



# **USAMRIID COMMAND OVERVIEW**

**Presented by**

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# Mission Statement



Conduct basic and applied research on biological threats resulting in medical solutions to protect the War Fighter.

# Chain of Command

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- **U.S. Army Medical Command**  
LTG James Peake, Surgeon General, US Army



- **U.S. Army Medical Research and Materiel Command**  
MG Lester Martinez-Lopez, Commander



- **USAMRIID**  
COL Erik A. Henschel, Commander

# Full Spectrum of Medical Product Development for Biological Defense

PREVENTION



DETECTION



DIAGNOSIS  
TREATMENT



YEARS

MONTHS

DAYS

HOURS

MINUTES

HOURS

DAYS

BIOLOGICAL  
DEFENSE

VACCINES

IMMUNE GLOBULINS

DRUGS

Diagnostics

Training

# Unique Capabilities



- **Tech Base Research and Expertise**
- **Vaccine/Drug Research and Testing**
  - Aerosol studies in animal models
  - GLP-animal efficacy studies
  - Inpatient, outpatient and field clinical studies
- **Reference Laboratory**
  - Special Pathogens Sample Test Laboratory
  - Bioforensics Center (2003)
- **SMART field deployable teams for outbreak response**
- **Operational Medicine**
  - Liaison with other services and agencies
  - Education of military medical and scientific specialists
  - SME's for medical management of biological casualties and response

# Unique People and Expertise

*USAMRIID's scientific staff includes over 200 postgraduate-level professionals with expertise in the following areas:*



- Aerobiology
- Clinical Research
- Pathology
- Exotic Viral Diseases
- Epidemiology
- Medical Entomology
- Lab Animal Medicine
- Operational Medicine
- Preventive Medicine
- Molecular Biology
- Immunology
- Toxinology
- Virology
- Vaccine Development
- Biochemistry
- Infectious Diseases
- Microbiology
- Molecular Modeling
- Emergency Medicine
- Regulatory Affairs
- Biosurety

# Unique Facilities



- Largest collection of BSL 4 containment laboratory space in the U.S.
- Comprehensive accredited animal care facilities
- Farm – Large Animal Care Facility

- Aerobiology Section
- BSL 4 patient care suite
- Field laboratory training center

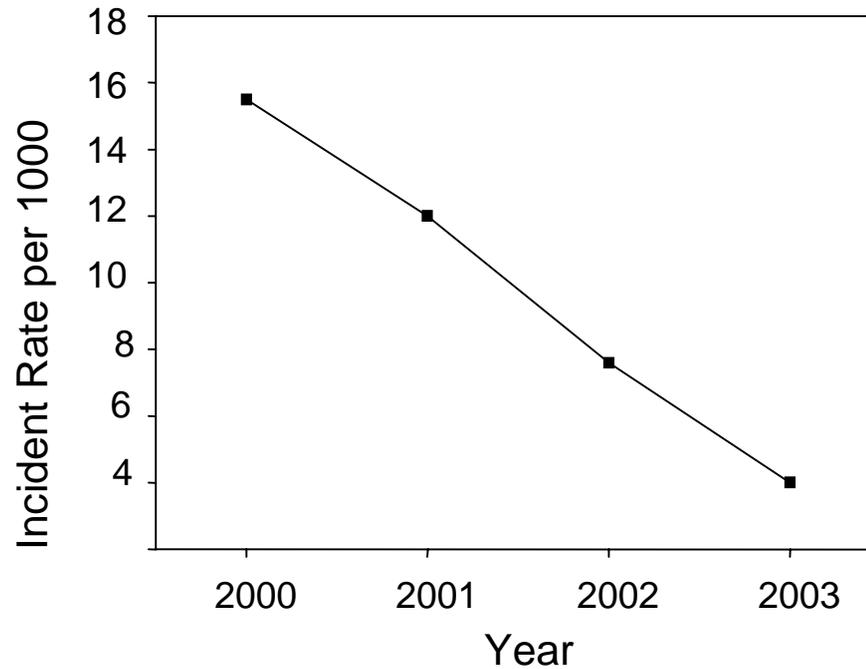


# Safety is Our Number 1 Priority

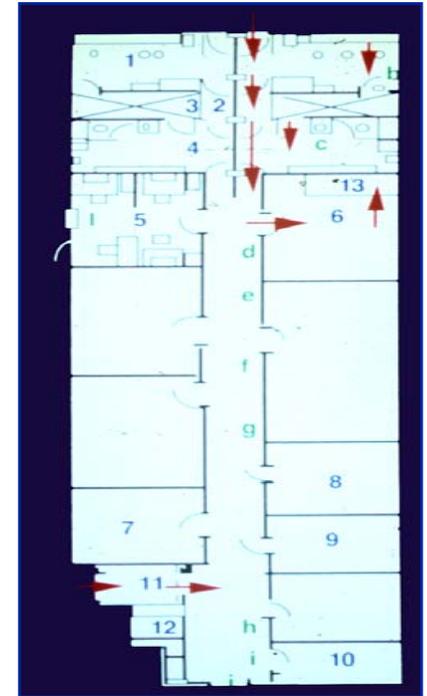
## Primary Controls



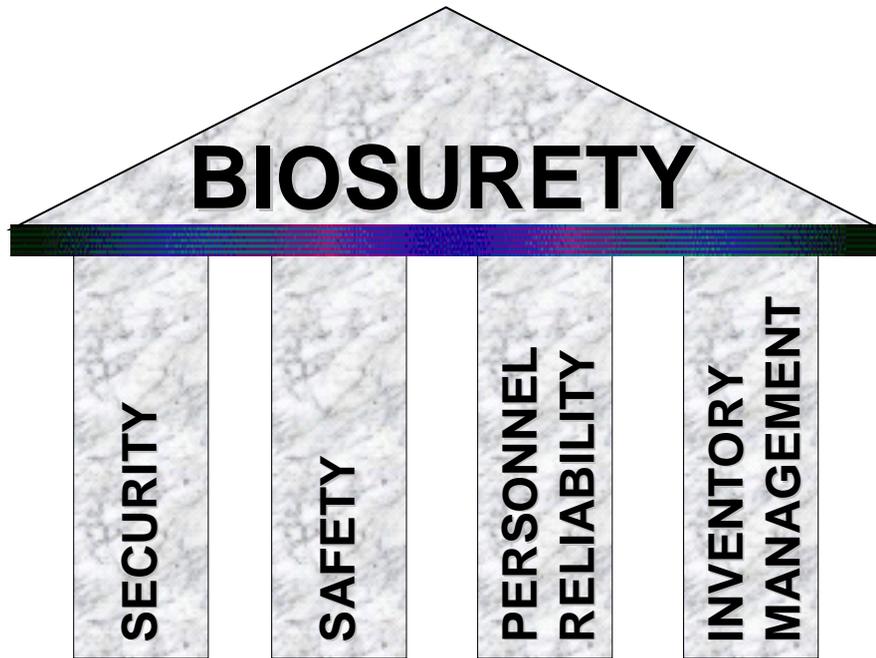
Potential Exposure Rates FY00-FY03



## Secondary Barriers



## Trained Workforce



- **Enhanced Physical Security**
- **Monitoring**
- **Personnel Reliability**
- **Inventory Registration and Management**

# USAMRIID

## *Biodefense Products to Protect the Nation*



### Available For Use Today

- Ciprofloxacin for Treatment of Inhalational Anthrax
- Tularemia Vaccine
- Venezuelan Equine Encephalitis (VEE) Vaccines
- **Eastern Equine Encephalitis (EEE)** Vaccines
- Western Equine Encephalitis (WEE) Vaccines
- Q-Fever Vaccine
- Botulinum Pentavalent Toxoid Vaccine
- Smallpox Vaccine (cell culture derived vaccinia virus)
- **Botulinum** Antitoxin (human & horse)
- Vaccinia Immune Globulin

### Currently Being Developed

- rPA-Based **Anthrax** Vaccine
- Botulinum Neurotoxin Bivalent Vaccine
- Venezuelan Equine Encephalitis Virus (V3526) Vaccine
- Plague Vaccine (F1-V)
- Joint Biological Agent Identification System (JBAIDS)
- Antibiotic Treatment of Pneumonic Plague
- Cidofovir for Treatment of Smallpox

### Future Solutions

- Staphylococcal Enterotoxin B; A Vaccine
- **Hantavirus** Vaccines
- Botulinum Neurotoxin Heptavalent Vaccine
- Next-Generation Immunodiagnostics

**Proven track record of innovative drugs, vaccines and diagnostics protecting Americans**

# USAMRIID Solutions for CDC Category A Biological Threats

## Smallpox

- Cell Culture Derived Smallpox Vaccine
- MVA Vaccine
- Cidovofir and other anti-viral drugs
- VIG, IgM & IV
- Orthopoxvirus and Variola Diagnostics

## Botulinum Neurotoxin

- rBONT Heptavalent Vaccine
- Monoclonal Antibodies
- Equine & Human Anti-Toxin
- Integrated Rapid Diagnostics

## Anthrax

- AVA Vaccine Studies
- Antibiotic Sensitivity
- rPA (Next Generation Anthrax Vaccine)
- Anthrax Immune Serum
- Generation After Next Vaccine
- Integrated Rapid Diagnostics

## Plague

- Plague Therapeutics
- Candidate F1-V Vaccine
- Integrated Rapid Diagnostics

## Tularemia

- LVS Vaccine
- Integrated Rapid Diagnostics

## Hemorrhagic Fevers

- Candidate Ebola and Marburg Vaccines
- Rift Vally Fever Virus /Junin Vaccines
- Ribavirin
- Integrated Rapid Diagnostics

# Multiagent Vaccine for Biological Threats (DTO CB.25)

To move away from this...



25 shots plus boosters

To this...

Botulinum  
toxin



Marburg Virus  
Anthrax

Or this...

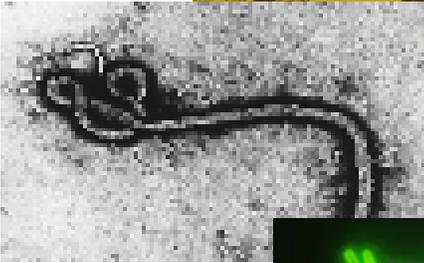
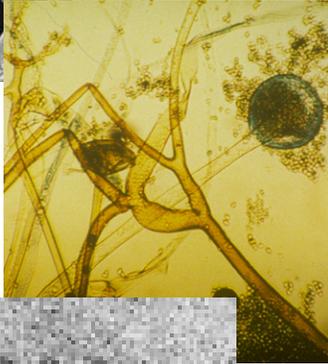
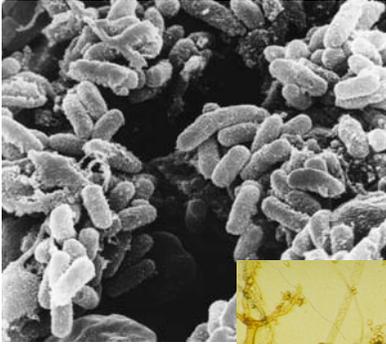
Marburg-Ci67  
Marburg-Musoke  
Marburg-Ravn



Ebola-Z  
Ebola-S

“Panfilovirus vaccine”

# Therapeutics



## Antibiotics:

- Anthrax
- Plague
- Q Fever
- Tularemia
- Glanders
- Brucellosis

## Antivirals:

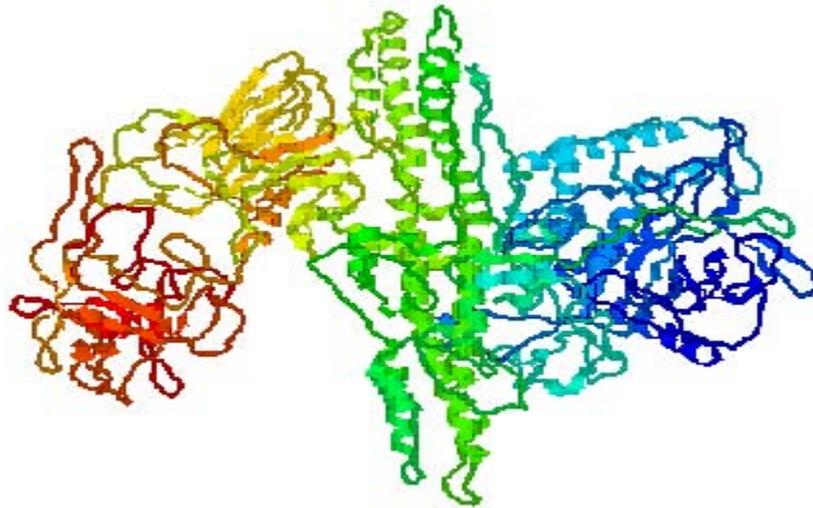
- Smallpox
- Ebola
- SARS

## Other treatments:

- Toxin inhibitors
- Immune globulins

# Structural Biology Program

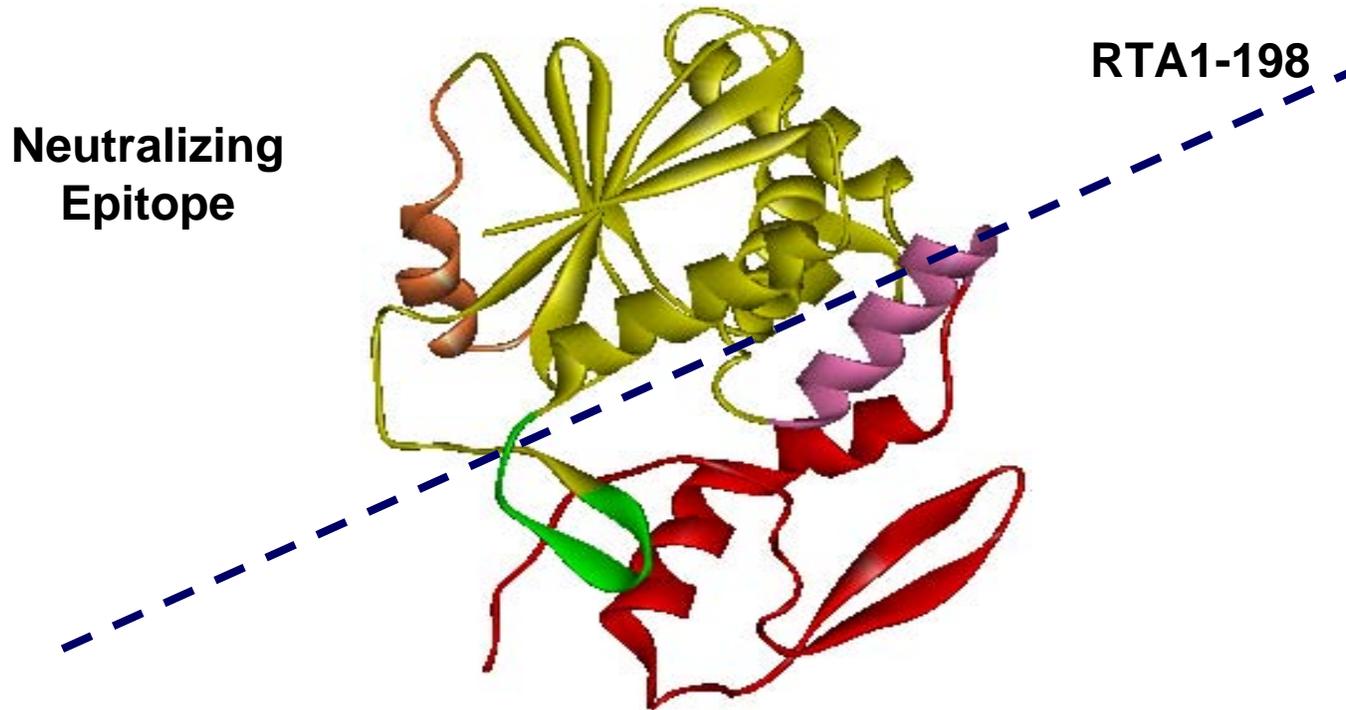
**Critical mass of X-ray crystal structures now available as resource for BoNT therapeutics effort**



**BoNT /A & /B holotoxins (4 structures)  
BoNT/B light chains (3 structures)  
heavy chain tetanus C-fragments (8 structures)**

# CB.46 Recombinant Ricin Vaccine

Domain-based Design Concept Behind Current Lead Candidate RTA33/198



Ribbon diagram of ricin toxin A chain colored by functional architecture

# Improved Diagnostics

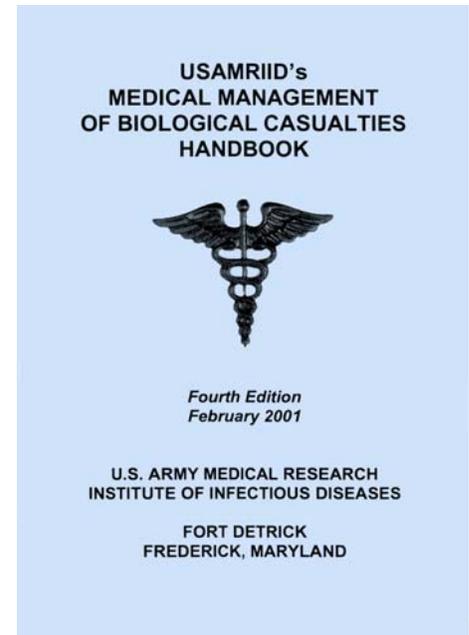


**SEB Toxin**  
**Ricin Toxin**  
**Botulinum neurotoxins**  
***Yersinia pestis***  
***Bacillus anthracis***  
**VEE virus**  
**Ebola and Marburg viruses**  
**Orthopoxvirus**  
**Smallpox**  
***Francisella tularensis***  
***Brucella sp.***  
***Coxiella burnetii***

✓ **Over 32 assays transitioned to the Critical Reagents Program in FY 2002-2003**

# Educational Products

- **Satellite distance learning course:**
  - > 6,000 to 18,000 students annually
  - completed 8<sup>th</sup> live broadcast in July 2003
- **Doubled in-house course student numbers to 600-700/year**
- **Joint Pub (FM8-284) Treatment of Biological Warfare Agent Casualties**
- **“Medical Response to Biological Warfare and Terrorism” broadcast:**
  - 52,515 participants
  - \$55 per student
  - \$4.50/CME credit hour



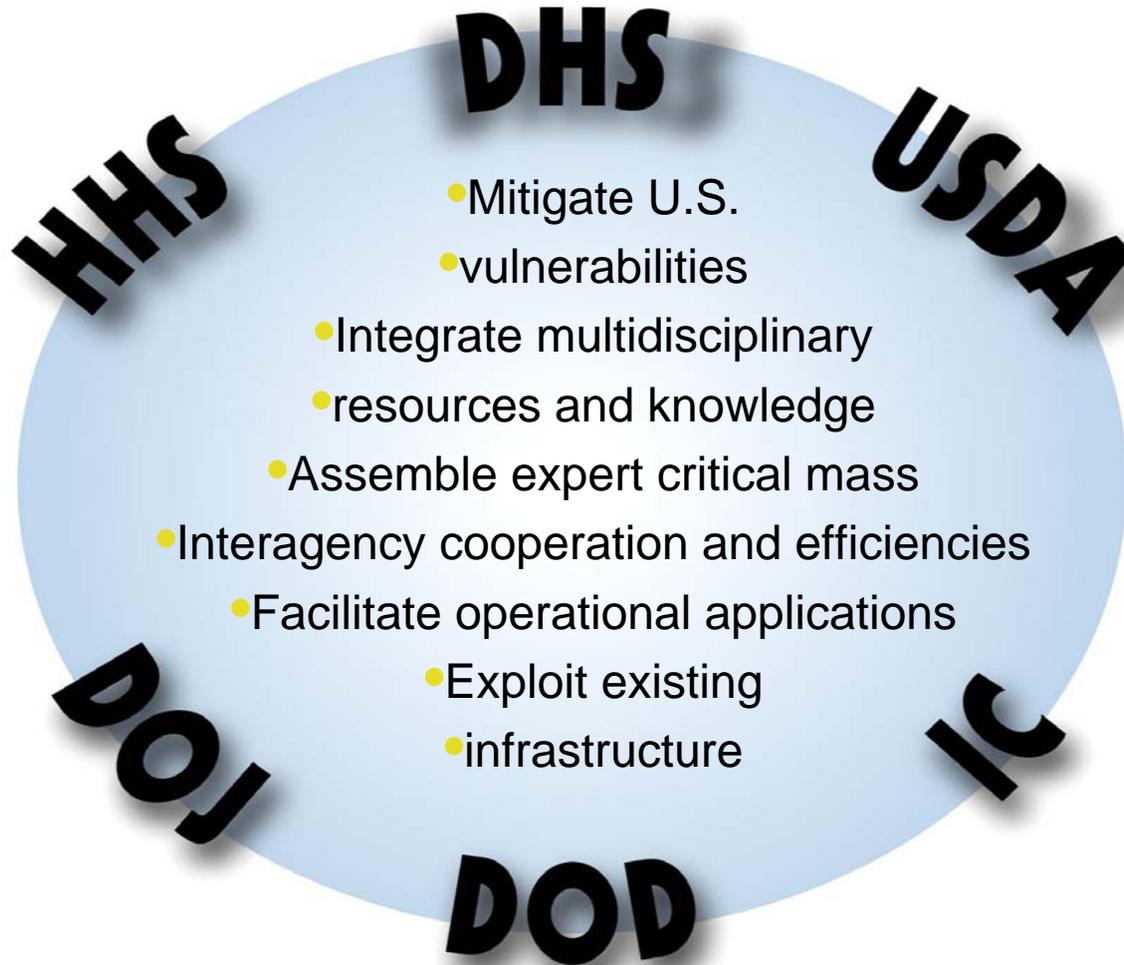
# OUTBREAK INVESTIGATIONS

- 1969 Venezuelan Equine Encephalitis (VEE), Honduras
- 1971 VEE in horses, Central America, southern Texas
- 1984 Eastern Equine Encephalitis in whooping cranes, Patuxent Wildlife Preserve, MD
- 1977 Rift Valley fever (RVF), animals and humans, Egypt
- 1983 Chikungunya fever, Indonesia
- 1988 Infant botulism, San Francisco
- 1988 RVF in animals and humans, Senegal and Mauritania
- 1989 Simian hemorrhagic fever, New Mexico
- 1990 Reston Ebola virus outbreak in primate colony, Reston, Virginia
- 1993 Hantavirus outbreaks in United States
- 1993 RVF outbreak in Egypt
- 1995 Ebola outbreak in Zaire
- 1995 VEE in Colombia
- 1996 Ebola Reston virus NHP outbreak, Alice, Texas
- 1997 Ebola Ivory Coast
- 1999 West Nile Virus
- 2000 West Nile Virus
- 2000 Anthrax outbreak, Minnesota
- 2000 Potential Ebola virus case, Uganda
- 2001 Anthrax Attacks

**2003 SARS**



# Fort Detrick Bio Defense Campus



**Best opportunity to achieve productive and efficient interagency cooperation in support of Homeland Security Biodefense**

***A National Asset:***

***...where Medical Biodefense was Born.***

