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# DOD HELPS FIGHT EBOLA IN WEST AFRICA

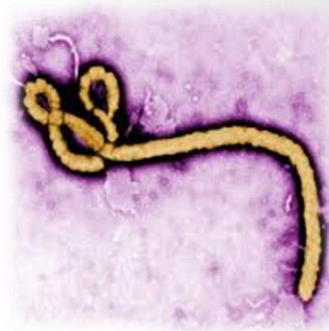
## OPERATION UNITED ASSISTANCE



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## EBOLA VIRUS DISEASE: KEY FACTS



Ebola virus disease (EVD), formerly known as Ebola haemorrhagic fever, is a severe, often fatal illness in humans.



The virus is transmitted to people from wild animals and spreads in the human population through human-to-human transmission.



The average EVD case fatality rate is around 50%. Case fatality rates have varied from 25% to 90% in past outbreaks.



The first EVD outbreaks occurred in remote villages in Central Africa, near tropical rainforests, but the most recent outbreak in west Africa has involved major urban as well as rural areas.



Community engagement is key to successfully controlling outbreaks. Good outbreak control relies on applying a package of interventions, namely case management, surveillance and contact tracing, a good laboratory service, safe burials and social mobilisation.



Early supportive care with rehydration, symptomatic treatment improves survival. There is as yet no licensed treatment proven to neutralise the virus but a range of blood, immunological and drug therapies are under development.



World Health  
Organization

# Ebola Outbreak Historical Timeline

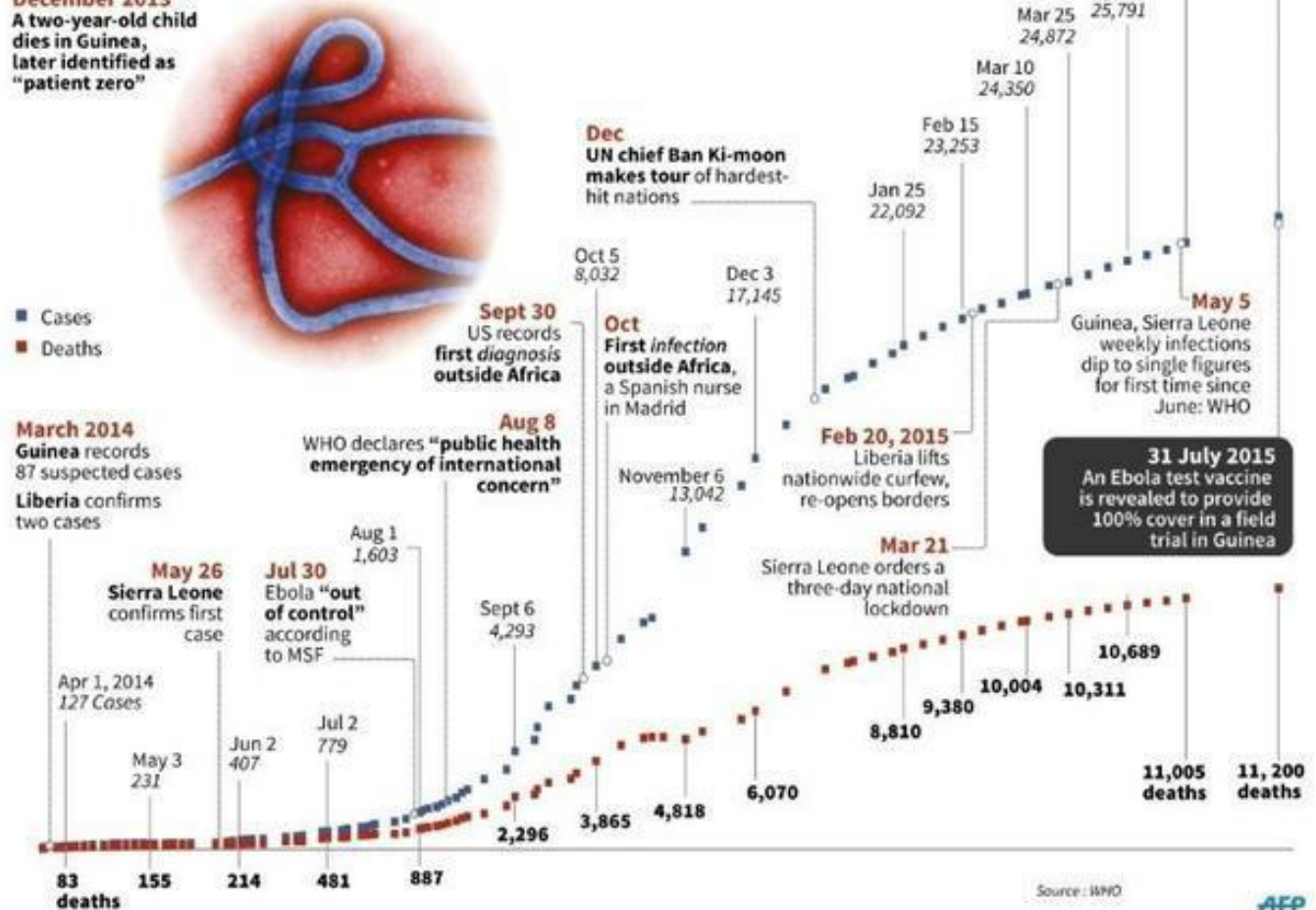
Year	Virus	Geographic Location	Human Deaths	Cases	CFR (case-fatality rate)
1976	SUDV	Juba, Madrid, Nzara, and Tembura, Sudan	151	284	53%
1976	EBOV	Yambuku, Zaire	280	318	88%
1977	EBOV	Bonduni, Zaire	1	1	100%
1979	SUDV	Nzara, Sudan	22	34	65%
1988	EBOV	Porton Down, United Kingdom [laboratory accident]	0	1	0%
1994	TAFV	Tai National Park, Cote d'Ivoire	0	1	0%
1994–1995	EBOV	Woleu-Ntem and Ogooue-Ivindo Provinces, Gabon	32	52	62%
1995	EBOV	Kikwit, Zaire	245	317	77%
1996	EBOV	Mayibout 2, Gabon	21	31	68%
1996	EBOV	Sergiyev Posad, Russia [laboratory accident]	1	1	100%
1996–1997	EBOV	Ogooue-Ivindo Provinces, Gabon; Cuvette-Ouest Department, Republic of the Congo	46	62	74%
2000–2001	SUDV	Guku, Mbarara, and Masindi Districts, Uganda	224	425	53%
2001–2002	EBOV	Ogooue-Ivindo Provinces, Gabon; Cuvette-Ouest Department, Republic of the Congo	97	124	78%
2002	EBOV	Ogooue-Ivindo Provinces, Gabon; Cuvette-Ouest Department, Republic of the Congo	10	11	91%
2002–2003	EBOV	Cuvette-Ouest Department, Republic of the Congo; Ogooue-Ivindo Provinces, Gabon	128	143	90%
2003–2004	EBOV	Cuvette-Ouest Department, Republic of the Congo	29	35	83%
2004	EBOV	Koltsovo, Russia [laboratory accident]	1	1	100%
2004	SUDV	Yambio County, Sudan	7	17	41%
2005	EBOV	Cuvette-Ouest Department, Republic of the Congo	9	11	82%
2007	EBOV	Kasai Occidental Province, Democratic Republic of the Congo	186	264	71%
2007–2008	BDBV	Bundibugyo District, Uganda	39	116	34%
2008–2009	EBOV	Kasai Occidental Province, Democratic Republic of the Congo	15	32	47%
2011	SUDV	Luweero District, Uganda	1	1	100%
2012	SUDV	Kibaale District, Western Uganda	17	24	71%
2012	BDBV	Orientale Province, Democratic Republic of the Congo	36	77	47%
<b>2014–2015</b>	<b>EBOV</b>	<b>Guinea, Sierra Leone, Liberia, Nigeria</b>	<b>11,310</b>	<b>28,616</b>	<b>40%</b>

•Haradhan Kumar Mohajan et al. *The Most Fatal 2014 Outbreak of Ebolavirus Disease in Western Africa. American Journal of Epidemiology and Infectious Disease*, 2014, Vol. 2, No. 4, 101-108. doi:10.12691/ajeid-2-4-4

## Ebola: timeline of the west African outbreak

The virus has killed more than 11,000 people, but now there is hope for an effective vaccine

**December 2013**  
A two-year-old child dies in Guinea, later identified as "patient zero"



September 2, 2015. Médecins Sans Frontières (MSF) President, Joanne Liu asked for civilian and military medical capacity to be deployed to deal with the growing crisis. *"The military are the only body that can be deployed in the numbers needed now and that can organize things fast."*



# US Government Response



- During the first week of August 2014, the US chiefs of mission in Liberia, Sierra Leone, and Guinea declared foreign disasters.
- In response, the United States Agency for International Development (USAID) established a disaster assistance response team (DART) in Liberia to lead and coordinate the US government response.

*“The Ebola epidemic in West Africa and the humanitarian crisis there is a top national security priority for the United States.” President Obama (September 16, 2014)*

## Whole-of-Government Response

1. Control the epidemic at its source in West Africa.
2. Mitigate second-order impacts, including blunting the economic, social, and political tolls in the region.
3. Engage and coordinate with a broader global audience.
4. Fortify global health security infrastructure in the region and beyond.

# Operation United Assistance

The DoD support to the whole-of-government Ebola response



Assistant Secretary of Defense Michael Lumpkin said, *“I traveled to the region thinking we faced a healthcare crisis with a logistics challenge. In reality, we face a logistics crisis focused on a healthcare challenge.”*



Photo courtesy of: Natalie Hawwa, USAID

General Darryl Williams (JFC-UA), DART Team Leader Bill Berger, and U.S. Ambassador to Liberia Deborah Malac.

*“The biggest impact was the announcement itself and having those boots on the ground, even if the US military hadn’t done anything else. The psychological impact was transformative to the Liberians. You have to understand the environment at that point in time: by July, August, September, there were dead bodies in the street, in the ocean. People were beyond afraid; they were despairing. The change was palpable within 24 hours of the president’s announcement.”* Deborah Malac, US Ambassador to Liberia

# **DOD's Sustained Support**

**In support of the Disaster Assistance Response Team (DART), Joint Force Command – United Assistance (JFC-UA) led military across four lines of effort.**

- 1. Command and Control**
- 2. Engineering Support**
- 3. Logistics Support**
- 4. Medical Training Assistance**

**Initial focus areas of JFC-UA to support the Government of Liberia**

- Institute DOD command and control
- Deploy mobile labs for EVD testing
- Acquire USMC MV-22s for mobility
- Re-mission Navy Seabees to start construction
- Establish camp infrastructure
- Provide MMU hospital for healthcare workers



# Operation United Assistance at a Glance

## Health Care Training



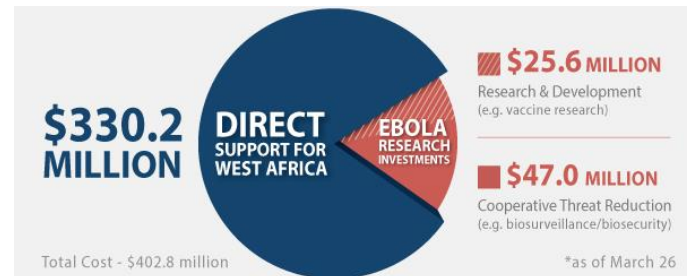
## Mobile Labs & Personal Protective Equipment



## Ebola Treatment Units Monrovia Medical Unit



## DoD Ebola-Related Costs

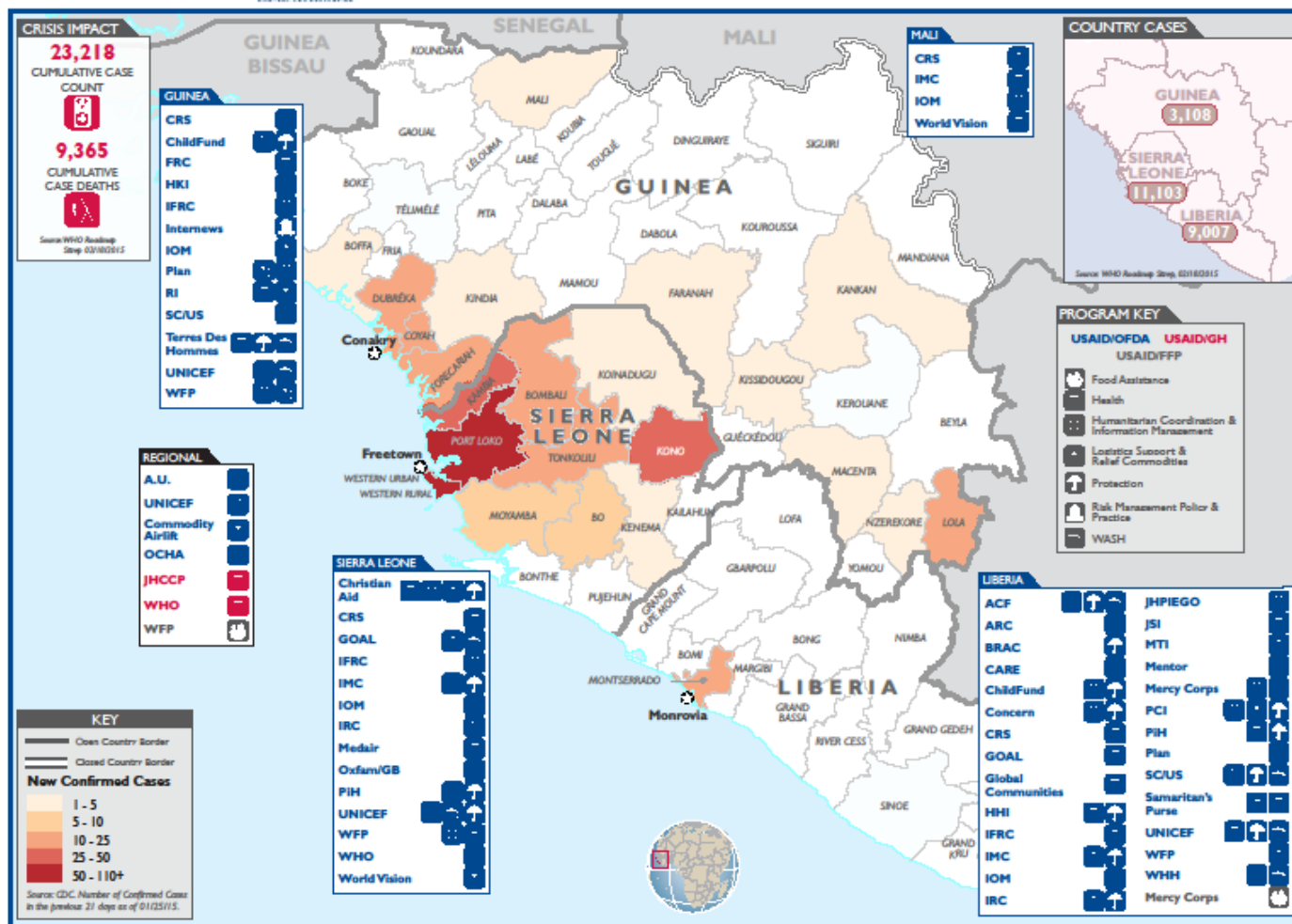


Source: [http://archive.defense.gov/home/features/2014/1014\\_ebola/](http://archive.defense.gov/home/features/2014/1014_ebola/)



## USG RESPONSE TO THE EBOLA OUTBREAK IN WEST AFRICA

Last Updated 02/15/15



The boundaries, names, and data used on this map do not imply official endorsement or acceptance by the U.S. Government and are not drawn to scale.

# Pillars of Operation United Assistance

## Construction of Monrovia Medical Unit



The 25-bed facility constructed from the ground up by a team of Navy Seabees, Soldiers and Airmen from Joint Forces Command – United Assistance. Completed 7 November, 2014.



Monrovia Medical Unit built specifically for the care of medical workers who become infected with the virus. Operated by personnel from the U.S. Public Health Service.



*“This facility is a beacon, a beacon that signals to all health care workers and responders from Liberia and all other nations to come to Liberia and join in the response,”* U.S. acting Deputy Surgeon General, Rear Admiral Scott F. Giberson.



# Pillars of Operation United Assistance

## Construction of Ebola Treatment Units

10 ETUs constructed with US aid and assistance



Photography by Morgana Wingard for USAID

# Pillars of Operation United Assistance

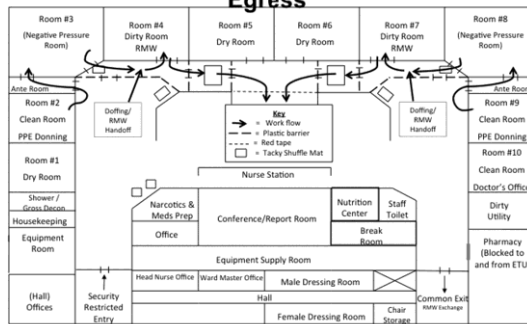
## Health Care Training



Photo courtesy of DoD News, Defense Media Activity

- 30-member DoD teams trained to respond to new cases of EVD in the United States.

### Ebola Treatment Unit (ETU) Ingress and Egress



Legend: RMW - Regulated Medical Waste. Healthcare personnel don PPE in the Clean Room (Room #2 and Room #9) and then enter the patient's room. Negative Pressure Room #3 and Room #8 via the Ante Rooms. Upon exit from the patient's room, the teams doff PPE in the Dirty Room (Room #4 and Room #7) and follow the egress through the plastic barrier and out to the common area in front of the nursing station.



Photo courtesy of U.S. Naval Medical Research Unit – No. 3 Public Affairs

Scenario	Brief Outline	Learning Objectives	Critical Tasks
Scenario 1: prodromal phase of EVD	<ul style="list-style-type: none"> <li>• Focuses on a patient in the early prodromal phase transitioning to the acute wet phase of EVD.</li> <li>• Patient presents to the ED, was diagnosed with EVD, transferred to the ETU, and encountered clinical deterioration with respiratory distress due to SOB and chest pain coupled with aspiration from frequent vomiting, fatigue, and diminished alertness.</li> </ul>	<ol style="list-style-type: none"> <li>1. Demonstrate proper donning/doffing of PPE.</li> <li>2. Demonstrate a primary patient assessment.</li> <li>3. Demonstrate peripheral IV placement.</li> <li>4. Demonstrate teamwork skills by using effective communication, closed loop communication, cross monitoring, and situational awareness.</li> <li>5. Recognize need to call for extra personnel and demonstrate the process to obtain personnel/supplies from inside the room.</li> <li>6. Recognize and treat hypoxia.</li> <li>7. Recognize and treat hypotension by initiating IV fluids to prevent shock.</li> <li>8. Collect and dispose of EVD wastes in accordance with current CDC guidelines.</li> </ol>	<ol style="list-style-type: none"> <li>1. During the case               <ol style="list-style-type: none"> <li>a. The team members must don/doff PPE according to protocol.</li> <li>b. Perform primary assessment upon entering room.</li> <li>c. Cover/remove EVD casualty wastes (emesis, stool, etc) to reduce viral load.</li> <li>d. Conduct peripheral IV placement.</li> <li>e. Recognize hypoxia and initiate appropriate and escalating oxygen therapy, bag-mask ventilation, and intubation based on response.</li> <li>f. Recognize hypotension and initiate volume resuscitation with NS, LR, albumin, or PRBCs as clinically indicated as well as resuscitation of maintenance IVs.</li> </ol> </li> <li>2. During debriefing               <ol style="list-style-type: none"> <li>a. Review the importance of removing EVD waste in a patient with high viral load.</li> <li>b. Review the importance and protocol for self-decontamination within a patient's room during patient care.</li> <li>c. Discuss the importance of sharp management during routine care in a patient with EVD.</li> <li>d. List the common clinical signs in a patient with EVD during the prodromal phase.</li> </ol> </li> </ol>
Scenario 2: wet gastrointestinal phase of illness	<ul style="list-style-type: none"> <li>• Focuses on a patient with EVD who is now on day 7 of illness and in the complicated gastrointestinal phase.</li> <li>• Patient was intubated shortly after admission due to respiratory failure and is now sedated and on mechanical ventilation.</li> <li>• This scenario focuses on the link between providing clinical care and the adverse events that might occur when combining electrolyte abnormalities that may occur in this stage of EVD with agents that are associated with QT prolongation.</li> </ul>	<ol style="list-style-type: none"> <li>1. Demonstrate proper donning/doffing of PPE.</li> <li>2. Demonstrate a primary patient assessment.</li> <li>3. Demonstrate blood sampling for i-STAT point-of-care testing.</li> <li>4. Demonstrate teamwork skills by using effective communication, closed loop communication, cross monitoring, and situational awareness.</li> <li>5. Recognize need to call for extra personnel and demonstrate the process to obtain personnel/supplies from inside the room.</li> <li>6. Recognize and treat common electrolyte abnormalities encountered in a patient in the wet phase of EVD.</li> <li>7. Recognize and treat cardiac arrhythmias that are more likely to present in patients with EVD due to treatment with other medications.</li> <li>8. Collect and dispose of EVD wastes in accordance with current CDC guidelines.</li> </ol>	<ol style="list-style-type: none"> <li>1. During the case               <ol style="list-style-type: none"> <li>a. The team members must don/doff PPE according to protocol.</li> <li>b. Perform primary assessment upon entering room.</li> <li>c. Cover/remove EVD casualty wastes (emesis, stool, etc) to reduce viral load.</li> <li>d. Obtain blood sampling for i-STAT point-of-care testing.</li> <li>e. Evaluate blood gas and respond to laboratory abnormalities.</li> <li>f. Recognize and treat cardiac arrhythmias as clinically indicated.</li> </ol> </li> <li>2. During debriefing               <ol style="list-style-type: none"> <li>a. Review the importance of removing EVD waste in a patient with high viral load.</li> <li>b. Review the importance and protocol for self-decontamination within a patient's room during patient care.</li> <li>c. Discuss the importance of sharp management during routine care in a patient with EVD.</li> <li>d. List the common signs of clinical deterioration in a patient in the complicated wet gastrointestinal phase of EVD.</li> <li>e. Review common electrolyte abnormalities in a patient in the complicated wet gastrointestinal phase of EVD.</li> <li>f. Review the potential side effects of polypharmacy in a patient with EVD.</li> </ol> </li> </ol>
Scenario 3: late, critically ill phase of disease	<ul style="list-style-type: none"> <li>• Focuses on a patient with EVD in the late phase of illness complicated with multisystem organ failure who is now on day 16 of his illness.</li> <li>• The patient is intubated, has anasarca, oliguric acute kidney injury with accompanying hematuria, and has developed encephalopathy, which manifests as a seizure.</li> <li>• The patient is intubated, has anasarca, oliguric acute kidney injury with accompanying hematuria, and has developed encephalopathy, which manifests as a seizure.</li> <li>• This scenario focuses on the link between providing clinical care and the adverse events that might occur during a complicated high-risk admission.</li> </ul>	<ol style="list-style-type: none"> <li>1. Demonstrate proper donning/doffing of PPE.</li> <li>2. Demonstrate a primary patient assessment.</li> <li>3. Demonstrate blood sampling for i-STAT point-of-care testing.</li> <li>4. Demonstrate teamwork skills by using effective communication, closed loop communication, cross monitoring, and situational awareness.</li> <li>5. Recognize encephalopathy with hypoxia and respond appropriately.</li> <li>6. Demonstrate successful intubation.</li> <li>7. Recognize need to call for extra personnel and demonstrate the process to obtain personnel/supplies from inside the room.</li> <li>8. Recognize and treat hypotension by initiating IV fluids to prevent shock.</li> <li>9. Recognize hemorrhage and respond appropriately.</li> <li>10. Recognize signs of multisystem organ failure to include seizure and treat appropriately.</li> <li>11. Collect and dispose of EVD wastes in accordance with current CDC guidelines.</li> </ol>	<ol style="list-style-type: none"> <li>1. During the case               <ol style="list-style-type: none"> <li>a. The team members must don/doff PPE according to protocol.</li> <li>b. Perform primary assessment upon entering room.</li> <li>c. Cover/remove EVD casualty wastes (emesis, stool, etc) to reduce viral load.</li> <li>d. Conduct blood sampling for i-STAT point-of-care testing.</li> <li>e. Recognize accidental extubation and respond appropriately with bagmask ventilation with the physician performing reintubation.</li> <li>f. Recognize hypotension and initiate volume resuscitation with NS, LR, albumin, or PRBCs as clinically indicated.</li> <li>g. Obtain and evaluate blood gas and respond to laboratory abnormalities.</li> <li>h. Recognize and treat severe anemia and suspected coagulopathy with blood product infusions.</li> <li>i. Recognize and treat symptoms of encephalopathy in a patient with EVD.</li> </ol> </li> <li>2. During debriefing               <ol style="list-style-type: none"> <li>a. Review the importance of removing EVD waste in a patient with high viral load.</li> <li>b. Review the importance and protocol for self-decontamination within a patient's room during patient care.</li> <li>c. Discuss the importance of sharp management during routine care in a patient with EVD and describe some treatments that have been offered.</li> <li>d. List manifestations of multisystem organ failure in a patient with EVD and describe some treatments that have been offered.</li> <li>e. Review potential etiologies of encephalopathy in a patient with EVD.</li> </ol> </li> </ol>



# Pillars of Operation United Assistance

## Health Care Training



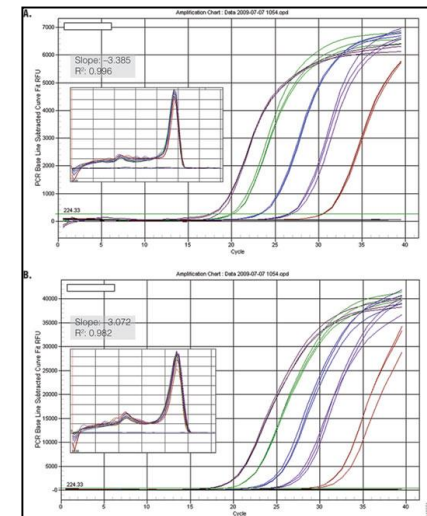
Over 1,500 healthcare and support staff within Liberia trained.

1. Staffing
2. Construction
3. Direct Patient Care
4. Laboratory Diagnostics
5. Safe Burial Practices



## Laboratory Diagnostics

- 
- The map displays the following details:
- Geographical Features:** The North Atlantic Ocean is to the west. Neighboring countries include Sierra Leone to the northwest, Guinea to the north, and Ivory Coast to the east. The map also shows parts of Senegal, Gambia, and Nigeria.
  - Political Boundaries:** County boundaries are marked with thin black lines. Major cities are indicated by red dots.
  - Key Locations:**
    - Monrovia:** The capital, marked with a red square.
    - Gbarnga:** A major city in the north, marked with a red circle.
    - Buchanan:** A city in the south, marked with a red dot.
    - Other cities:** Tubmanburg, Koya, Harper, and many others are labeled.
  - Counties:** Labeled counties include Lofa, Nimba, Grand Bassa, Rivercess, and others.
  - Legend:**
    - Red square: National Capital (Monrovia)
    - Red dot: Other cities
    - Red circle: District Capital
    - Red line: District boundary
    - Red line: District boundary
  - Inset Map:** A small map of Africa in the bottom left corner, with Liberia highlighted in red.



**Use resources & infrastructure available in the area but be prepared to conduct mission without burdening the local government or health care system.**

# Key Strategies of the incident management system (IMS)

- Central coordination of all partners (USAID DART, GOL)



- Disease surveillance (CDC, MOH)



- Case investigation (CDC, MOH)



- Laboratory confirmation (DOD, CDC, MOH, other partners)

Samaritan's Purse  
INTERNATIONAL RELIEF

- Contact tracing (CDC, MOH)



- Safe transportation of infected patients (NGOs, IGOs, MOH)

- Isolation (NGOs, USAID, CDC, IGOs, other partners)



- Infection control measures within the health care system (CDC, DOD, NGOs, others)

- Community engagement (DOD, CDC, USAID)

- Safe burial (NGOs, MOH, IGOs, other partners)





# Key Strategies of the IMS

## Public Health Measures

- Early detection
- Isolation
- Infection Control

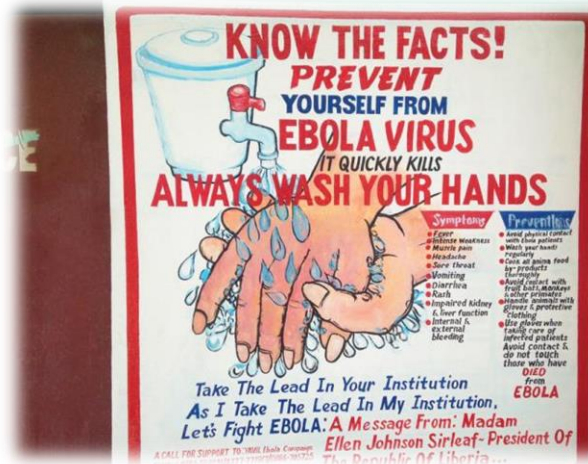


## Case Investigation and Contact Tracing



# Key Strategies of the IMS

## Community Engagement & Education



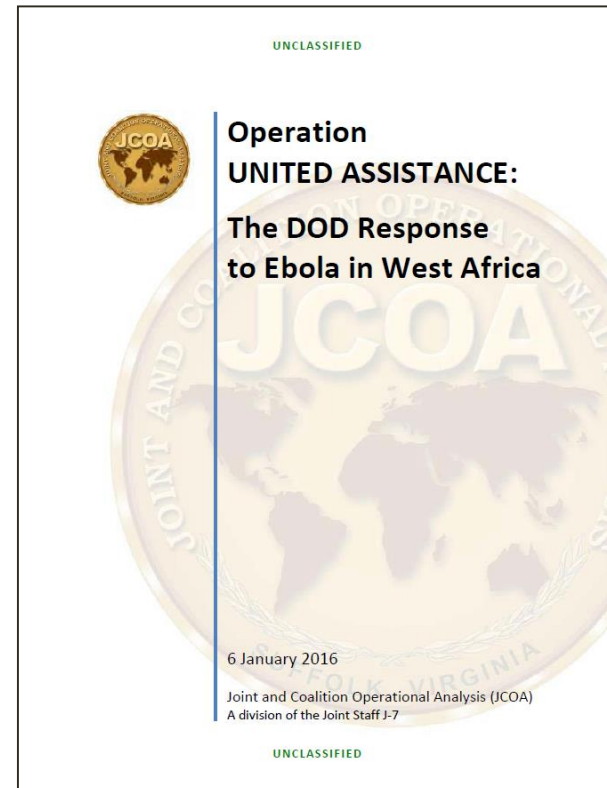
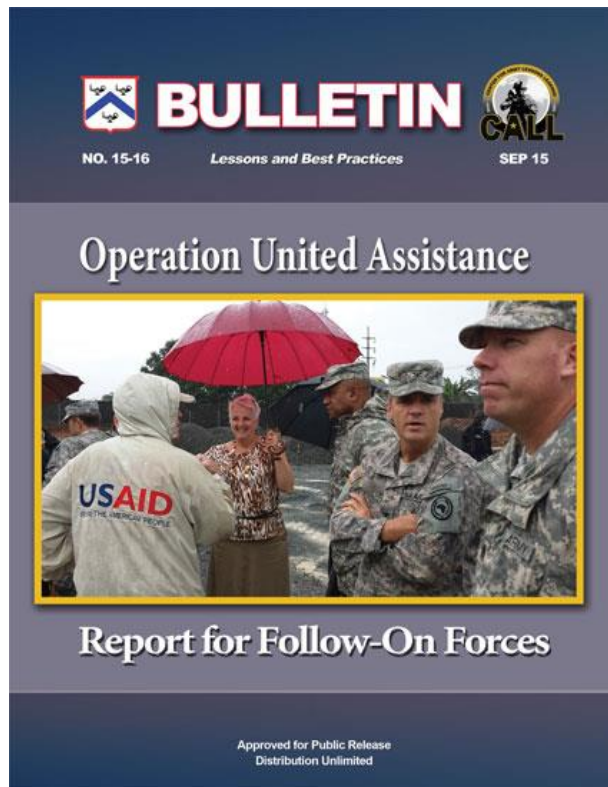


# Key Strategies of the IMS

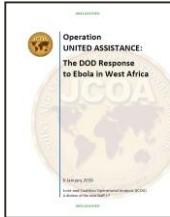
## Safe Burial Practices



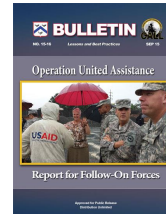
# Operation United Assistance Lessons Learned



# Operation United Assistance Lessons Learned



- DOD should support USG efforts to work with international organizations, NGO's, partner nations, and other stakeholders to clearly define roles and responsibilities during international crisis response.
- DOD should examine the interagency decision-making process to expedite the whole-of-government response.
- Support the development of a structure for cross-organizational USG team that can coordinate scalable whole-of-community response.
- Review procedures for operating with USPHS, CDC, HHS, USAID, and other key partners.
- Review and revise DOD policies with regards to authorities and processes while in support of other USG agencies. (I.e. Transport of infectious personnel and contaminated materials). Incorporate changes into CCMD theater strategy, campaign planning, and exercises programs.



- Be mindful of the host nation and all partners when speaking of military's role in the response. Do not adopt warfighter language or mindset.
- Conduct planning, work, and communications in the unclassified environment as much as possible to allow full coordination of all partners.
- Tailor the force to meet mission requirements.
- Integrate all partners into planning considerations.

# Ebola Virus arrives in Nigeria

On July 20, 2014, infected patient Patrick Sawyer flies from Liberia to Lagos, Nigeria. Dies on July 25<sup>th</sup>.

Within days, Ebola spreads to 20 others in Lagos and Port Harcourt.

Signals the first case of an Ebola outbreak introduction into a new country via air travel.

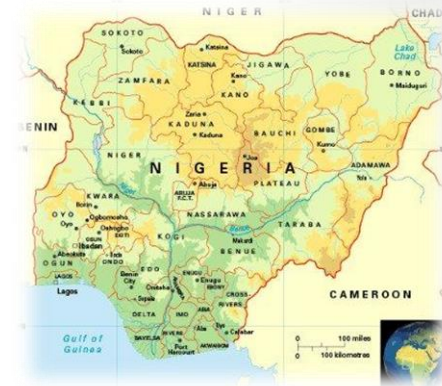
Nigeria: 177 Million

Lagos: 21 Million

*“(Ebola) won’t blow over — you have to make a rapid, intense effort.”*

CDC Director, Dr. Thomas Frieden.

**20 laboratory confirmed cases with 8 deaths**





# How did Nigeria end its outbreak so quickly?

*"A dense population and overburdened infrastructure create an environment where diseases can be easily transmitted and transmission sustained. A rapid response using all available public health assets was the highest priority." Dr. Faisal Shuaib, CDC.*

- Immediate establishment of Ebola Emergency Operations Center (converted Bill & Melinda Gates Foundation command center to fight polio)
- CDC had 10 individuals in country training over 100 local doctors in epidemiology, 40 reassigned to perform contract tracing for Ebola.
- Intensive Contact Tracing: 18,500 in-person visits among 894 identified contacts.
- Existing medical investigation teams for emerging infectious diseases.
- Dr. Faisal Shuaib credited coordinated effort by:
  - Health Ministry
  - CDC
  - World Health Organization
  - Unicef
  - Doctors Without Borders
  - International Committee for the Red Cross



Empty Ebola ward in Nigeria. Credit: CDC Global via flickr.



## Organizational structure of the Ebola Response Incident Management Center

