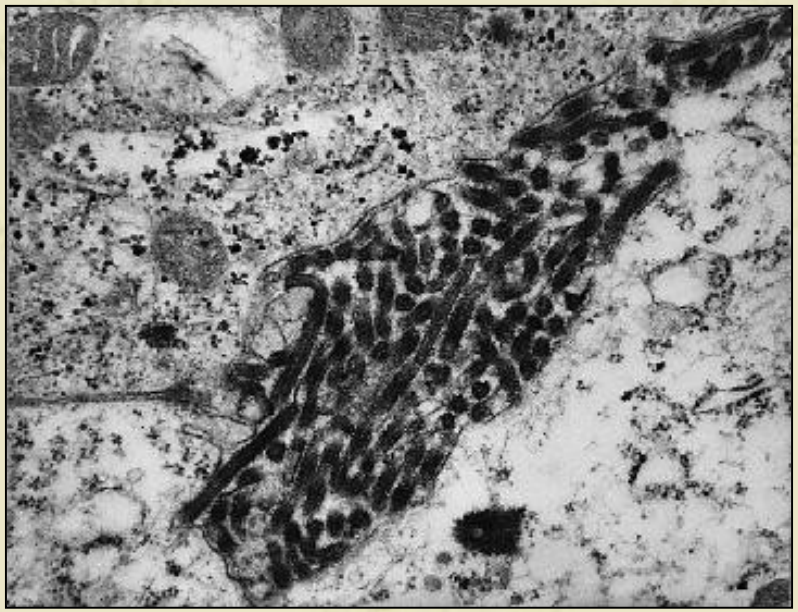
Medical NBC Briefing Series
Medical NBC Aspects of
Marburg



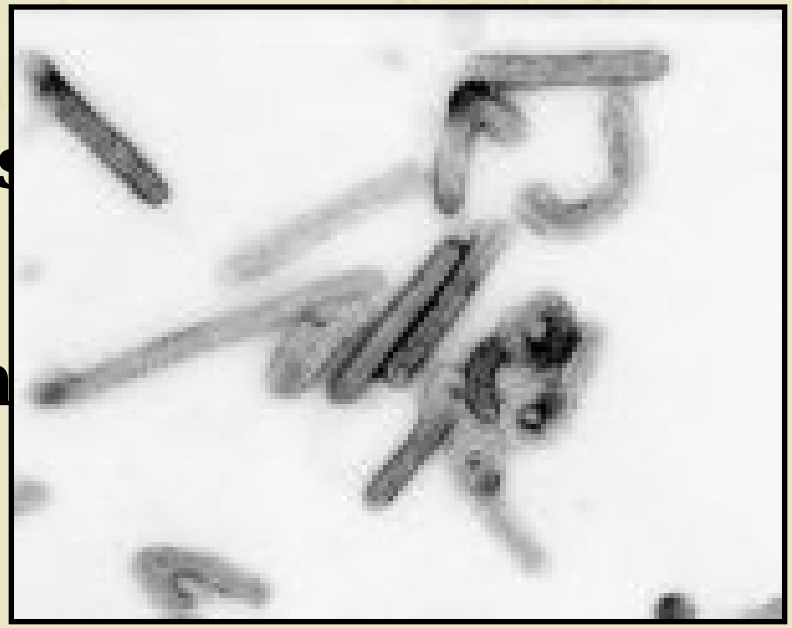
Purpose

- *This presentation is part of a series developed by the Medical NBC Staff at The U.S. Army Office of The Surgeon General.*
- *The information presented addresses medical issues, both operational and clinical, of various NBC agents.*
- *These presentations were developed for the medical NBC officer to use in briefing either medical or maneuver commanders.*
- *Information in the presentations includes physical data of the agent, signs and symptoms, means of dispersion, treatment for the agent, medical resources required, issues about investigational new drugs or vaccines, and epidemiolo*
- *Notes pag* *ence.*

Office of the Surgeon General for the Army

Outline

- Background
- Battlefield Respons
- Medical Response
- Command and Con
- Summary
- References

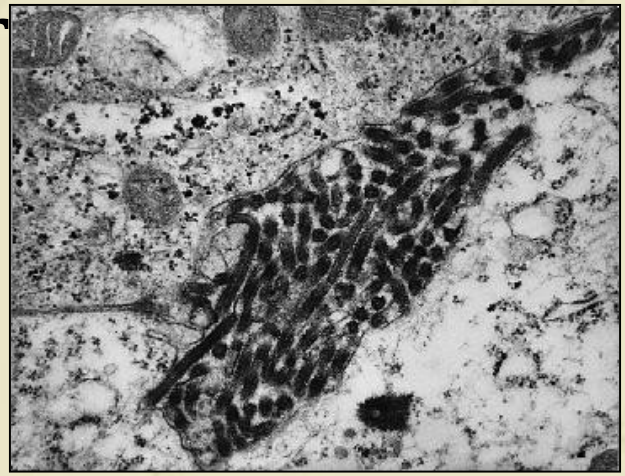


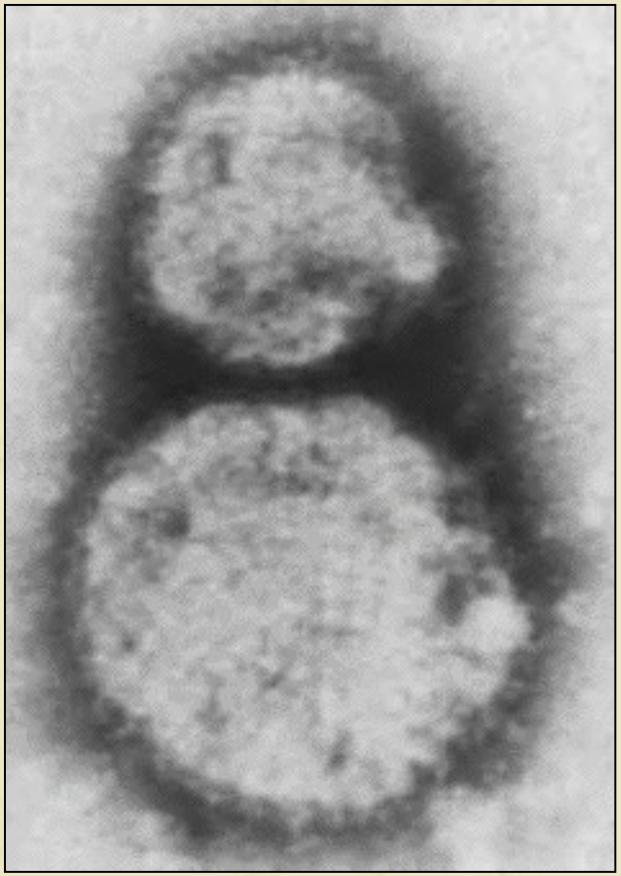
Background

- Disease Background
- Disease Course Summary
- Signs and Symptoms
- Diagnosis
- Treatment
- Current Situation
- Weaponization

Disease Background

- **RNA viruses**
- **Marburg recognized in Germany in 1967**
- **23-29% case mortality r**





Marburg Disease Course Summary In Untreated Individuals

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
EXPOSURE		High fever, headache, muscle aches, stomach pain, fatigue, diarrhea →				
← Incubation 3-9 Days →						
Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14
Chest pain, shock, and death within one week of infection →						
← Incubation 3-9 Days →						
Day 15	Day 16	Day 17	Day 18	Day 19	Day 20	Day 21
Day 22	Day 23	Day 24	Day 25	Day 26	Day 27	Day 28

Signs and Symptoms - Marburg

- 3 to 9 day incubation period
- Sudden onset of back pain, sore throat, muscle pain, headache, and nausea
- Skin rash (papular or maculopapular), fever, low platelets, gastrointestinal bleeding
- Rapid progression to jaundice; increased bleeding abnormalities
- Death from encephalitis, fulminant hepatitis, pulmonary and gastrointestinal hemorrhage

Diagnosis - Clinical

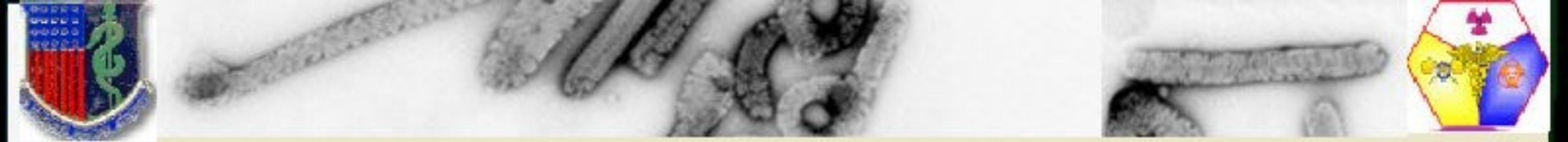
- **Large numbers of individuals in the same geographic area presenting over a short time span**
- **Acute onset of fever, muscle pain, and extreme exhaustion**

Diagnosis - Laboratory

- **Blood and urine tests**
- **Requires maximum biosafety laboratory**
- **Handling specimens should be with extreme caution and special collection and handling methods must be used**

Treatment

- **Quarantine of known cases**
- **Supportive care – substantial advanced medical supportive care is necessary**
  - Intensive care unit facilities
  - Oxygen
  - Hydration (IV therapy)
  - Ventilation support for severe cases
  - Pain management
  - Avoiding blood thinners



Current Situation

- **Currently endemic in Africa**
- **As a biological warfare agent, Marburg poses a significant threat to ground troops**
  - Highly transmissible
  - Infectious
  - Lethal
  - Easily dispersible to ground troops as an aerosol
  - Stable in the environment
- **International deployments of US troops**
- **Risk of importation/exportation of disease**

Weaponization

- **Aerosolization**
  - Inhalation threat
  - Delivery systems can be si
    - Spray systems
    - Sub munitions
    - Detonation containers
    - Crop duster or boat
    - Bomblets
    - Aircraft

Battlefield Response to Marburg

- **Detect**
- **Protect**
  - Individual protection
  - Collective protection

Detection

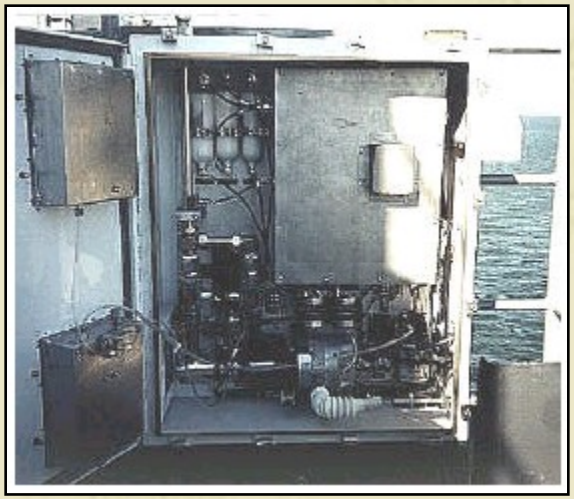
- **Possible methods of detectio**
  - Detection of agent in the environ
  - Clinical (differential diagnosis)
  - Medical surveillance (coordination enhances detection capability)
- **Diagnosis of Marburg is not presumptive of a BW attack – the disease may be endemic to the area**

Detection of Agent in the Environment

- **Biological Smart Tickets**
- **Enzyme Linked Immunosorbant Assay (ELISA) (Fielded with the 520th TAML)**
- **Polymerase Chain Reaction (PCR) (Fielded with the 520th TAML)**

Detection of Agent in the Environment (cont.)

- **M31E1 Biological Integrated Detection System (BIDS)**
- **Interim Biological Agent Detector (IBAD)**



Clinical Detection

Sudden presentation of

- High fevers, muscle pain, and extreme exhaustion presenting in groups
- Rapid progression of symptoms

Laboratory Confirmation

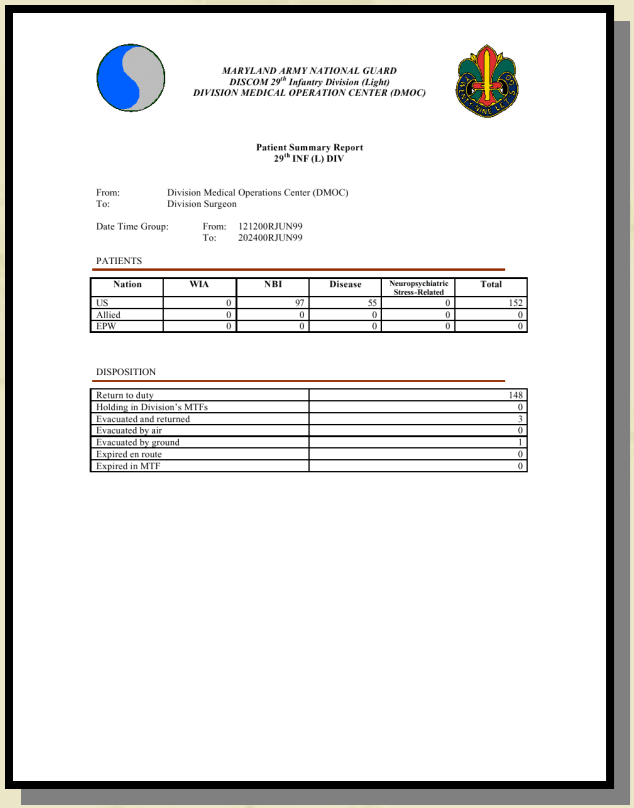
- **Division medical assets lack lab equipment to conduct test to determine hemorrhagic fevers**
- **Specimen must be sent to theater level or CONUS lab**
  - Unit SOP's for collection
  - Safety precautions
- **Lab specimens should be submitted to the correct diagnostic laboratory**
- **Contact lab prior to collection or preparation in order to assure proper methods are utili[18]**

Laboratory Confirmation (cont.)

Points of contact for biological sampling and shipping

- Corps Chemical Officer
- Technical Escort Unit
- AFMIC
- 520th TAML
- USAMRIID
- WRAIR
- CDC

Medical Surveillance



MARYLAND ARMY NATIONAL GUARD
DISCOM 29th Infantry Division (Light)
DIVISION MEDICAL OPERATION CENTER (DMOC)

Patient Summary Report
29th INF (L) DIV

From: Division Medical Operations Center (DMOC)
To: Division Surgeon

Date Time Group: From: 121200RJUN99
To: 202400RJUN99

PATIENTS

Nation	WIA	NBI	Disease	Neuropsychiatric Stress-Related	Total
US	0	97	55	0	152
Allied	0	0	0	0	0
EPW	0	0	0	0	0

DISPOSITION

Return to duty	148
Holding in Division's MTFs	0
Evacuated and returned	3
Evacuated by air	0
Evacuated by ground	1
Expired en route	0
Expired in MTF	0

Clues in the daily medical disposition reports of a BW Attack

- Simultaneous presentations of large numbers of infected
- Natural outbreaks would have an index case and the numbers would build

Individual Protection

- **Mask and BDO with gloves and boots.**
- **Standard uniform clothing affords a reasonable protection against dermal exposure to biological agents**
- **Casualties unable to wear MOPP should be handled in casualty wraps**

Collective Protection

- Hardened or unhardened shelter equipped with an air filtration unit providing overpressure
- Standard universal precautions should be employed as individuals are brought inside the collective protection units
- Marburg is communicable from person to person
- Contaminated articles can be decontaminated using 0.05% hypochlorite solution - 22

Medical Response to Marburg

- Triage and Evacuation
- Evacuation or Quarantine
- Infection Control
- Resource Requirements

Triage and Evacuation

- **Triage**
  - Priorities based on severity of symptoms
  - Respiratory support, ICU needs, and quarantine facilities will increase priorities
- **Evacuation –Immediate**
  - Considerable infection control precautions during transport
  - Must consider quarantine in place in a mass casualty situation
  - Evacuation of patients will be METT-T dependent

Evacuation or Quarantine


Figure 8-6. Arms carry.

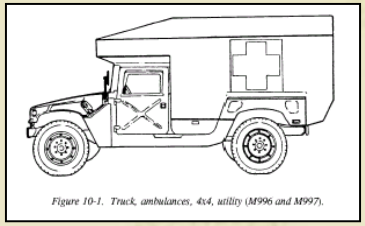


Figure 10-1. Truck, ambulances, 4x4, utility (M996 and M997).

- **Evacuation**
  - Marburg patients not likely to RTD in the normal theater evacuation policy of 15 days
  - Strict interpretation of the doctrine calls for evacuation
- **Quarantine**
  - Contagious
  - Limit spread of the virus
  - Unlike smallpox, Marburg is already endemic to various parts of the world
- **Guidance**
  - Before evacuating patients suspected of Marburg, seek guidance from the CINC, J5, and the MTF Commander

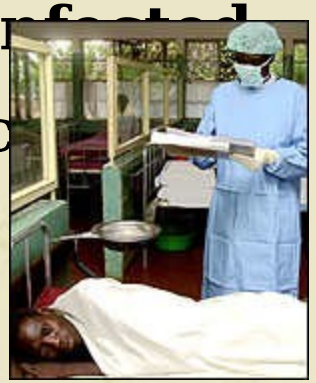
Infection Control

- **Communicable from person to person**
- **Single room with adjoining anteroom as only entrance**
  - Hand washing facility with decontamination solution
- **Negative air pressure if possible**
- **Strict barrier precautions**
  - gloves, gown, mask. Shoe covers, protective eyeware/faceshield
  - consider HEPA respirator for prominent hemorrhage, vomiting, diarrhea, cough
- **Patient remains - Quartermaster section**
  - Decontamination, embalming, transportation in hermetically sealed containers

DOXYCYCLINE

Infection Control (cont)

- **Chemical toilet**
- **All body fluids disinfected**
- **Disposable equipment / sharps i rigid containers and autoclaved /incinerated**
- **Double-bag refuse-outside bag disi**
- **Electronic/mechanical equipment c paraformaldehyde disinfected**



Resource Requirements

- **Specialized evacuation assets**
- **Isolation facilities**
- **Ribavirin**
- **Supportive therapies**
  - Vigorous IV therapy
- **Intensive care facilities for severely compromised patients**
- **Possibility for quarantine of mass amounts of patients**
- **Specialized infection control equipment for care providers**
- **Quarantine, if imposed, would strain the supply chains**

Command and Control

- **Intelligence**
  - Medical surveillance and intelligence reports are key to keep the Command alert to the situation
- **Evacuation of the sick or Quarantine**
- **Maneuver**
  - Quarantine or isolation is required of symptomatic patients
- **Logistics**
  - Additional Class VIII materials will be required and evacuation routes to Echelon III will be heavily utilized
  - Specialized evacuation assets may be required
- **Manpower**
  - Many soldiers may be affected by aerosol dissemination in a short period of time

Command and Control Response to Psychological Impact

- **May vary from person to person**
- **Psychological Operations**
  - Rumors, panic, misinformation
  - Soldiers may isolate themselves in fear of disease spread
- **Countermeasures**
  - LEADERSHIP is responsible for countering psychological impacts through education and training of the soldiers
  - Implementation of defensive measures such as crisis stress management teams

Summary

- **Marburg virus is highly infectious when aerosolized**
- **The possibility for weaponization is highly probable**
- **Detection may not occur until after exposure when patients are reported**
- **Command decisions that will be required upon detection of Marburg:**
  - Evacuation or Quarantine?
  - Evacuation: Many patients will be presenting at one time. Methods of evacuation?
  - Treatment: Procurement of additional equipment and supplies? Isolation of affected troops?

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