



Epidemic Ebola Virus Disease

Understanding, demystifying and controlling a frightening disease

Republic of Guinea, 2014

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Rome, Italy

2014 Boyd Orr Conference ▪ University of Glasgow ▪ 17 July 2014

Republic of Guinea

- **Independence: 1958**
- **246,000 km² (~ UK or Uganda)**
- **11.5 M population (~Portugal or Tunisia)**
 - ~ 1 physician/10,000 persons
 - ~ 3 hospital beds/10,000 persons
- **HDI: 178/186**

Guinea is a poor country that possesses major mineral, hydroelectric, solar power and agricultural resources.



Genus Ebolavirus

- **5 distinct species: Sudan, Zaïre, Bundibugyo, Taï Forest, Reston**
- **Incubation period: 2-21 days**
- **Case fatality ratio: 41–89%**
- **Animal reservoir unknown**
- **No vaccine**
- **Supportive, symptomatic clinical care**
- **Control strategy based on early detection and isolation of case patients**



Ebola Virus Disease

Clinical progression may include

(% observed in Guinea outbreak)

- **Fever (77%)**
- **Intense fatigue (64%)**
- **Vomiting (59%)**
- **Diarrhea (57%)**
- **Anorexia (43%)**
- **Headache (37%)**
- **Myalgias (19%)**
- **Abdominal pain (19%)**
- **Hemorrhage (17%)**
- **Joint pain (16%)**

Data: Government of Guinea, 15 July 2014

Ebolavirus Ecology

Enzootic Cycle

New evidence strongly implicates bats as the reservoir hosts for ebolaviruses, though the means of local enzootic maintenance and transmission of the virus within bat populations remain unknown.

Ebolaviruses:

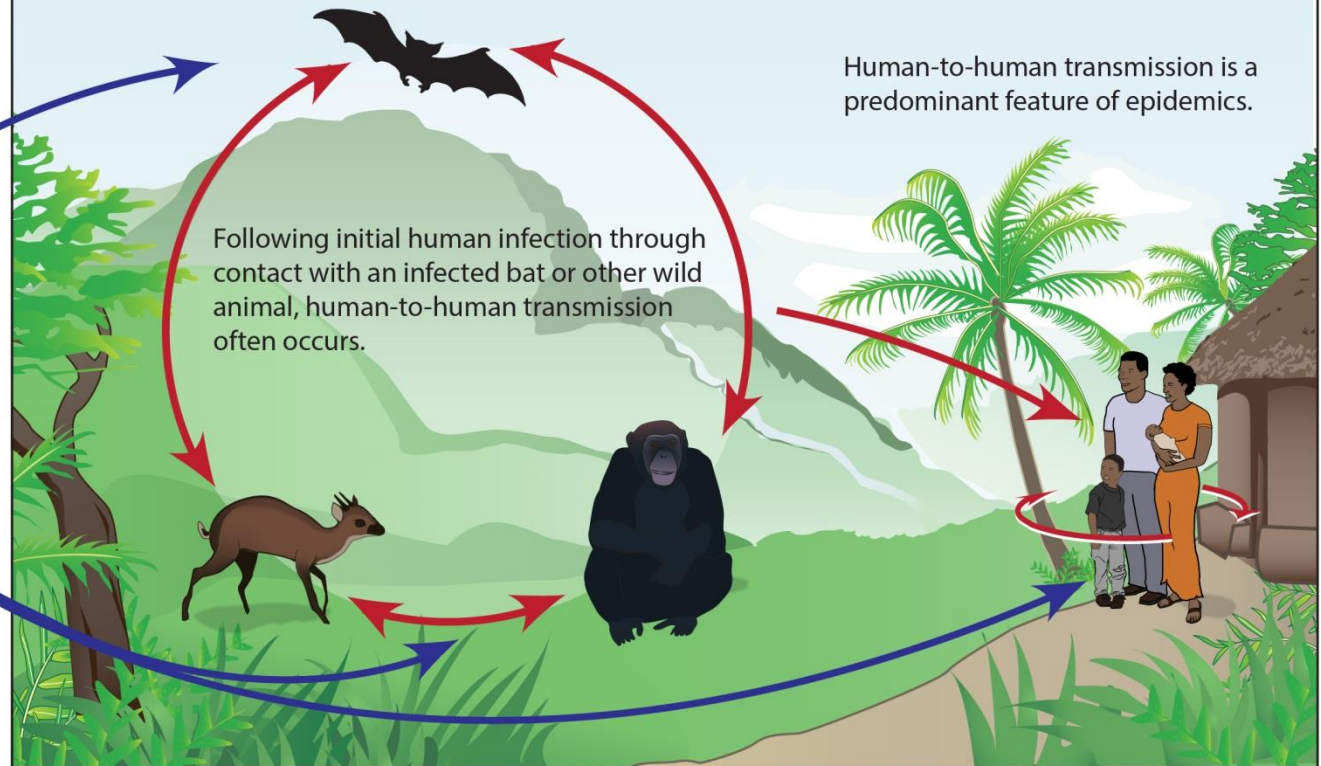
- Ebola virus (formerly Zaire virus)
- Sudan virus
- Tai Forest virus
- Bundibugyo virus
- Reston virus (non-human)



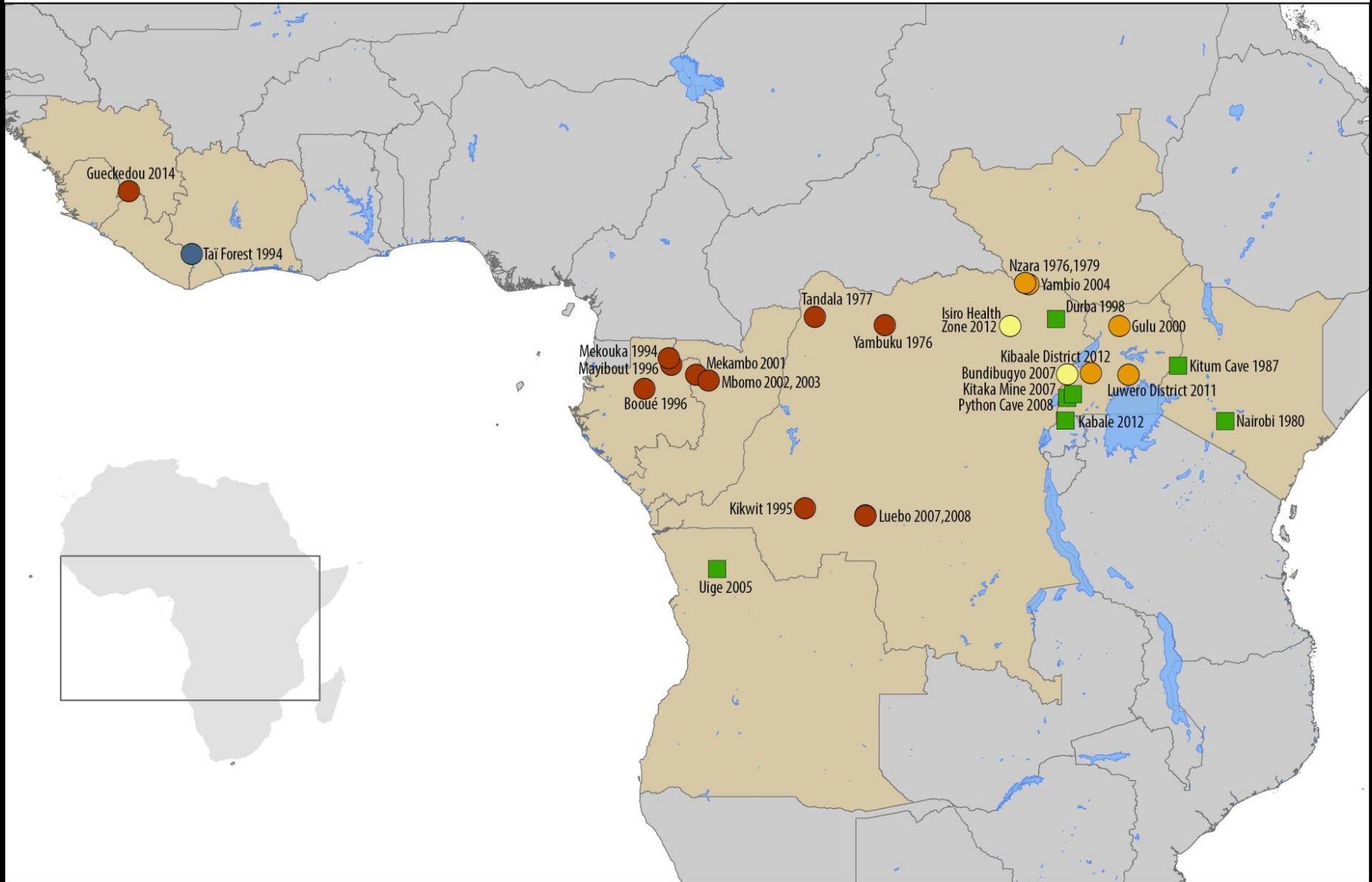
Epizootic Cycle

Epizootics caused by ebolaviruses appear sporadically, producing high mortality among non-human primates and duikers and may precede human outbreaks. Epidemics caused by ebolaviruses produce acute disease among

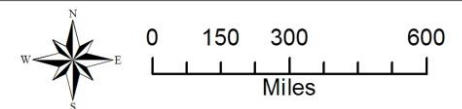
humans, with the exception of Reston virus which does not produce detectable disease in humans. Little is known about how the virus first passes to humans, triggering waves of human-to-human transmission, and an epidemic.



CENTRAL AFRICA FILOVIRUS OUTBREAKS 1976-2014



● Ebola virus ● Sudan virus ● Taï Forest ● Bundibugyo virus ■ Marburg virus





Ebola outbreak challenges

- **Index case usually not the first case**
- **Hospitals, funerals and large gatherings can be sources of amplification**
- **Case definition, case finding and database are important early tasks**
- **Good laboratory support & cold chain required**
- **Communications are essential, yet may be extremely difficult**

Breaking transmission depends on trust and cooperation

... a frightening disease ...

Gambia bans flights from Ebola-hit nations

AFP

By AFP | AFP - Tue, Apr 15, 2014

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View Photo

AFP/AFP/File - Staff of the 'Doctors without Borders' medical aid organisation carry the body of a person killed by viral haemorrhagic fever, at a center for victims of the Ebola virus in Guekedou, ...more ▾



beyond reason

JFK NURSES ABANDON ER WARD OVER SUSPECTED EBOLA DEATH

Written by Wade C. L. Williams, wade.williams@frontpageafricaonline.com

Published: 11 July 2014

Monrovia - Panic is brewing among health workers, including doctors and nurses in Liberia as the Ebola virus continues to spread and claim lives.

At the John F. Kennedy Medical Center the country's leading referral hospital, health workers abandoned duties in the emergency ward after a patient who was brought in very sick died.

Health authorities in Monrovia speaking to FrontPageAfrica confirmed the incident and stated that everything is being done to put the situation under control.



Ebola Hemorrhagic Fever Outbreak, Guinea

First 21 weeks

Outbreak recognized late due to lack of

- clinical knowledge
- VHF surveillance
- viral diagnostics

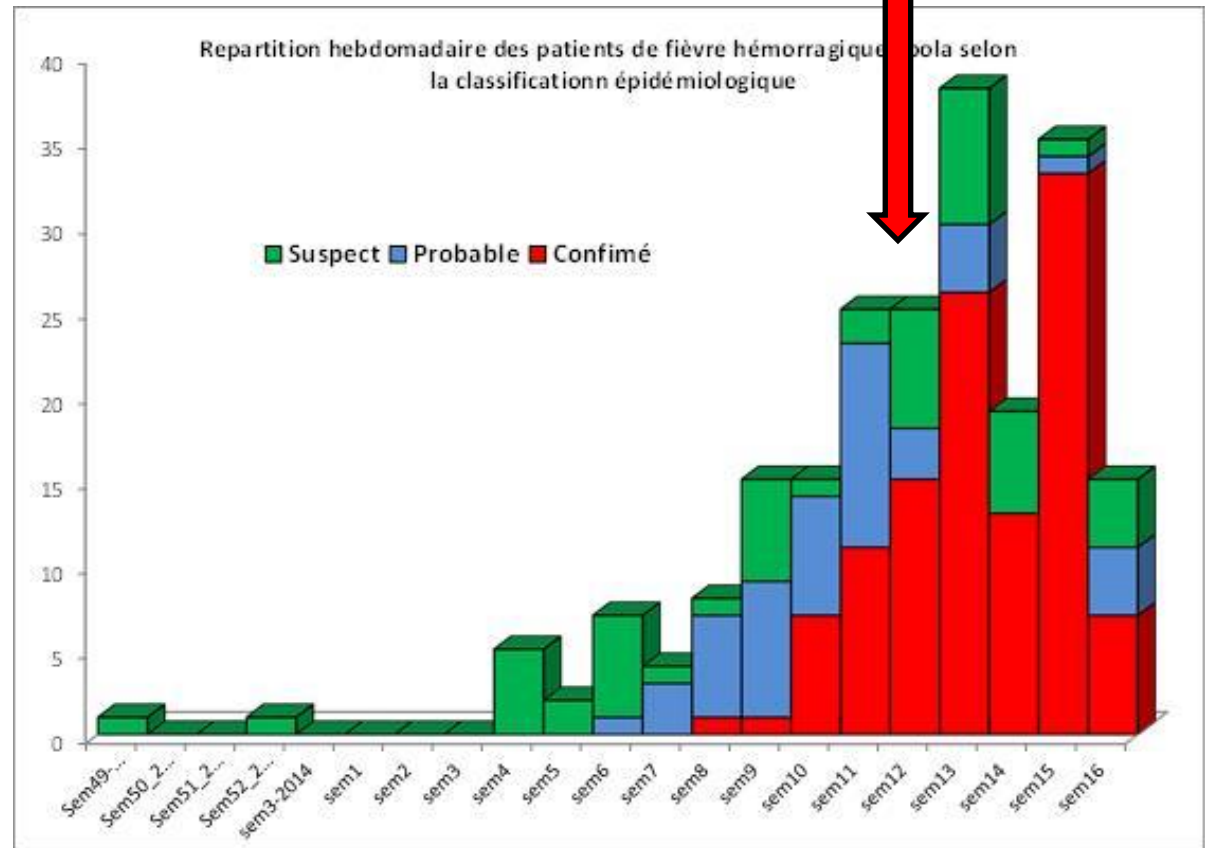
Leading to

→ multiple chains of human-to-human transmission

→ multiple locations

→ increased complexity and challenges to control efforts

Outbreak Detection



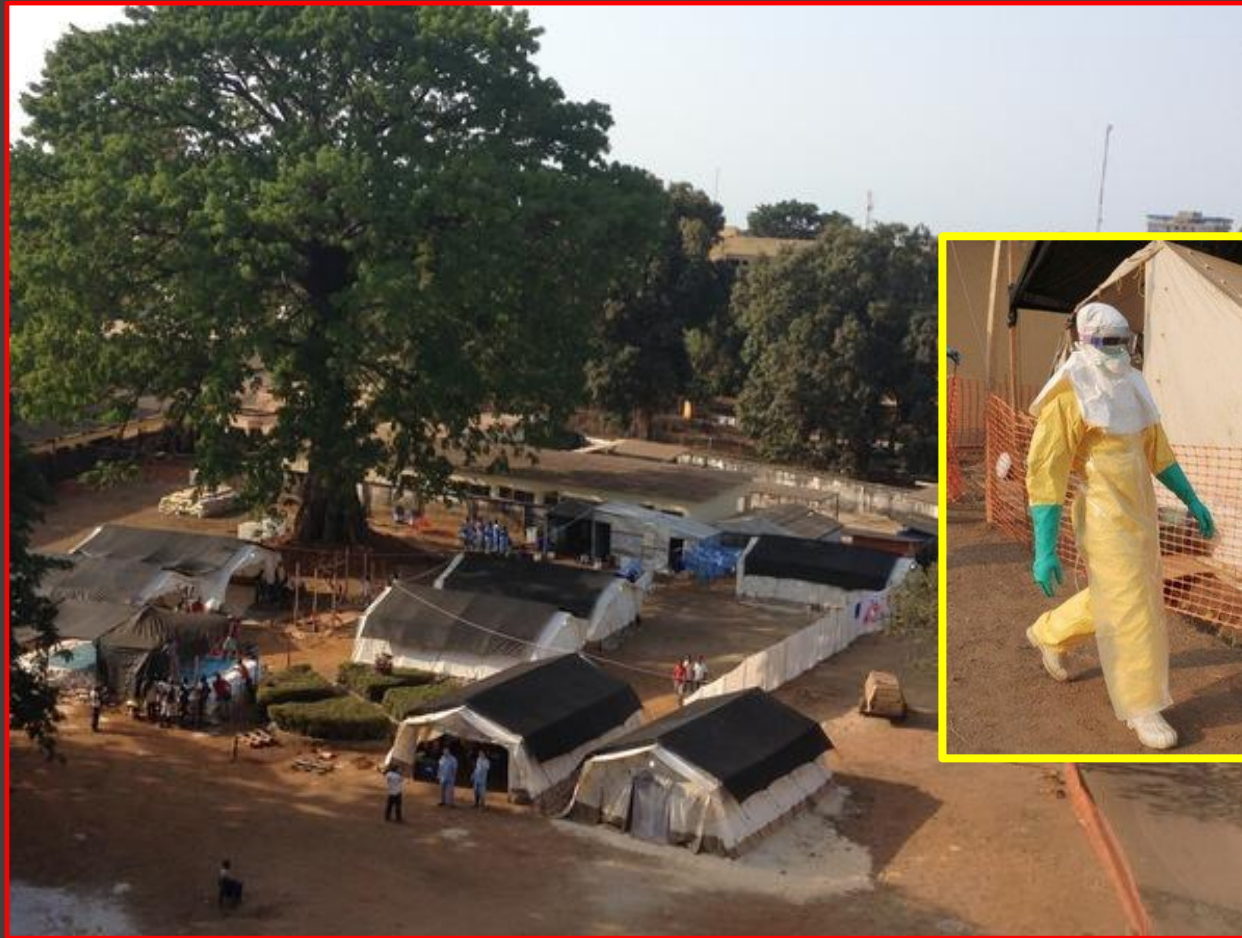


Guinean Healthcare Partnership

- **Guinea Ministry of Health**
- **MSF (incl. Belgium & France)**
- **WHO (GOARN)**
- **CDC**
- **Red Cross**
- **Institute Pasteur**
- **EC Mobile Lab Team**
- **Local health and development NGOs**
- **UNICEF**
- **Guinea Ministry of Agriculture**
- **FAO**

Médecins Sans Frontières

Isolation wards, patient care, data management, ambulance service



Red Cross

Ambulance, rumor confirmation and burial





CDC

Data Analysis: [Epi Info 7](#)

Data for decision-making

- Case definitions
- Allocation of resources
- Contact tracing
- Active surveillance
- Supervision and evaluation
- Communications



Breaking Chains of Transmission Strengthening Health Care

- **Detect and report illness**
- **Isolate and test suspect cases**
- **Treatment of case patients**
- **Contact tracing**
- **Protect health care workers**
 - ✓ **PPE**
 - ✓ **Improve general hygiene**
 - ✓ **Chlorine + chlorine + chlorine**







Breaking Chains of Transmission

Changing Community Behaviors

- **Trust of MoH (support of local healers)**
- **Report ill persons to authorities**
- **Report and test unusual deaths**
- **Funeral rituals and other practices surrounding death and dying**
- **Hunting and preparation of bush meat**
- **Trade in forest animal products**
- **Combatting stigmatization**

Issues of Trust

Life in Guinée Forestière

Extreme poverty

Marginalized

Distrust in daily life

- Opening drinks
- Sharing food

Sorcery

Secret societies

- 2-month initiation in the forest
- Strict burial rites

→ **CHALLENGE:** *How do we gain trust and cooperation?*

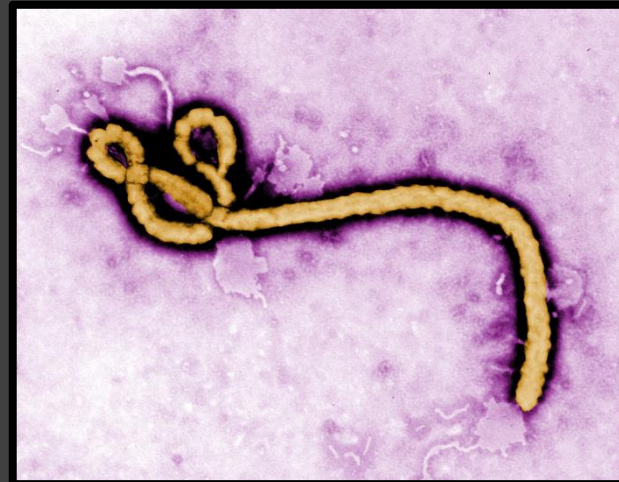
Spiritual Universes and Belief Systems

We all choose which ghosts to believe in

- Do you believe in phantoms you can see in the forest?



- Do you believe in viruses you cannot see? (unless you happen to have an electron microscope)



Bamba

- Day 1:** Report by community agent of village hiding sick child
- Day 2:** Supervision team told “there are no sick children here”
- Day 3:** Team returned with mayor and DMO – vehicle attacked with stones and machetes
- Day 4:** *Comité des Sages* visited and chased out and roads to Ouéndé Kenema blocked to health vehicles



Efforts to Build Trust

- **Rural radio broadcasts**
- **Community health agents**
- **Comité des sages**
- **Appeal to authority (préfet, maire, ...)**
- **Posters**
- **Meetings with secret societies**
- **Meetings with society of hunters**
- **Meetings with school teachers**



Définition:

La fièvre hémorragique Ébola est une maladie contagieuse et très dangereuse.

Mode de transmission de la maladie:

- Elle se transmet essentiellement d'une personne malade à une personne saine, à travers des selles, le sang, l'urine, la salive, la sueur, le sperme, les vomissures, autres sécrétions biologiques, ou encore par des objets souillés appartenant à des personnes malades ou décédés.
- Les rats, les souris, les chauves-souris, ou encore la consommation de viande d'animaux de brousse infectés (morts ou vivants) comme les singes, les chimpanzés, les gorilles, les antilopes des bois, les porcs sont susceptibles de transmettre la fièvre Ébola.

Signe clinique de la maladie:

- Elle se manifeste par une fièvre, des maux de tête, des diarrhées, des vomissements et des hémorragies.

Messages aux populations pour prévenir la fièvre Ébola :

- Éviter tout contact avec le sang, l'urine ou les vomissures des malades.
- Ne pas toucher ni laver le corps des malades décédés.
- Porter des gants lors de la manipulation des vêtements des malades. Faire bouillir les vêtements avant de les laver.
- Lavons nous les mains au savon et au chlore ou javel, avant de manger, avant de préparer les aliments, avant de donner à manger aux enfants, après les toilettes et le nettoyage anal des enfants.
- Conservons les aliments et des céréales, dans des contenants inaccessibles aux insectes et aux rongeurs.
- Chauffons les repas froids avant de les manger.
- Lavons soigneusement les fruits et légumes crus à l'eau et savon ou avec l'eau chlorée avant de les consommer.

- Traitons l'eau au chlore, eau de javel, Sur'Eau, Chlore'C avant de la consommer

- Utilisons des récipients propres et fermés pour le transport et le stockage de l'eau de consommation.

- Dératisons nos maisons.

- Évacuons, enfouissons, incinérons les ordures ménagères, immondes loin des habitations.

- Maintenons propre l'intérieur et l'environnement de nos habitations.

- Utilisons des latrines hygiéniques et /ou évacuons correctement les selles y compris celles des enfants réputées à tort comme étant pas nocives.

- Évitons les contacts, les visites aux malades suspects d'être infectés par le virus Ébola.

- Lavons et désinfectons le linge et la literie souillés.

- Déclarons tout cas suspect aux autorités sanitaires les plus proches.

- Évitons les pratiques traditionnelles favorisant la transmission comme les rituels funéraires de repas collectifs avec ou sans lavage des mains au savon de lavage, les expositions, la conservation, les transports des corps.

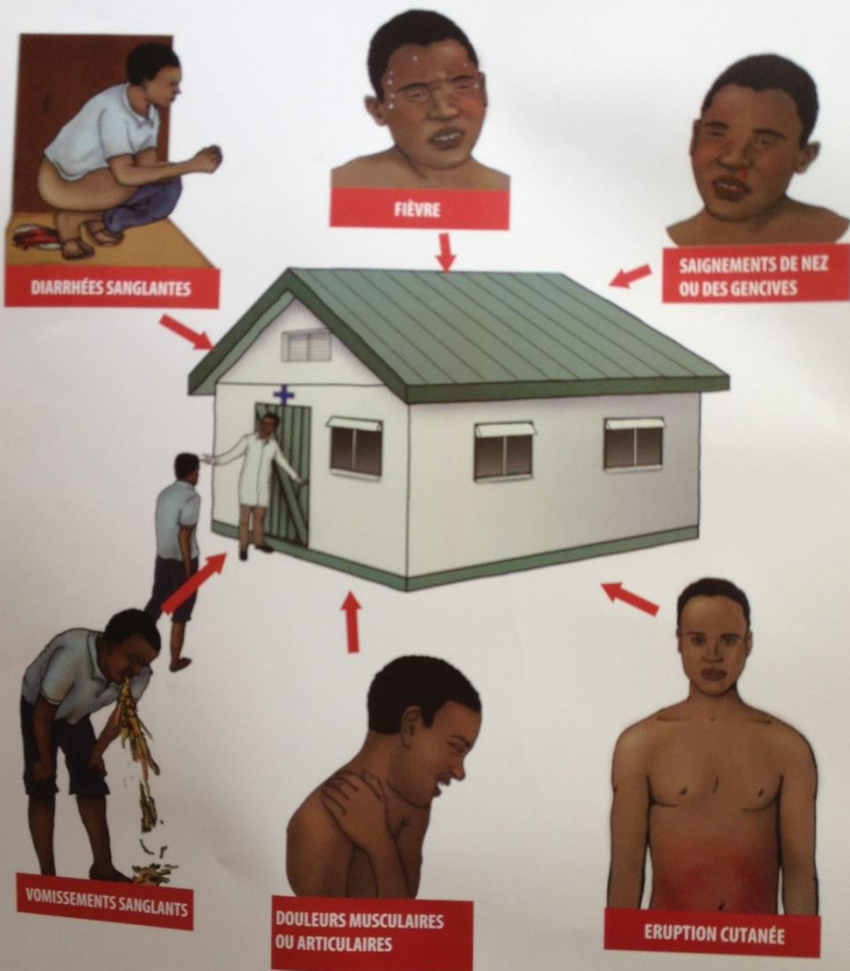
- Acceptons l'enterrement sécurisé des corps dans les meilleurs délais et aux cimetières les plus proches sous la seule responsabilité des agents compétents de la santé et de la Croix Rouge Guinéenne.

- Soyons sereins car des mesures médicales adéquates sont prises pour le contrôle de cette maladie. À cet effet, le traitement de tous les malades est gratuit dans des centres d'isolement appropriés.

Ensemble nous vaincrons la fièvre Ébola.



Si vous avez ces signes, consultez immédiatement le Centre de Santé le plus proche.



Appelons le **115** pour toute assistance
Ministère de la Santé de la République de Guinée et ses partenaires



EBOLA COMMENT EMPÊCHER SA PROPAGATION

Ebola se propage rapidement et peut tuer les personnes infectées.
Comment se protéger ?

1 Évitez de toucher...



2 Lavons-nous toujours les mains



3 Signalons toute personne présentant des signes au Centre de Santé



Appelons le **115** pour toute assistance

Ministère de la Santé de la République de Guinée et ses partenaires

One Health Approach

Role of FAO - Conakry

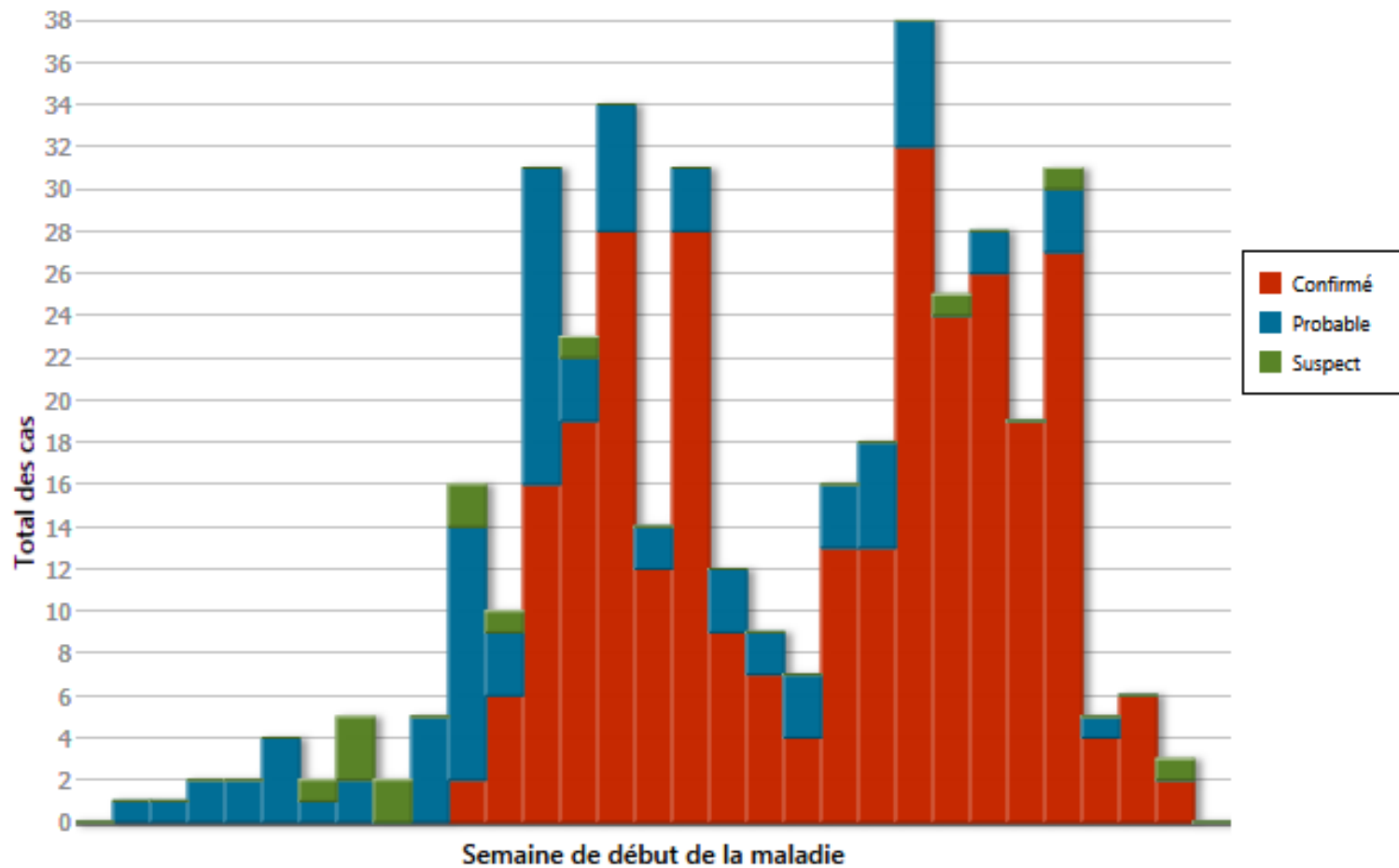
- **Organized meeting of MoH and Ministry of Livestock**
- **Agreed to create an interministerial commission modeled on influenza commission**
 - reinforce surveillance
 - access to Society of Hunters

Plan: Investigate possible animal reservoirs of Ebola virus



Courbe épidémiologique des cas confirmés, probables, et suspects par semaine du début de la maladie

15-Jul-2014 18:34



Ebola Hemorrhagic Fever Outbreak in Guinea, Liberia, and Sierra Leone 2014



Source: CDC
30 June 2014

Elizabeth Ervin, CDC/SPB, June 30 2014

Chronology and mortality of previous Ebola virus disease outbreaks

Year	Country	Ebolavirus species	Cases	Deaths	Case fatality
2014	West Africa combined	Zaire	938	523	56%
2014	Sierra Leone	Zaire	385	125	32%
2014	Liberia	Zaire	142	88	62%
2014	Guinea	Zaire	411	310	75%
2012	Democratic Republic of Congo	Bundibugyo	57	29	51%
2012	Uganda	Sudan	7	4	57%
2012	Uganda	Sudan	24	17	71%
2011	Uganda	Sudan	1	1	100%
2008	Democratic Republic of Congo	Zaire	32	14	44%
2007	Uganda	Bundibugyo	149	37	25%
2007	Democratic Republic of Congo	Zaire	264	187	71%
2005	Congo	Zaire	12	10	83%
2004	Sudan	Sudan	17	7	41%
2003 (Nov-Dec)	Congo	Zaire	35	29	83%
2003 (Jan-Apr)	Congo	Zaire	143	128	90%
2001-2002	Congo	Zaire	59	44	75%
2001-2002	Gabon	Zaire	65	53	82%
2000	Uganda	Sudan	425	224	53%



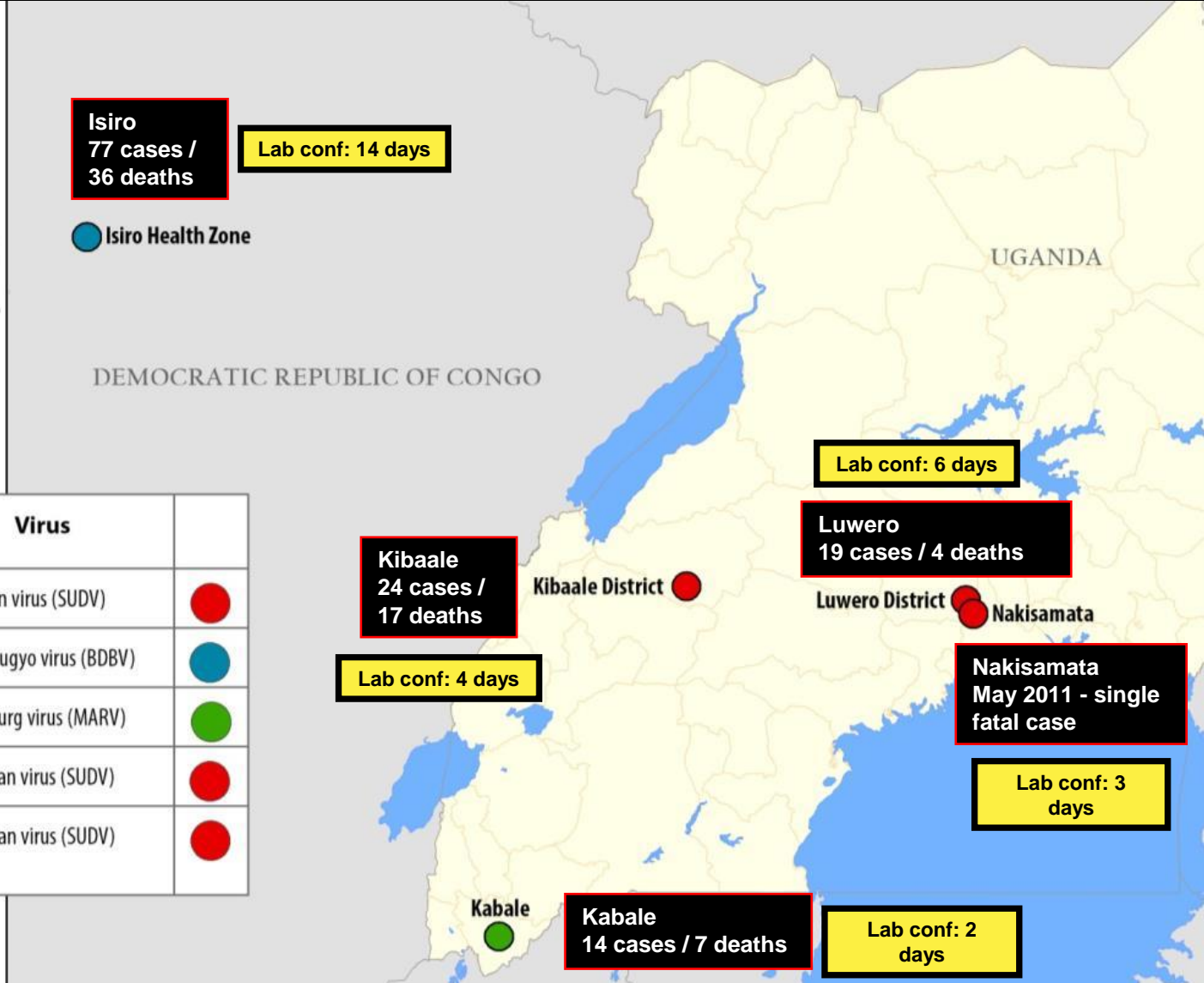
UGANDA

Investing in capacity building pays off

- **CDC collaboration with MoH and UVRI**
- **Expanded to 12 surveillance sites**
- **Case reporting forms**
- **Telephone reporting *hotline***
- **Electronic databases**
- **VHF diagnostics (UVRI/CDC laboratory)**
- **Trained more than 40 district and hospital staff**

UGANDA & DRC Ebola and Marburg HF outbreaks since 2010

Rapid detection & response



Year of Isolation	Location	Virus	
2012	Kibaale, Uganda	Sudan virus (SUDV)	●
2012	Isiro District, DRC	Bundibugyo virus (BDBV)	●
2012	Kabale, Uganda	Marburg virus (MARV)	●
2012	Luwero District, Uganda	Sudan virus (SUDV)	●
2011	Nakisamata Village, Uganda	Sudan virus (SUDV)	●