advanced Characterization

- Analysis of resistance genes using advanced molecular methods (e.g., next generation sequencing)
- Enhanced identification of mobile genetic elements and association with antibiotic resistance genes

■ Training Courses

- Partnered with Multidrug Resistant Organism Repository (MRSN) to train partner nation lab technicians

■ Data Analysis, Enhanced Reporting, and Training

- Study linking bacterial isolates to individual-level medical encounter from service members
- Collaborative surveillance efforts among Navy Marine Corps Public Health Center – EpiData Center, MRSN and PVC to support Combating Antibiotic Resistant Bacteria (CARB) Initiative

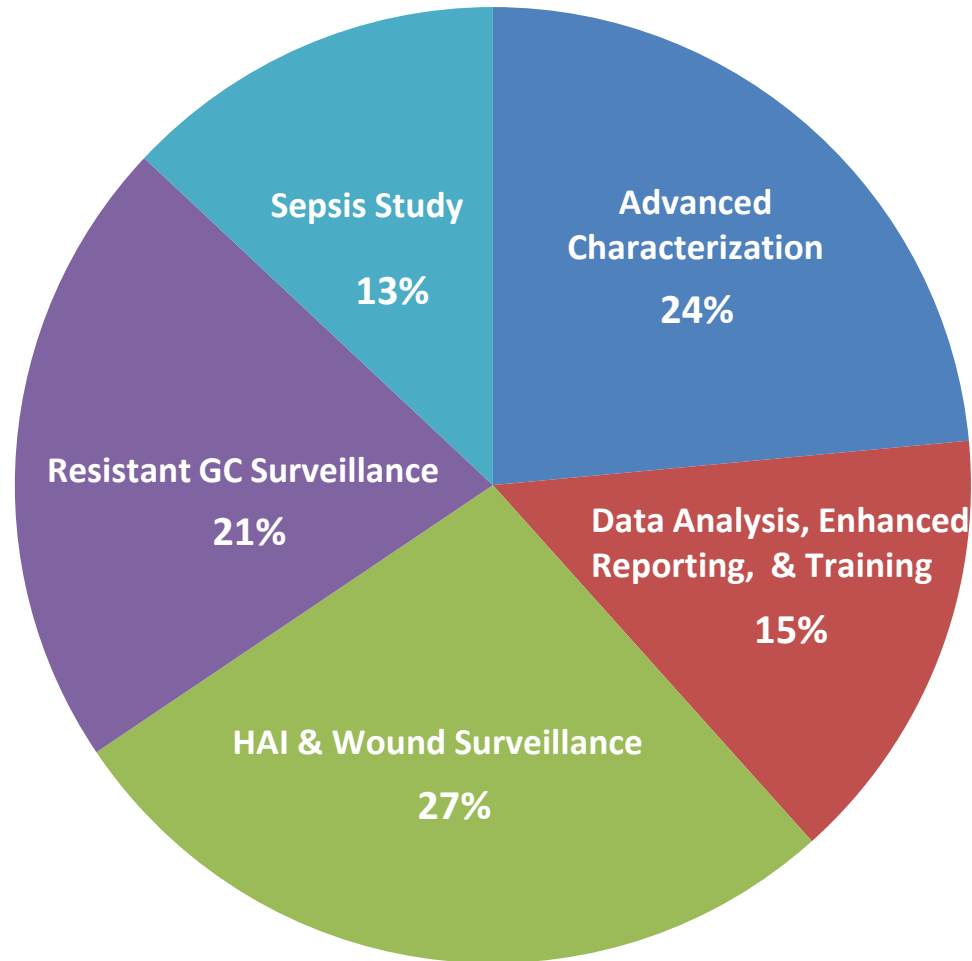
AMR/STI Activities

- **Surveillance for HAIs, Wound Infections, and drug-resistant GC**
 - U.S. military including, forward-deployed and those receiving care at in/outpatient settings
 - Foreign military or civilian populations in hospital and outpatient settings
- **Antibiotic Stewardship**
 - Pharmacovigilance Center (PVC) establishes reporting capability within DOD to generate Antimicrobial Use reports for all Military Treatment Facilities (MTFs) in the Military Health System.
 - Data sent to CDC's National Healthcare Safety Network's Antibiotic Use Module
- **Combating Antibiotic Resistant Bacteria (CARB) Initiative**
 - Executive Order (EO) #13676 (September, 2014), launched the CARB National Strategy and CARB National Action Plan

CARB National Action Plan

1. Stewardship – judicious use of antibiotics in medical treatment facilities
2. Surveillance – of targeted multidrug-resistant bacteria
3. Diagnostics – rapid testing for AMR bacteria
4. Therapeutics – new and novel approaches to treating AMR bacteria
5. International Collaboration – for surveillance, collection, dissemination, and sharing of best practices

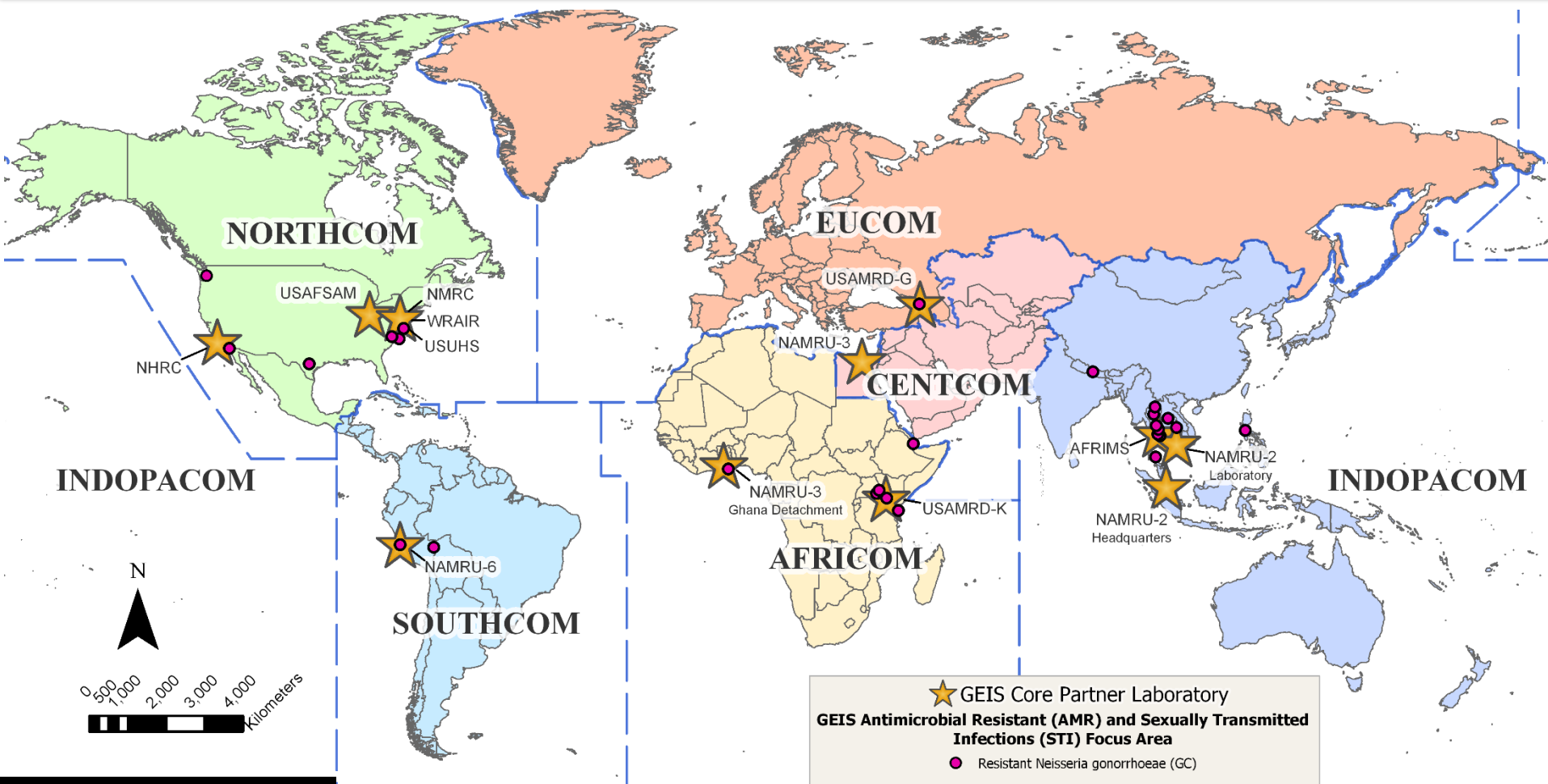
AMR/STI FY18 Portfolio



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FY18 Drug Resistant GC Surveillance Sites



10 projects, \$1.8M

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DoD Gonococcal Repository and Reference Lab

UNCLASSIFIED



- Uniformed Services University of the Health Sciences
 - maintains a repository for GC isolates collected from GEIS surveillance projects
 - serves as a reference lab with expertise in culture and antibiotic susceptibility testing
 - provides secondary verification, advanced characterization, and cryopreservation
- All GEIS-funded GC projects are required to submit suspected GC isolates to the reference lab and the reference lab provides technical support to the sites as needed.



Product: Executive Summary (EXSUM)



- Uses data reported by GEIS funded surveillance activities to shape force health protection measures
- Example: Country X Drug-Resistant GC Surveillance
 - **Actionable Data:** Reports have confirmed high level of resistance to quinolones, tetracycline and penicillin & resistance to azithromycin
 - **Significance:** Azithromycin last-line drug to treat GC infection
 - **Result:** GEIS generated EXSUM to GCC to inform treatment options for personnel in/from that area

AMR/STI FA Accomplishments

- Surveillance efforts reported the first U.S. human *Escherichia coli* isolate carrying the gene (mcr-1) for colistin resistance
- Identified the first *Acinetobacter baumannii* strain confirmed to express New Delhi metallo-beta-lactamase-1 (NDM-1) in South American
- Added to existing efforts to map Carbapenem-resistant *Enterobacteriaceae* (CRE) spread and risks, including visibility into at least 10 additional African nations
- Identified first dual Mobilized Colistin Resistance (MCR) genes in a human clinical isolate in GEIS AMR surveillance network

QUESTIONS

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