ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ

Κοινωνία & Υγεία
Οι προσδιοριστές της Υγείας
Η επιδημία του Ebola

Τάσος Φιλαλήθης
Καθηγητής Κοινωνικής Ιατρικής
Τμήμα Ιατρικής

Ebola virus disease
Source: World Health Organization (WHO)

Ebola

Ebola virus disease is a severe, often fatal illness in humans.

H2H

In the 2014 Ebola outbreak, nearly all of the cases of EVD are a result of human-to-human transmission.

2 to 21 days

The incubation period from time of infection to symptoms is 2 to 21 days.

World Health Organization (WHO)
Παγκόσμιος Οργανισμός Υγείας (ΠΟΥ)

http://www.who.int/csr/disease/ebola/en/

Ebola virus disease

- **Information from CDC (Center for Disease Control and Prevention, USA)**

- **http://www.cdc.gov/vhf/ebola/index.html**

Pietr Piot, Director of the London School of Hygiene & Tropical Medicine

Peter Piot was a researcher at a lab in Antwerp when a pilot brought him a blood sample from a Belgian nun who had fallen mysteriously ill in Zaire.

WHO updates

1976

Ebola first appeared in 1976 in 2 simultaneous outbreaks, in Nzara, Sudan...

The Ebola River Go to Article

SOUTH SUDAN

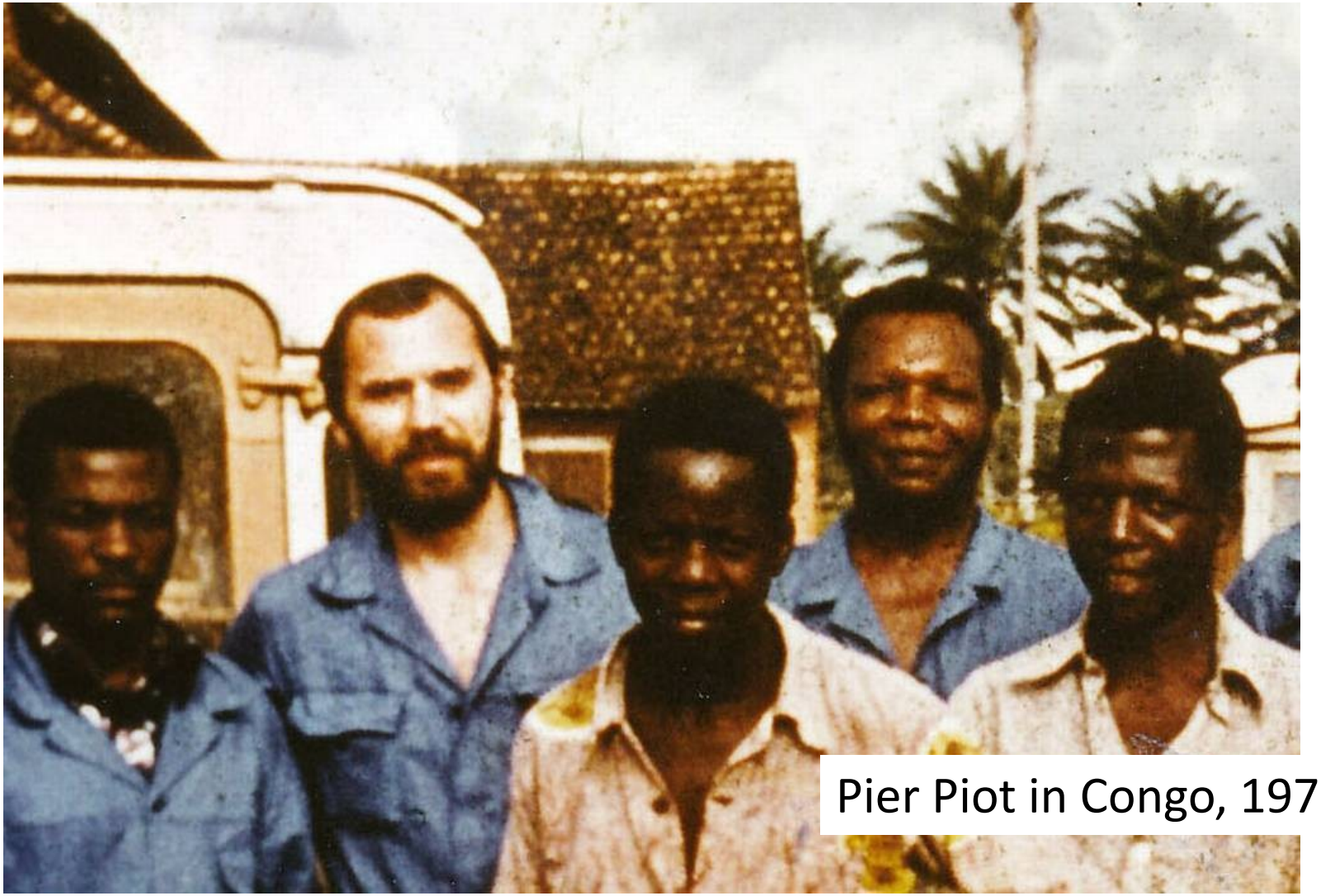
Yambuku

Nzara

ebola river

DEMOCRATIC REPUBLIC OF THE CONGO

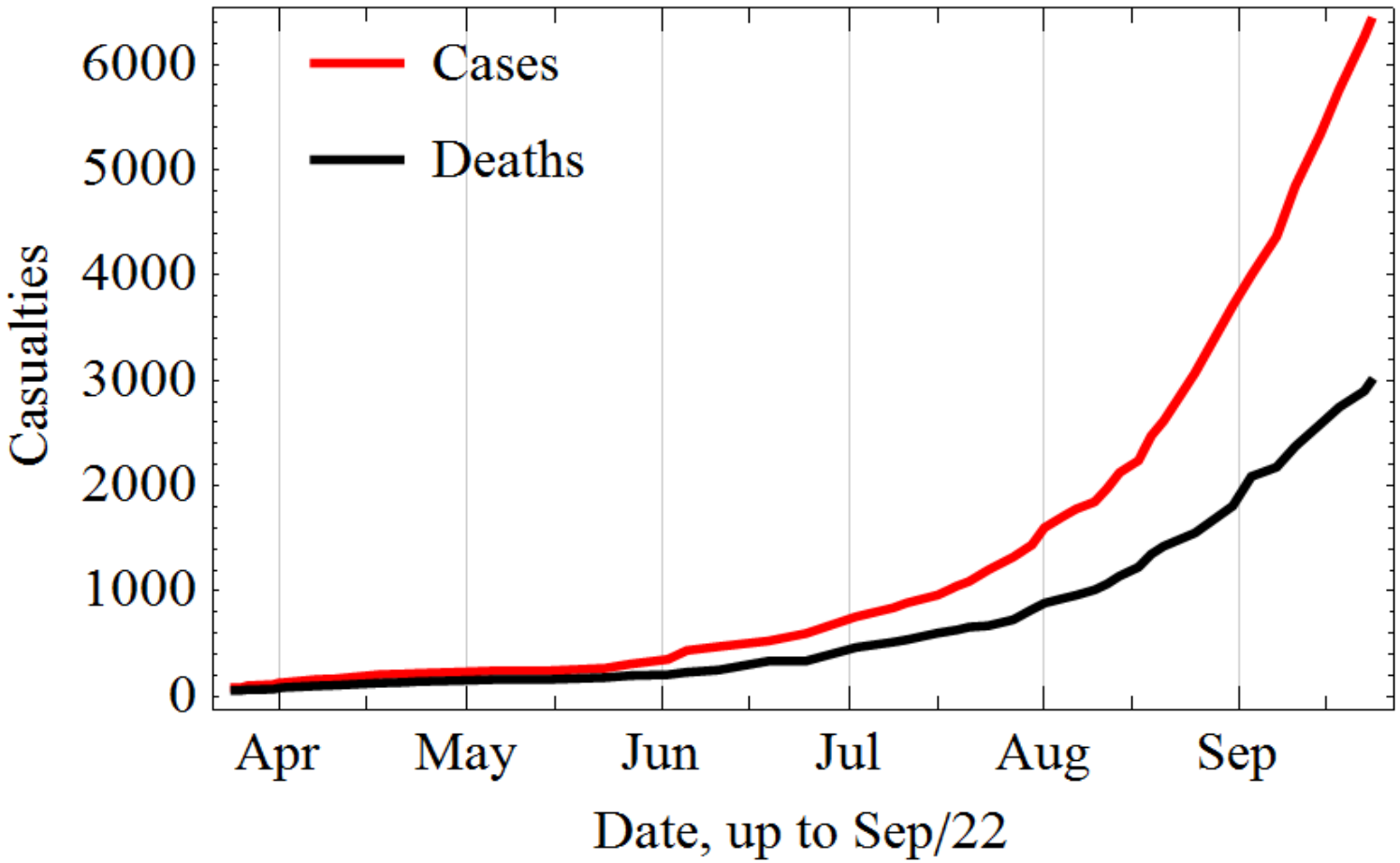
...and in Yambuku, Democratic Republic of Congo. The latter was in a village situated near the Ebola River, from which the disease takes its name.



Pier Piot in Congo, 1976

Nun buried in Congo, 1975

Ebola virus disease – Cases, Sep 2014




First outbreak of Ebola in Zaire
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Cases 318 0 315 425 264
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Ebola outbreak in West Africa; largest in history
Year 1976 1976 1996 2001-2002 2007 2014
Cases 1 1 1 57 149 *27,000+
Deaths 0 0 1 43 37 *11,000+

Ebola virus disease - Background

- The Ebola virus causes an acute, serious illness which is often fatal if untreated.
- Ebola virus disease (EVD) **first appeared in 1976** in 2 simultaneous outbreaks, one in Nzara, **Sudan**, and the other in Yambuku, **Democratic Republic of Congo**.
- The latter occurred in a village near the **Ebola River**, from which the disease takes its name.
- The current outbreak in west Africa, (first cases notified in March 2014), is the largest and most complex Ebola outbreak
- There have been more cases and deaths in this outbreak than all others combined.
- The most severely affected countries, Guinea, Sierra Leone and Liberia have very weak health systems, lacking human and infrastructural resources, having only recently emerged from long periods of conflict and instability.
- Also in Nigeria and Senegal

Ebola virus disease – Basic 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. [Fatality: Θνητότητα]
- 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.

1st Ebola outbreak in West Africa

Multiple countries:

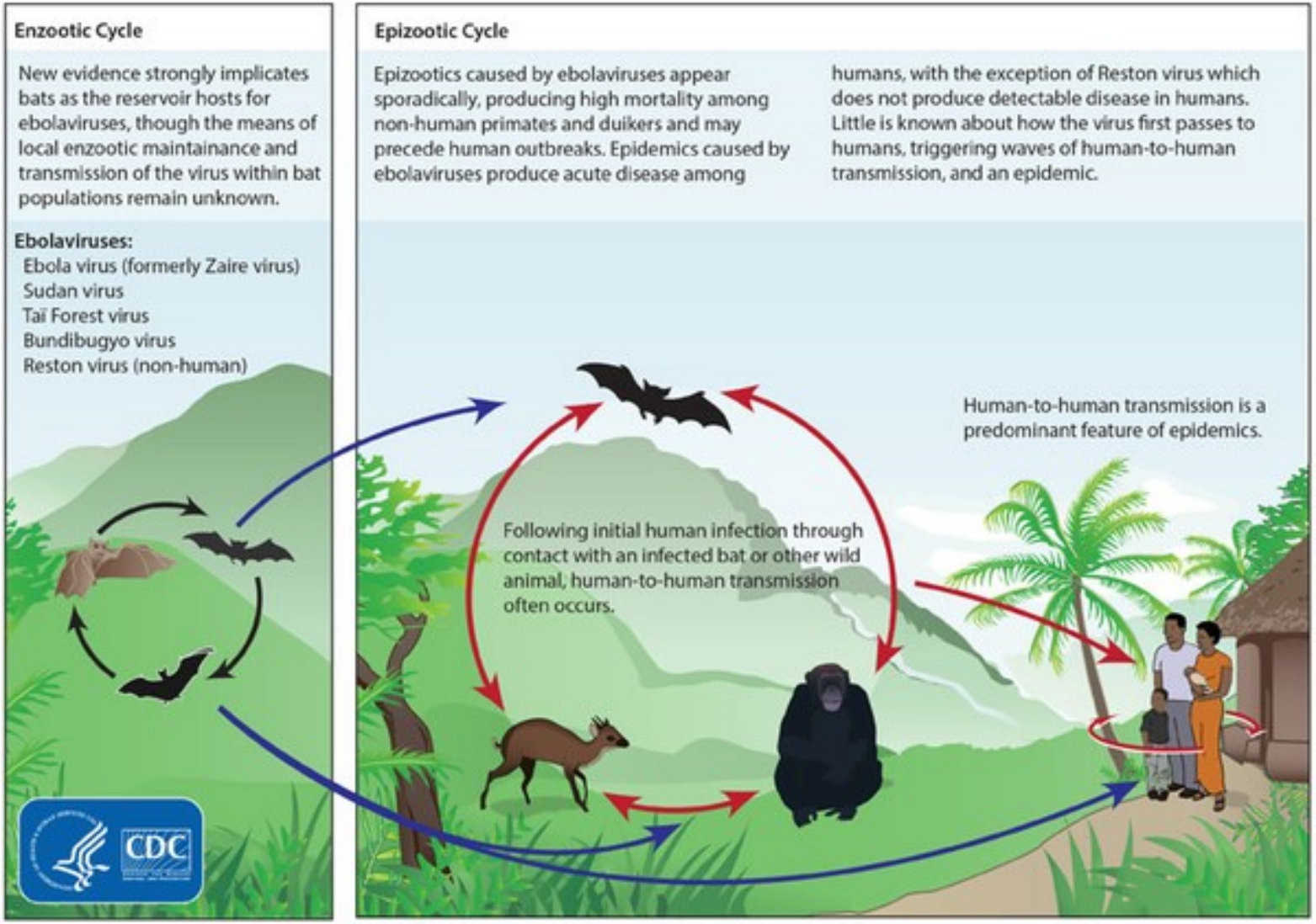
- Guinea
- Liberia
- Nigeria
- Senegal
- Sierra Leone

Likely host = bats

1 in 2

people who get Ebola in this outbreak have died.

Life cycles of the *Ebolavirus*



http://en.wikipedia.org/wiki/Ebola_virus_disease

How do you get the Ebola virus?

Direct contact with:

1. **Body fluids of a person who is sick with or has died from Ebola.** (blood, vomit, pee, poop, sweat, semen, spit, other fluids)
2. **Objects contaminated with the virus** (needles, medical equipment)
3. **Infected animals** (by contact with blood or fluids or infected meat)

Ebola virus disease - Transmission

- Fruit bats natural Ebola virus hosts.
- Humans: close contact with the blood, secretions, organs or other bodily fluids of infected animals such as **chimpanzees, gorillas, fruit bats, monkeys, forest antelope and porcupines**.
- Ebola then spreads through **human-to-human transmission via direct contact** (through broken skin or mucous membranes) with the blood, secretions, organs or other bodily fluids of infected people, and with surfaces and materials (e.g. bedding, clothing) contaminated with these fluids.
- Health-care workers have frequently been infected while treating patients with suspected or confirmed EVD.
- Burial ceremonies can also play a role.

When is someone able to spread the disease to others?

Ebola only spreads when people are sick.
A patient must have symptoms to spread the disease to others.

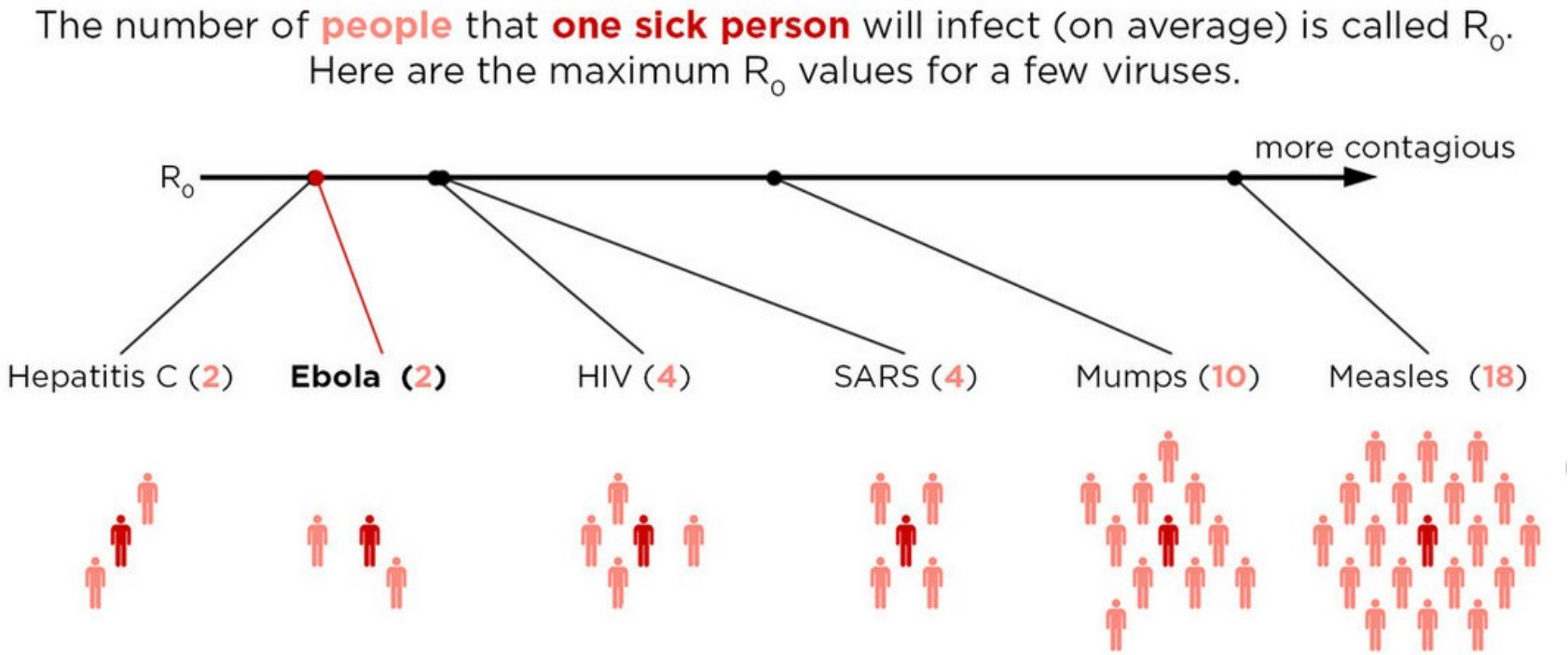
MONTH						
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

After 21 days, if an exposed person does not develop symptoms, they will not become sick with Ebola.

No, Seriously, How Contagious Is Ebola?

by MICHAELEEN DOUCLEFF

October 02, 2014 10:59 AM ET



http://www.npr.org/blogs/health/2014/10/02/352983774/no-seriously-how-contagious-is-ebola

Early Symptoms:

Ebola can only be spread to others after symptoms begin. Symptoms can appear from 2 to 21 days after exposure.

- **Fever**
- **Headache**
- **Diarrhea**
- **Vomiting**
- **Stomach pain**
- **Unexplained bleeding or bruising**
- **Muscle pain**

Ebola virus disease - Symptoms

- First symptoms are the sudden onset of fever fatigue, muscle pain, headache and sore throat.
- This is followed by vomiting, diarrhoea, rash, symptoms of impaired kidney and liver function, and in some cases, both internal and external bleeding (e.g. oozing from the gums, blood in the stools).
- Laboratory findings include low white blood cell and platelet counts and elevated liver enzymes

Ebola – Treatment

- Supportive care-rehydration with oral or intravenous fluids- and treatment of specific symptoms, improves survival.

Ebola – Prevention and control

- A package of interventions, namely case management, surveillance and contact tracing, a good laboratory service, safe burials and social mobilisation.
- Community engagement is key to successfully controlling outbreaks.

What is contact tracing?

Contact tracing can stop the Ebola outbreak in its tracks

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

VACCINES

- **Is there a vaccine to protect against Ebola virus disease?**
- At this time, there are no vaccines to protect against EVD licensed for use in humans. Clinical trials for several candidate vaccines are in various phases and a safe and effective vaccine is hoped for by the end of 2015.
- Trials are under way for 9 different types of vaccine

http://www.who.int/medicines/emp_ebola_q_as/en/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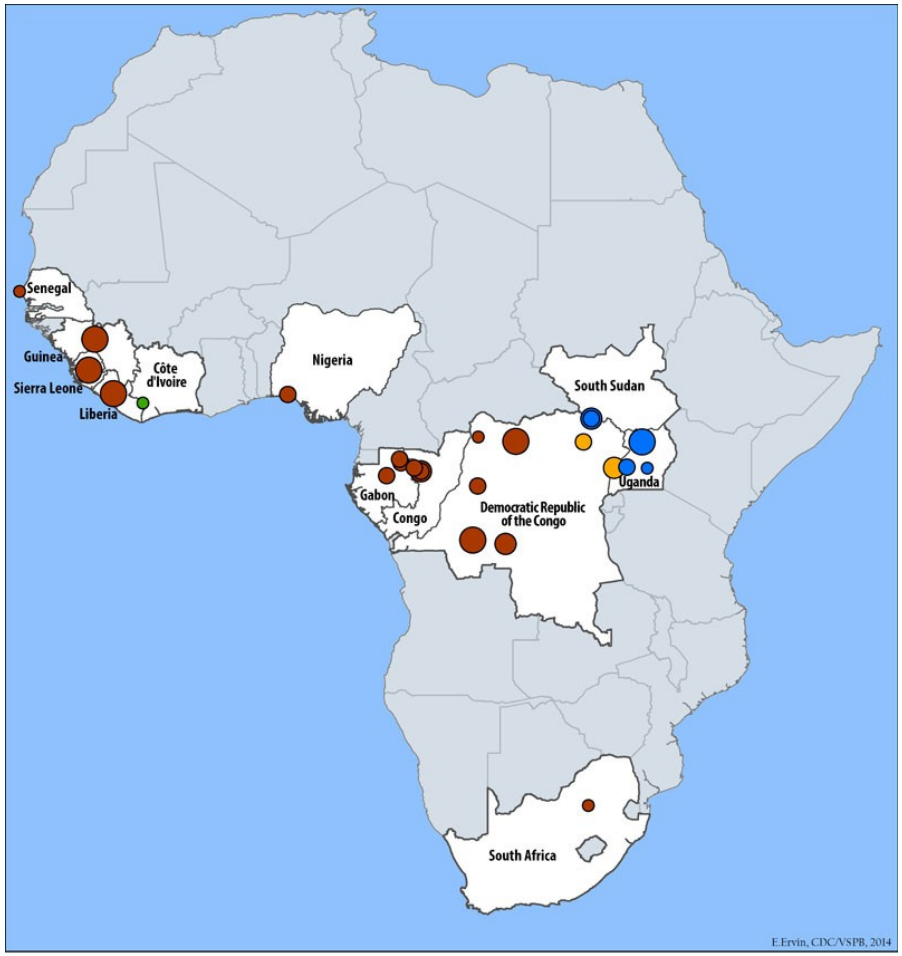
Ebola in Africa, 1976 – 2014 (CDC)



EBOLAVIRUS OUTBREAKS BY SPECIES AND SIZE, 1976 - 2014

Species

- Zaire ebolavirus
- Sudan ebolavirus
- Tai Forest ebolavirus
- Bundibugyo ebolavirus

Number of Cases

- 1 - 10
- 11 - 100
- 101 - 300
- Greater than 300 reported cases

N W E S

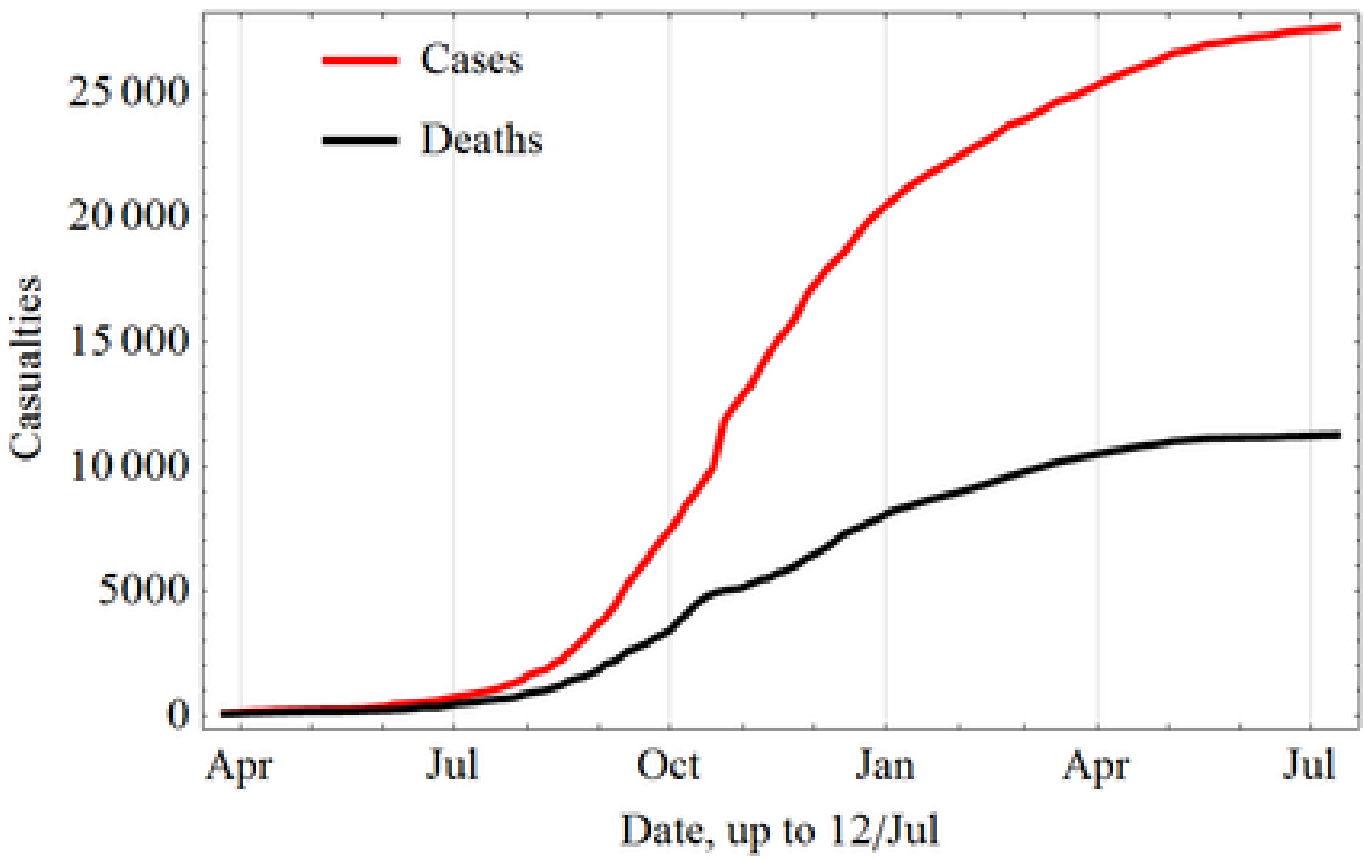
0 245 490 980 Miles

Ebola: cases 1976 – 2000

Year	Country	Ebolavirus species	Cases	Deaths	Case fatality
2000	Uganda	Sudan	425	224	53%
1996	South Africa (ex-Gabon)	Zaire	1	1	100%
1996 (Jul-Dec)	Gabon	Zaire	60	45	75%
1996 (Jan-Apr)	Gabon	Zaire	31	21	68%
1995	Democratic Republic of Congo	Zaire	315	254	81%
1994	Cote d'Ivoire	Taï Forest	1	0	0%
1994	Gabon	Zaire	52	31	60%
1979	Sudan	Sudan	34	22	65%
1977	Democratic Republic of Congo	Zaire	1	1	100%
1976	Sudan	Sudan	284	151	53%
1976	Democratic Republic of Congo	Zaire	318	280	88%

Ebola: cases 2001 – 2012

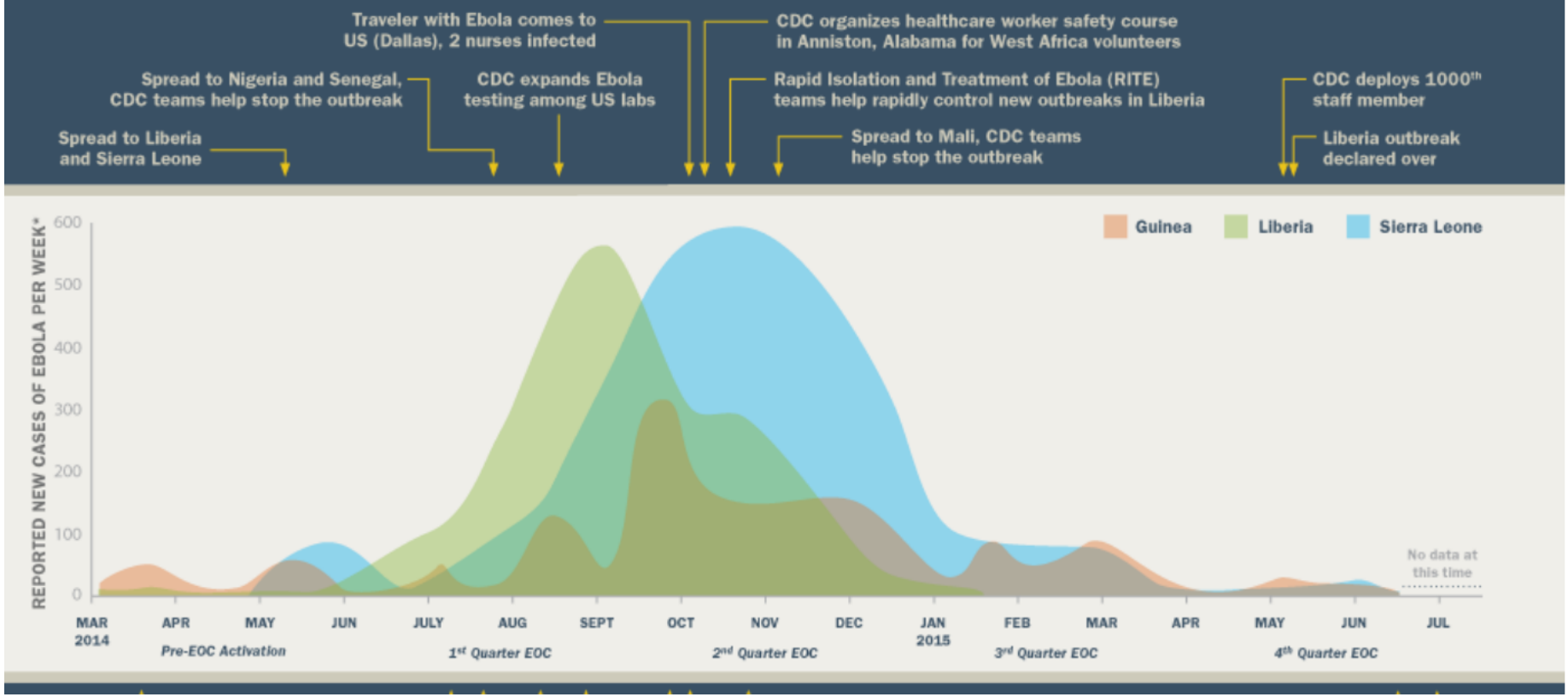
Year	Country	Ebolavirus species	Cases	Deaths	Case fatality
2012	Democratic Republic of Congo	Bundibugyo	57	29	51%
2012	Uganda	Sudan	7	4	57%
2012	Uganda	Sudan	24	17	71%
2011	Uganda	Sudan	1	1	100%
2008	Democratic Republic of Congo	Zaire	32	14	44%
2007	Uganda	Bundibugyo	149	37	25%
2007	Democratic Republic 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%



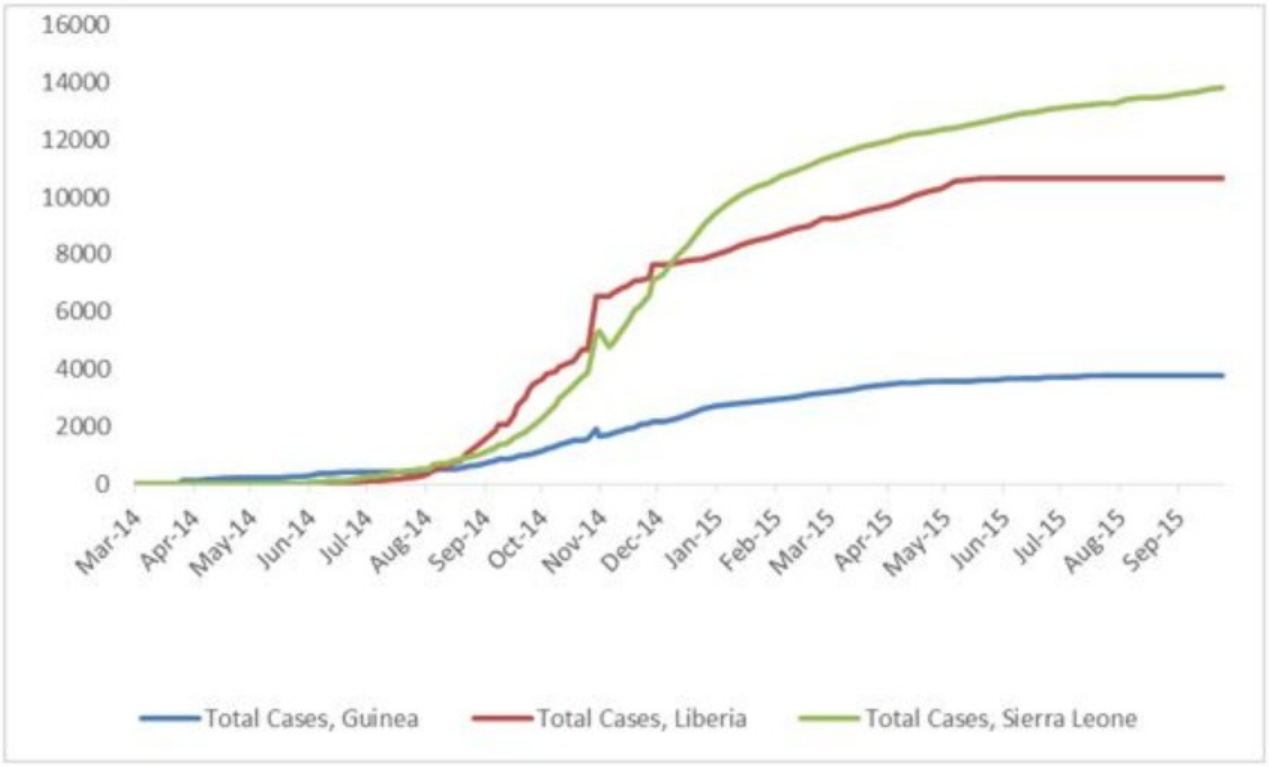
Increase over time in the cases and deaths during the 2013–2015 outbreak

https://en.wikipedia.org/wiki/Ebola_virus_disease

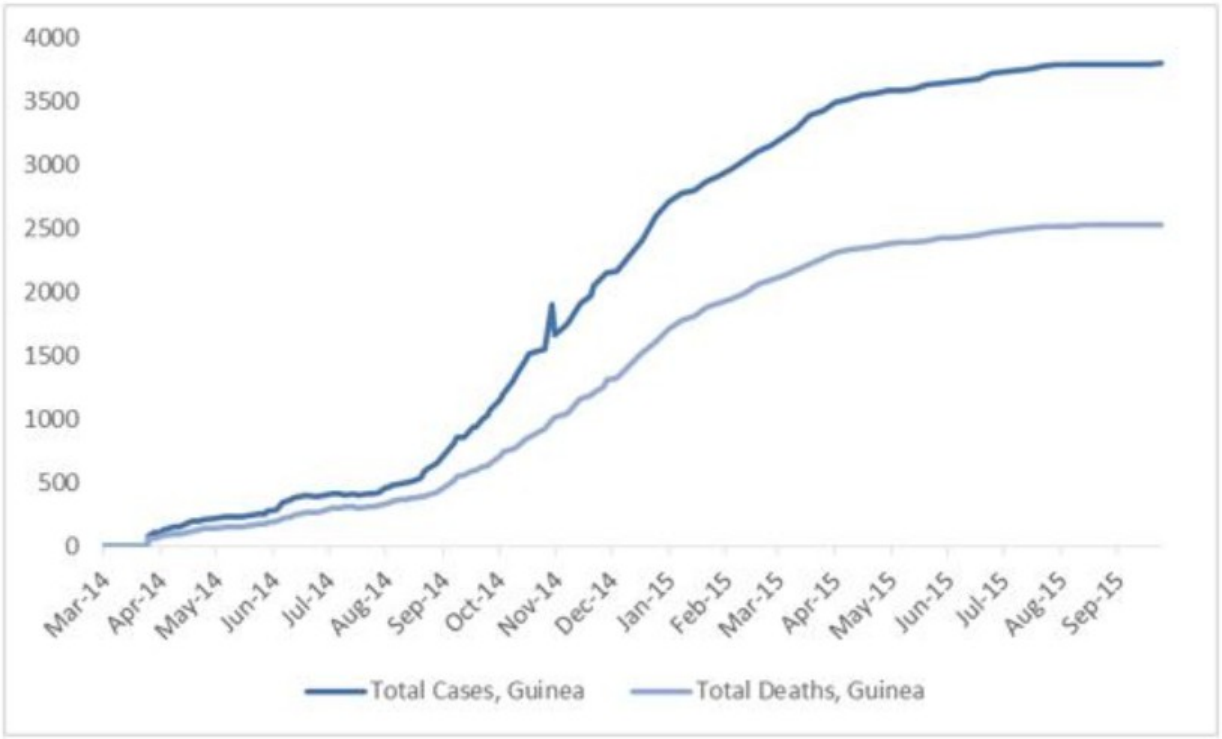
CDC's Response to Ebola: March 2014 – July 2015



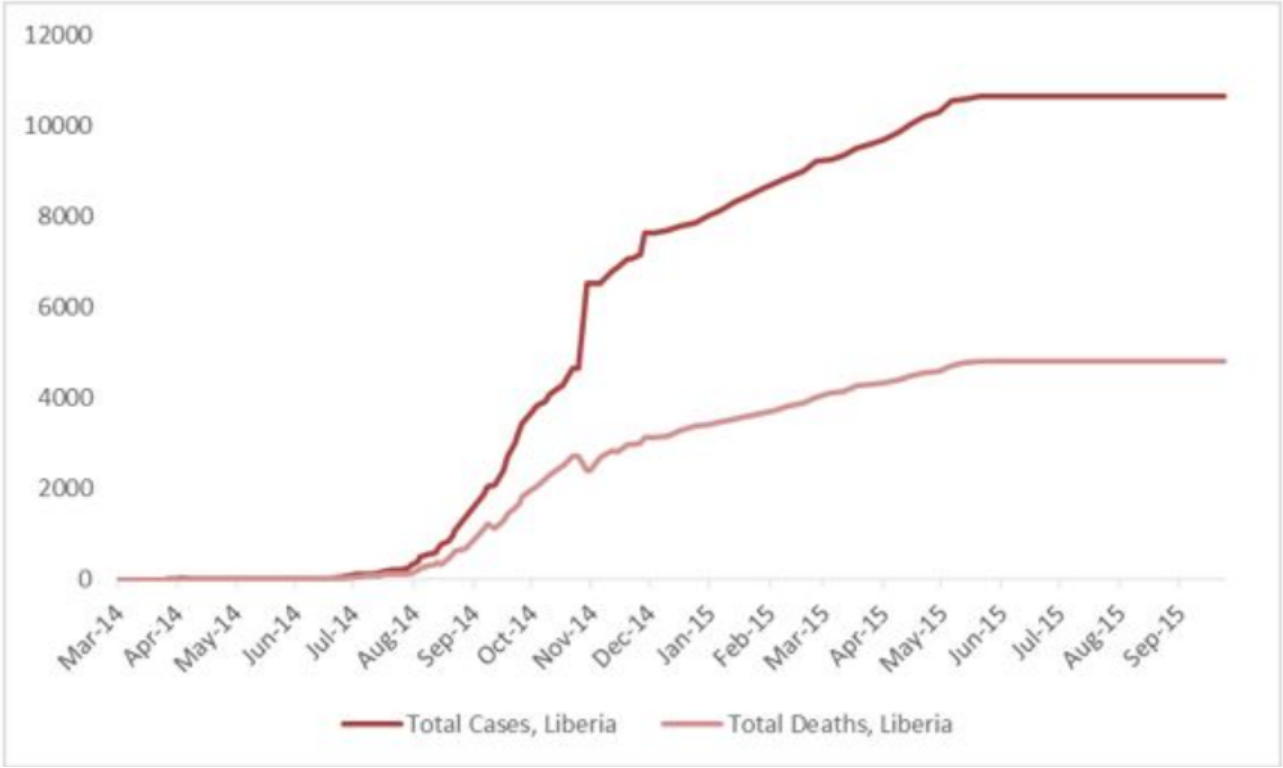
Graph 1: Total suspected, probable, and confirmed cases of Ebola virus disease in Guinea, Liberia, and Sierra Leone, March 25, 2014 – September 20, 2015, by date of WHO Situation Report, n=28295



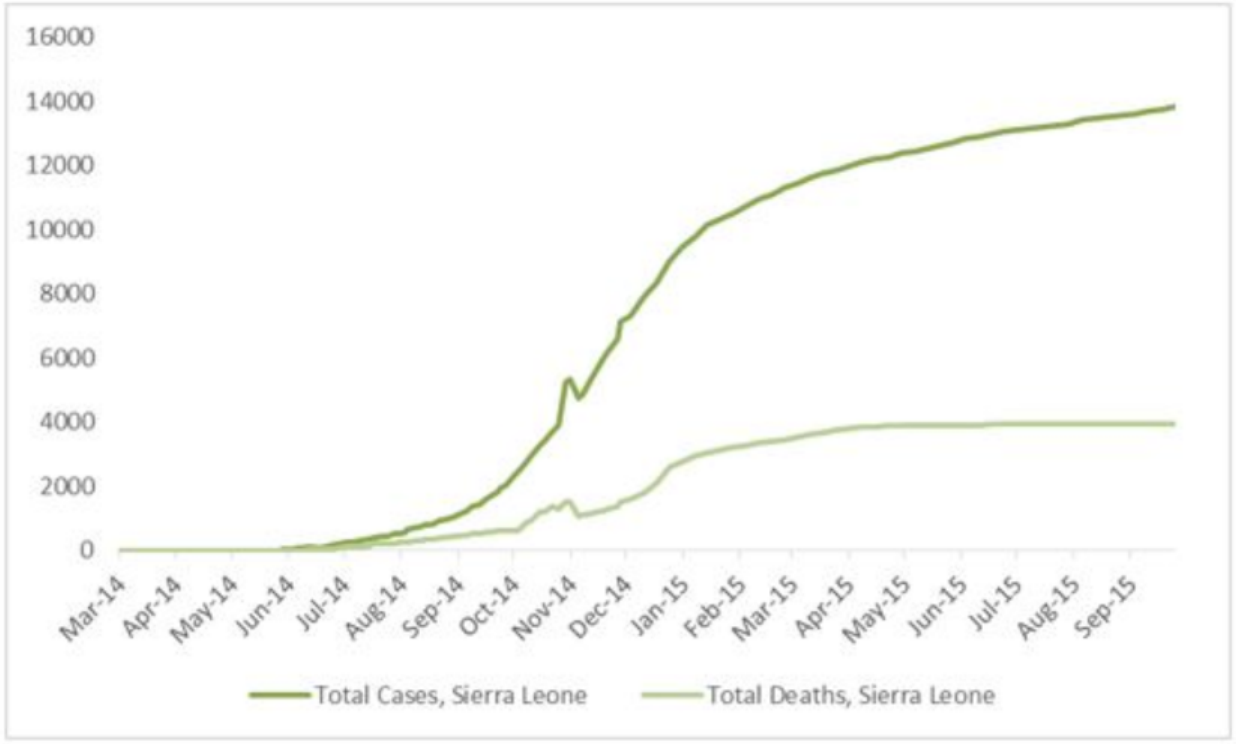
Graph 2: Total suspected, probable, and confirmed cases and deaths of Ebola virus disease in Guinea, March 25, 2014 – September 20, 2015, by date of WHO Situation Report, n=3800



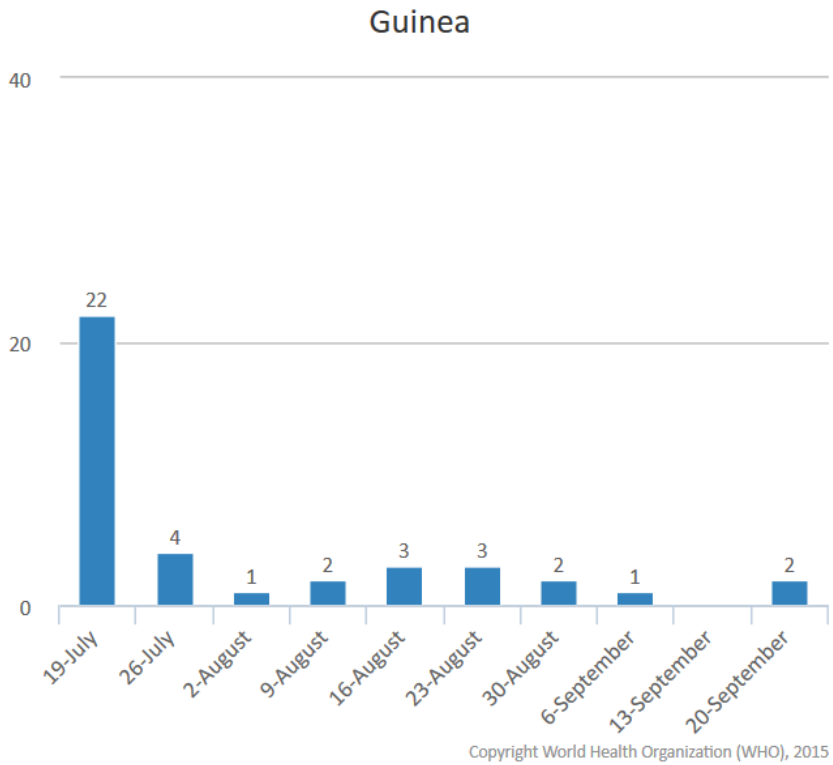
Graph 3: Total suspected, probable, and confirmed cases and deaths of Ebola virus disease in Liberia, March 25, 2014 – September 20, 2015, by date of WHO Situation Report, n=10672

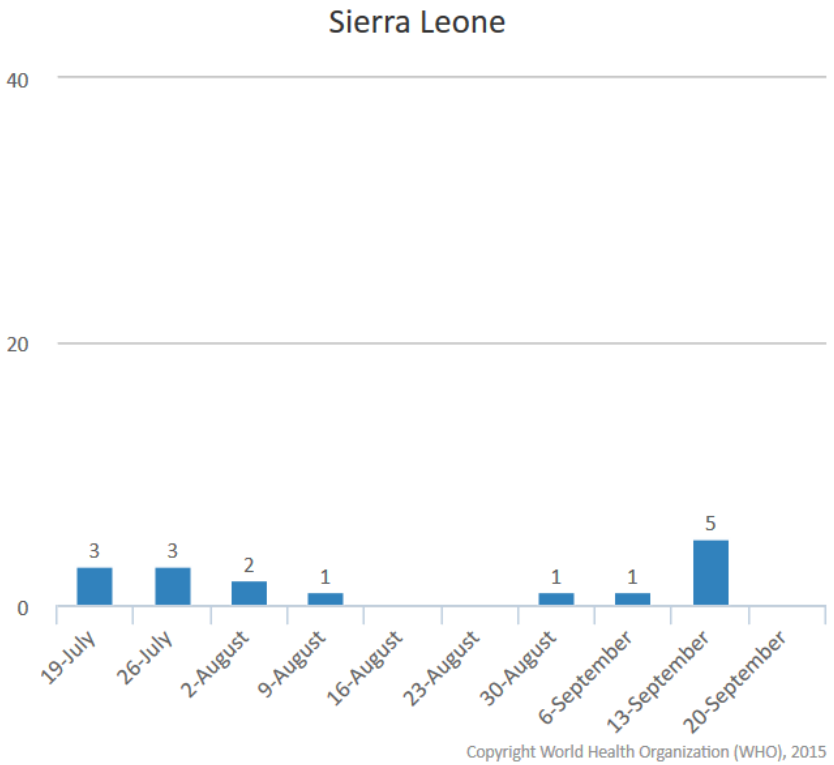


Graph 4: Total suspected, probable, and confirmed cases and deaths of Ebola virus disease in Sierra Leone, March 25, 2014 – September 20, 2015, by date of WHO Situation Report, n=13823



Total confirmed cases (by week, 2015)





Situation map of the outbreak in West Africa

Date December 2013 – present

Casualties

- *Note: current estimates suggest that the number of cases may have been substantially underreported, by up to 70 percent.*[1]

Country	Cases	Deaths	Last update On 24 September 2015 by WHO
Liberia	10,672	4,808	outbreak ended 3 September 2015[2][3]
Sierra Leone	13,846	3,955	22 September 2015[2]
Guinea	3,801	2,533	22 September 2015[2]
Nigeria	20	8	outbreak ended 19 October 2014[4]
Mali	8	6	outbreak ended 18 January 2015[5]
United States	4	1	outbreak ended 21 December 2014[6]
Italy	1	0	outbreak ended 20 July 2015[7]
United Kingdom	1	0	outbreak ended 10 March 2015[8]
Senegal	1	0	outbreak ended 17 October 2014[4]
Spain	1	0	outbreak ended 2 December 2014[9]
Total	**28,355**	**11,311**	**as of 22 September 2015**

MEDECINS SANS FRONTIERES

Ebola in West Africa: Epidemic requires massive deployment of resources

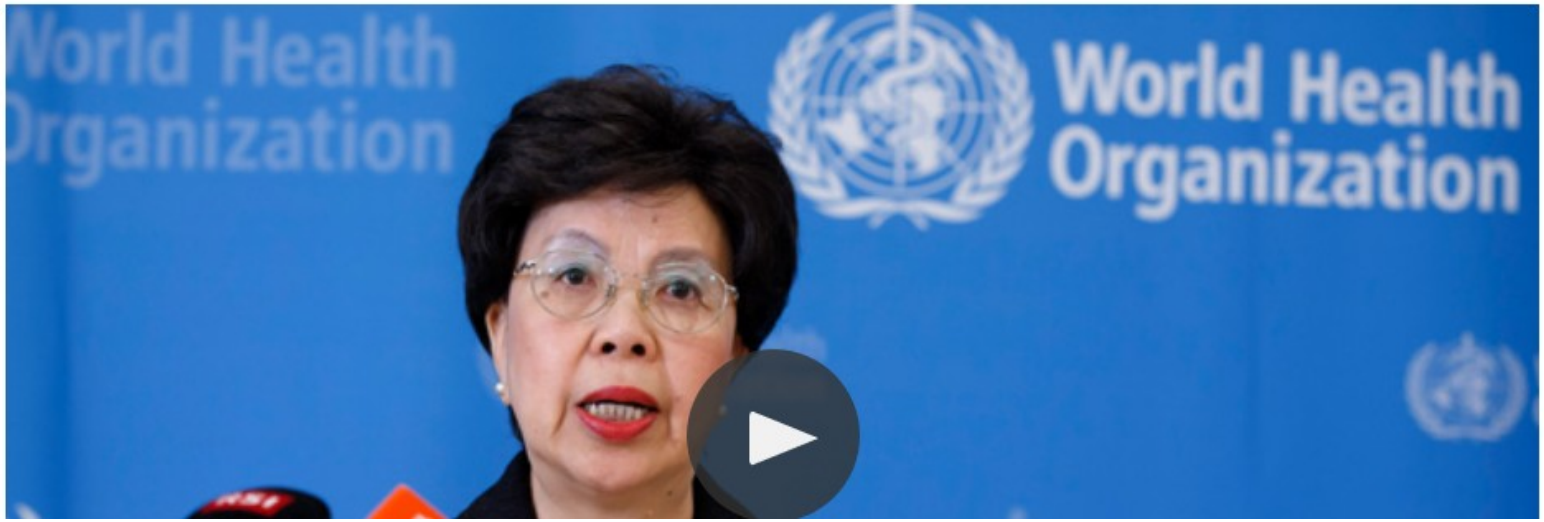
23 June 2014

23 June 2014

The Guardian, 8 August 2014

WHO declares Ebola outbreak an international public health emergency

Director general Margaret Chan says west African countries' health systems need international help to manage infection



The New York Times, 8 Aug 2014

- One major international medical organization, Doctors Without Borders, responded to the statement with a renewed call for a “massive deployment” of health specialists to the stricken countries. “Lives are being lost because the response is too slow,” it said.
- “The W.H.O. declaration on Ebola comes months after the outbreak was first identified in Guinea in March. Mr. Janssens* said that a combination of factors — including denials by the authorities in affected countries and the international community’s slow recognition of the gravity of the crisis — had all contributed to delays in gearing up an effective response.”
- * Dr. Bart Janssens, the director of operations at Doctors Without Borders

The Guardian, 9 October 2014

- Ebola: government cuts to the WHO aided delays in dealing with outbreak
- Health organisation suffered from global austerity, needs urgent overhaul and sounded the alarm too late, experts say

Sarah Boseley, health editor

The Guardian, 30 September 2015 - Ebola is all but over, but the postmortem is just getting started

- [By Sarah Boseley]
- … the focus had turned to the growing problems of non-communicable diseases (NCDs) – lifestyle-related heart attacks, strokes, cancers and diabetes – in response to the demands of the member states that make up its executive board.
- One insider said: “The WHO has consistently been told that the burden of disease has shifted to NCDs. Resources have been shifted to cover this. If that is what governments want, that is what they get.”
- http://www.theguardian.com/world/2015/sep/30/ebola-inquest-un-united-nations-world-health-organisation

The Guardian, 30 September 2015 - Ebola is all but over, but the postmortem is just getting started

Zabulon Yoti, an Ebola expert from Uganda based at the Brazzaville office of WHO:

"… it **was in a rural area**, as before, and they felt sure it could be contained. They were wrong. Villagers were simply not reporting outbreaks any more. By May, it had been diagnosed in all three countries. By late summer, it had reached the slums.

It became out of control because it reached congested slum areas as well,…

… [but] the spread was just too fast. This was unprecedented. This was unusual. **I'm not sure if this happened again we would still be prepared**."

Remember:
Plague?
Cholera?
Smallpox?

WHO: Ebola Response Phases 1 & 2

- **Phase 1 (August – December 2014)**
- Rapid scale-up of treatment beds, safe and dignified burial teams, and behaviour change capacities.

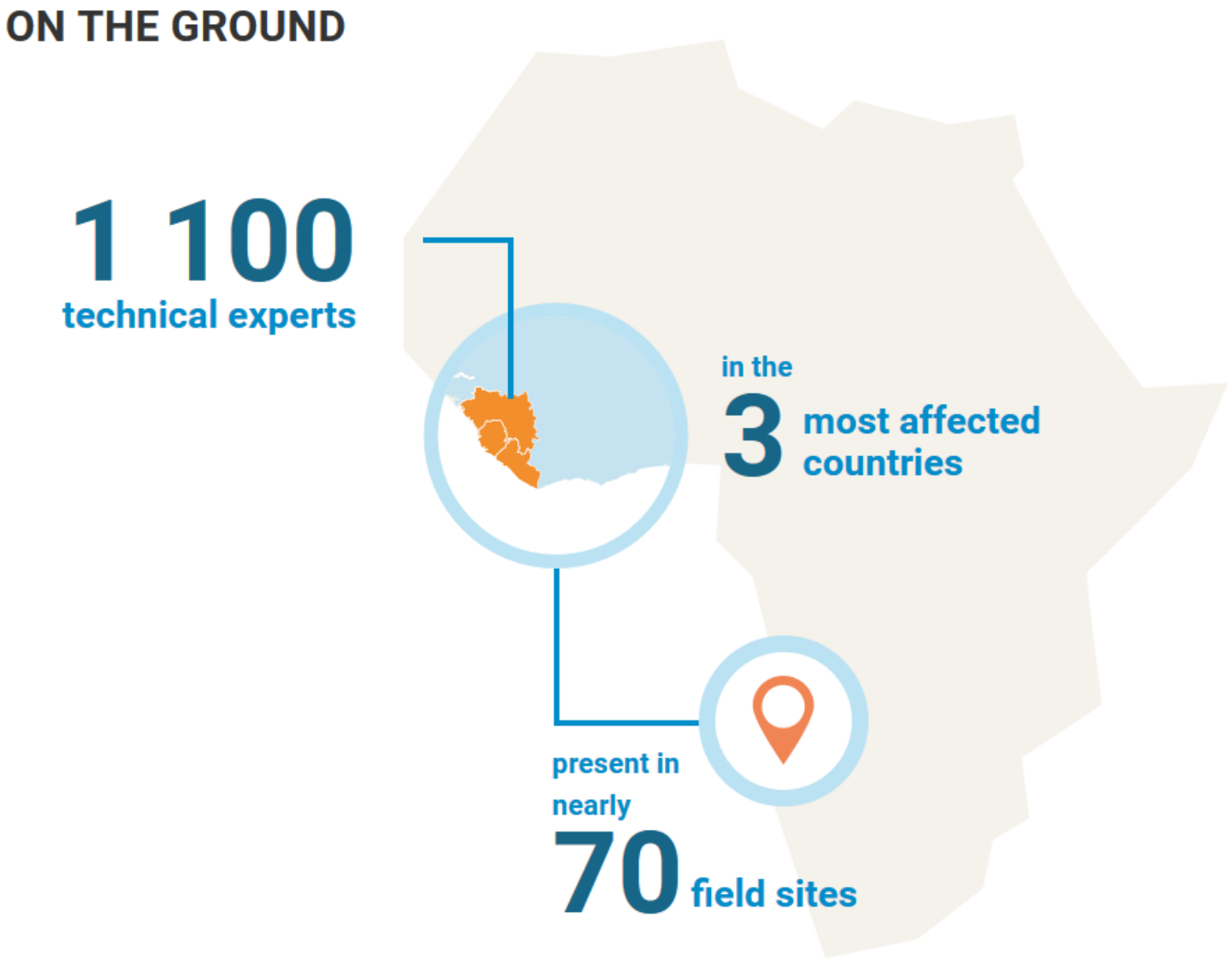
- **Phase 2 (January – July 2015)**
- Enhanced capacities for case finding, contract tracing, and community engagement.

WHO: Ebola Response Phase 3 (Aug 2015 –)

Framework for achieving and sustaining a resilient zero

- Objective 1 - To accurately define and rapidly interrupt all remaining chains of Ebola transmission
- Objective 2 - To identify, manage and respond to the consequences of residual Ebola risks.

Response by WHO



Response by WHO

SUPPLIES

More than
1.48 million
sets of personal protective equipment

And improved disease detection from an average of

4 contacts per patient → **69** contacts per patient

Expediting vaccine trials from

10+ years → **18 months**

Nigeria

- **Index Case**
- The index case in Nigeria was a Liberian-American, who flew from Liberia to Nigeria's commercial capital Lagos on 20 July 2014. Sawyer became violently ill upon arriving at the airport and died five days later. In response, the Nigerian government observed all of Sawyer's contacts for signs of infection and increased surveillance at all entry points to the country.[8]
- **Subsequent Transmission**
- On 6 August 2014, the Nigerian health minister told reporters, "Yesterday the first known Nigerian to die of Ebola was recorded. This was one of the nurses that attended to the Liberian. The other five newly confirmed cases are being treated at an isolation ward."[9]
- On 19 August, it was reported that the doctor who treated Sawyer, had also died of Ebola disease.[10]
- On 22 September 2014, the Nigeria health ministry announced, "As of today, there is no case of Ebola in Nigeria. All listed contacts who were under surveillance have been followed up for 21 days."
- The Nigerian **unique method of contact tracing** became an effective method later used by countries, such as the United States, when Ebola threats were discovered.[

Transmission dynamics and control of Ebola virus disease outbreak in Nigeria, July to September 2014

F O Fasina (daydupe2003@yahoo.co.uk)[1], A Shittu[2], D Lazarus[3], O Tomori[4], L Simonsen[5,6], C Viboud[6], G Chowell[6,7]

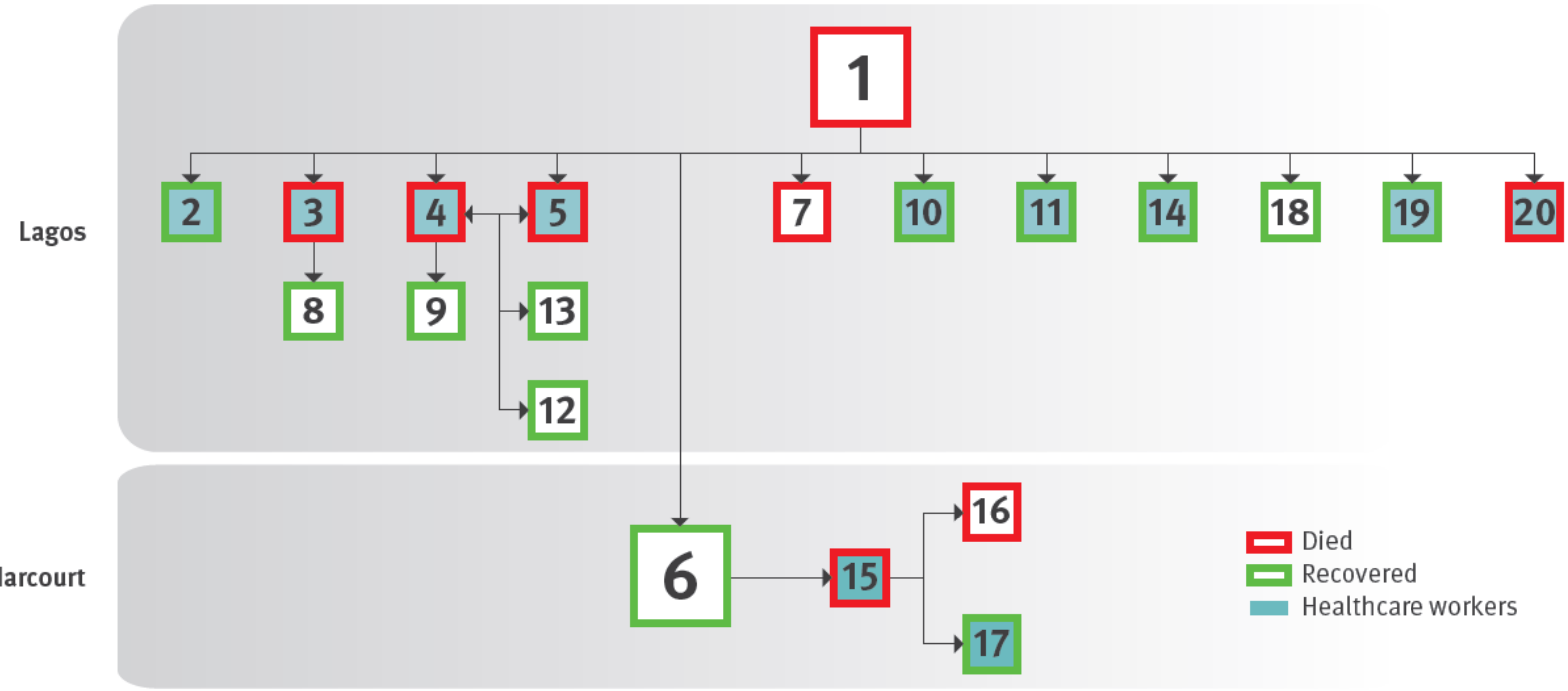
Article submitted on 23 September 2014 / published on 9 October 2014

Fasina FO, Shittu A, Lazarus D, Tomori O, Simonsen L, Viboud C, Chowell G. Transmission dynamics and control of Ebola virus disease outbreak in Nigeria, July to September 2014. Euro Surveill. 2014;19(40):pii=20920. Available online: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20920

Citation style for this article:

FIGURE 2

Transmission tree of the Ebola virus disease outbreak in Nigeria, July–September 2014



Liberia

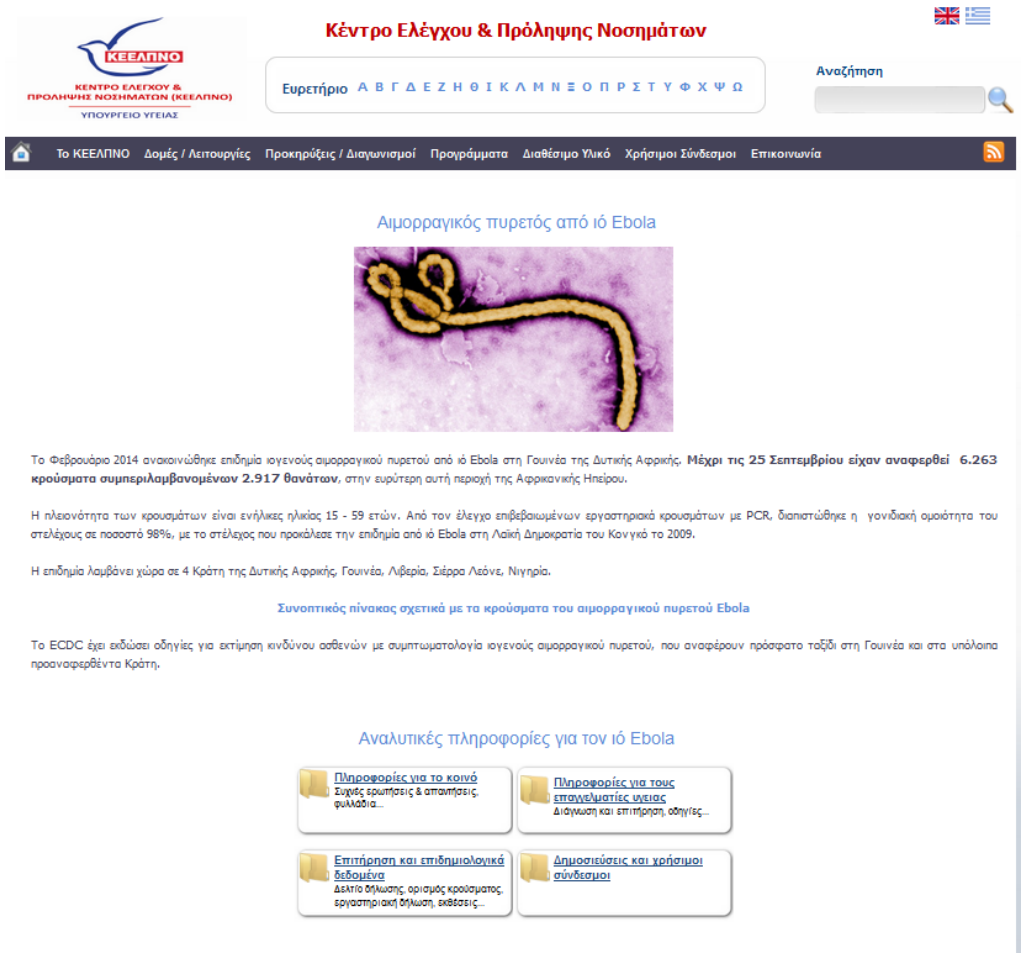
- In Liberia, the disease was reported in both Lofa and Nimba counties in late March 2014.
- With only **50 physicians in the entire country—one for every 70,000 Liberians**—Liberia already faced a health crisis even before the outbreak (Population: 4,3 million)
- In October, the Liberian ambassador in Washington was reported as saying that he feared that **his country may be "close to collapse"**
- In November the rate of new infections in Liberia appeared to be declining and the state of emergency was lifted. The drop in cases was believed to be related to an integrated strategy combining **isolation and treatment with community behaviour change including safe burial practices, case finding and contact tracing**
- In January 2015, the MSF field coordinator reported that Liberia was down to only five confirmed cases.[The last known case of Ebola died on 27 March,[114] and the country was officially declared **Ebola-free on 9 May after 42 days without any further cases being recorded.**

ΗΠΑ… & Ισπανία…

- **Dallas Hospital Backpedals On Reason For Releasing Ebola Patient**
- …Hospital, which is currently treating patient Thomas Eric Duncan for the Ebola virus, has revised the explanation it offered earlier this week as to why it had initially released Duncan after his first visit to the hospital on Sept. 25. Duncan later had to be brought back to the hospital by ambulance on Sept. 28.
- The patient died on 8 Oct.

- **Nurse reported Ebola symptoms many times before being quarantined**
- Teresa Romero Ramos says when she first told health authorities of her symptoms she was given only paracetamol.

http://www.keelpno.gr/el-gr/

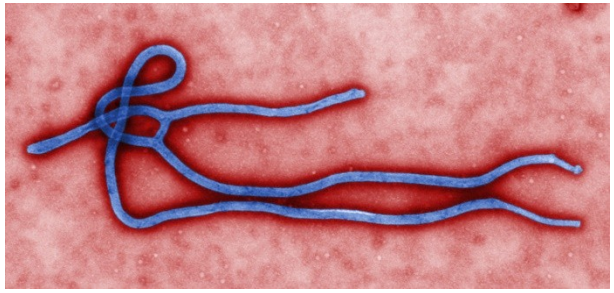


Lancet, Letter, Vol 386 August 22, 2015

- Lawrence Gostin and Eric Friedman (May 9, p 1902)1 have emphasised various immediate causes of the Ebola epidemic in Guinea, Liberia, and Sierra Leone, discussing **under-resourced health systems, disregard for the International Health Regulations, and shortcomings of WHO**.
- However, these authors ignore some fundamental causes. According to the UN Human Development Index rankings,2 Liberia is ranked 175th, Guinea 179th, and Sierra Leone 183rd.
- Yet, these countries are not poor: they are **richly endowed with natural wealth**. However, much of this wealth is removed from the region as **illicit outflows of capital and cheap, under-priced exports**, leaving behind impoverished and war-ravaged populations, and degraded environments.
- David Sanders, *David McCoy, David Legge, Anne-Emmanuelle Birn, Amit Sengupta

Ebola virus disease: τι φταίει;

Και ο ιός…



και η φτώχεια…

André Carrilho, *New York Times,* August 2014

Τέλος Ενότητας

Ευρωπαϊκή Ένωση
Ευρωπαϊκό Κοινωνικό Ταμείο

ΕΠΙΧΕΙΡΗΣΙΑΚΟ ΠΡΟΓΡΑΜΜΑ
ΕΚΠΑΙΔΕΥΣΗ ΚΑΙ ΔΙΑ ΒΙΟΥ ΜΑΘΗΣΗ
επένδυση στην κοινωνία της γνώσης
ΥΠΟΥΡΓΕΙΟ ΠΑΙΔΕΙΑΣ & ΘΡΗΣΚΕΥΜΑΤΩΝ, ΠΟΛΙΤΙΣΜΟΥ & ΑΘΛΗΤΙΣΜΟΥ
ΕΙΔΙΚΗ ΥΠΗΡΕΣΙΑ ΔΙΑΧΕΙΡΙΣΗΣ

ΕΣΠΑ 2007-2013
ΕΥΡΩΠΑΪΚΟ ΚΟΙΝΩΝΙΚΟ ΤΑΜΕΙΟ

Με τη συγχρηματοδότηση της Ελλάδας και της Ευρωπαϊκής Ένωσης

Χρηματοδότηση

- Το παρόν εκπαιδευτικό υλικό έχει αναπτυχθεί στα πλαίσια του εκπαιδευτικού έργου του διδάσκοντα.
- Το έργο «**Ανοικτά Ακαδημαϊκά Μαθήματα στο Πανεπιστήμιο Κρήτης**» έχει χρηματοδοτήσει μόνο τη αναδιαμόρφωση του εκπαιδευτικού υλικού.
- Το έργο υλοποιείται στο πλαίσιο του Επιχειρησιακού Προγράμματος «Εκπαίδευση και Δια Βίου Μάθηση» και συγχρηματοδοτείται από την Ευρωπαϊκή Ένωση (Ευρωπαϊκό Κοινωνικό Ταμείο) και από εθνικούς πόρους.

Σημειώματα

Σημείωμα αδειοδότησης

- Το παρόν υλικό διατίθεται με τους όρους της άδειας χρήσης Creative Commons Αναφορά, Μη Εμπορική Χρήση, Όχι Παράγωγο Έργο 4.0 [1] ή μεταγενέστερη, Διεθνής Έκδοση. Εξαιρούνται τα αυτοτελή έργα τρίτων π.χ. φωτογραφίες, διαγράμματα κ.λ.π., τα οποία εμπεριέχονται σε αυτό και τα οποία αναφέρονται μαζί με τους όρους χρήσης τους στο «Σημείωμα Χρήσης Έργων Τρίτων».

[1] http://creativecommons.org/licenses/by-nc-nd/4.0/

- Ως **Μη Εμπορική** ορίζεται η χρήση:
  - που δεν περιλαμβάνει άμεσο ή έμμεσο οικονομικό όφελος από την χρήση του έργου, για το διανομέα του έργου και αδειοδόχο
  - που δεν περιλαμβάνει οικονομική συναλλαγή ως προϋπόθεση για τη χρήση ή πρόσβαση στο έργο
  - που δεν προσπορίζει στο διανομέα του έργου και αδειοδόχο έμμεσο οικονομικό όφελος (π.χ. διαφημίσεις) από την προβολή του έργου σε διαδικτυακό τόπο

- Ο δικαιούχος μπορεί να παρέχει στον αδειοδόχο ξεχωριστή άδεια να χρησιμοποιεί το έργο για εμπορική χρήση, εφόσον αυτό του ζητηθεί.

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Σημείωμα Αναφοράς

Διατήρηση Σημειωμάτων

Οποιαδήποτε αναπαραγωγή ή διασκευή του υλικού θα πρέπει να συμπεριλαμβάνει:

- το Σημείωμα Αναφοράς
- το Σημείωμα Αδειοδότησης
- τη δήλωση Διατήρησης Σημειωμάτων
- το Σημείωμα Χρήσης Έργων Τρίτων (εφόσον υπάρχει)

μαζί με τους συνοδευόμενους υπερσυνδέσμους.