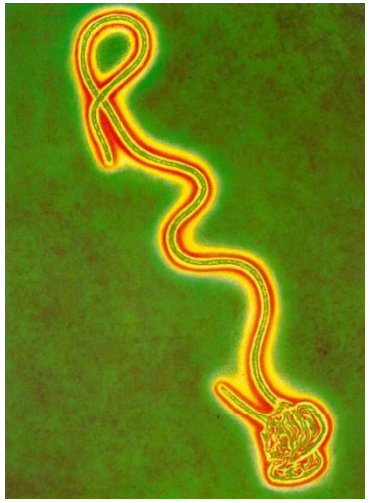

Ebola Virus Disease

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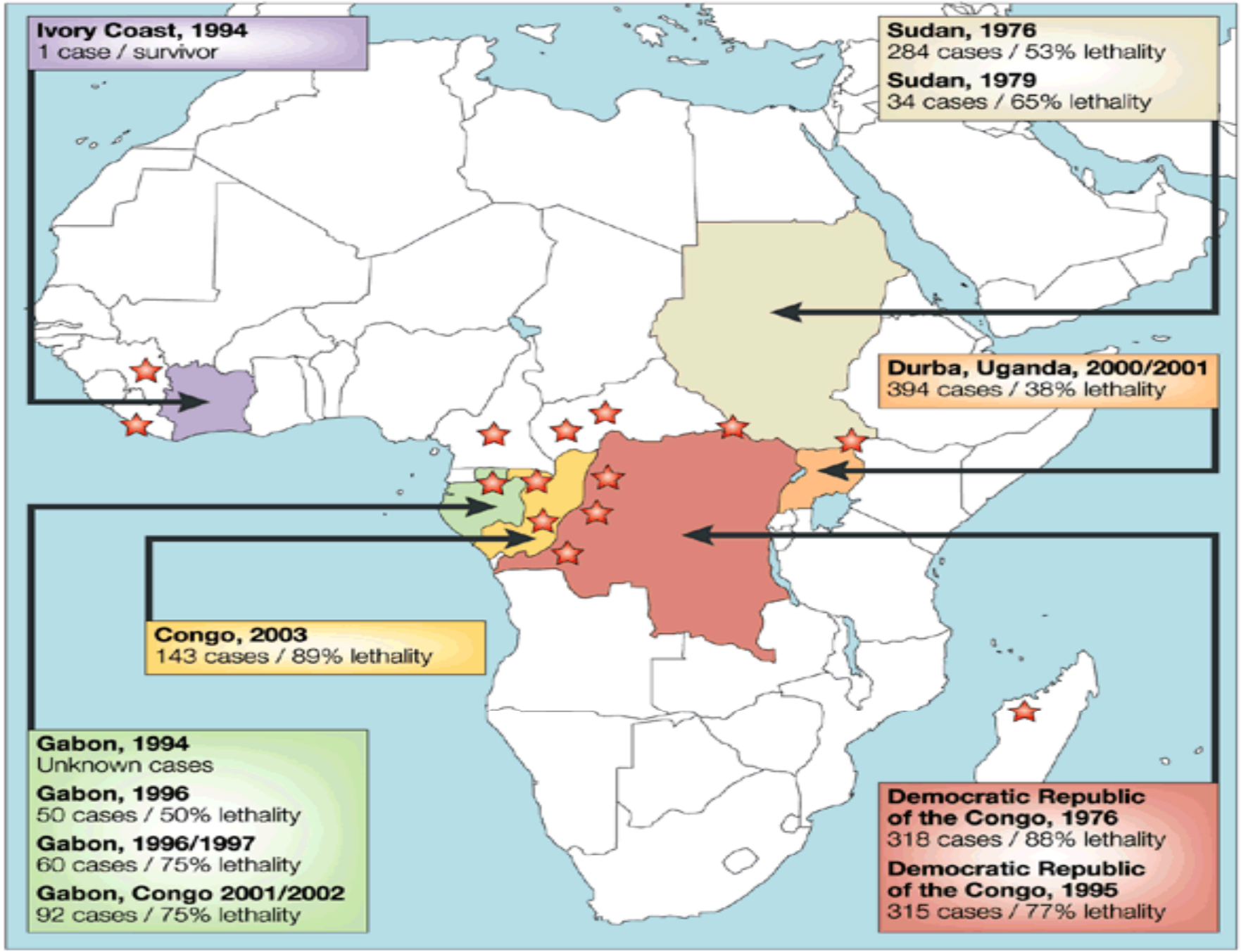
What is Ebola Virus Disease (EVD)

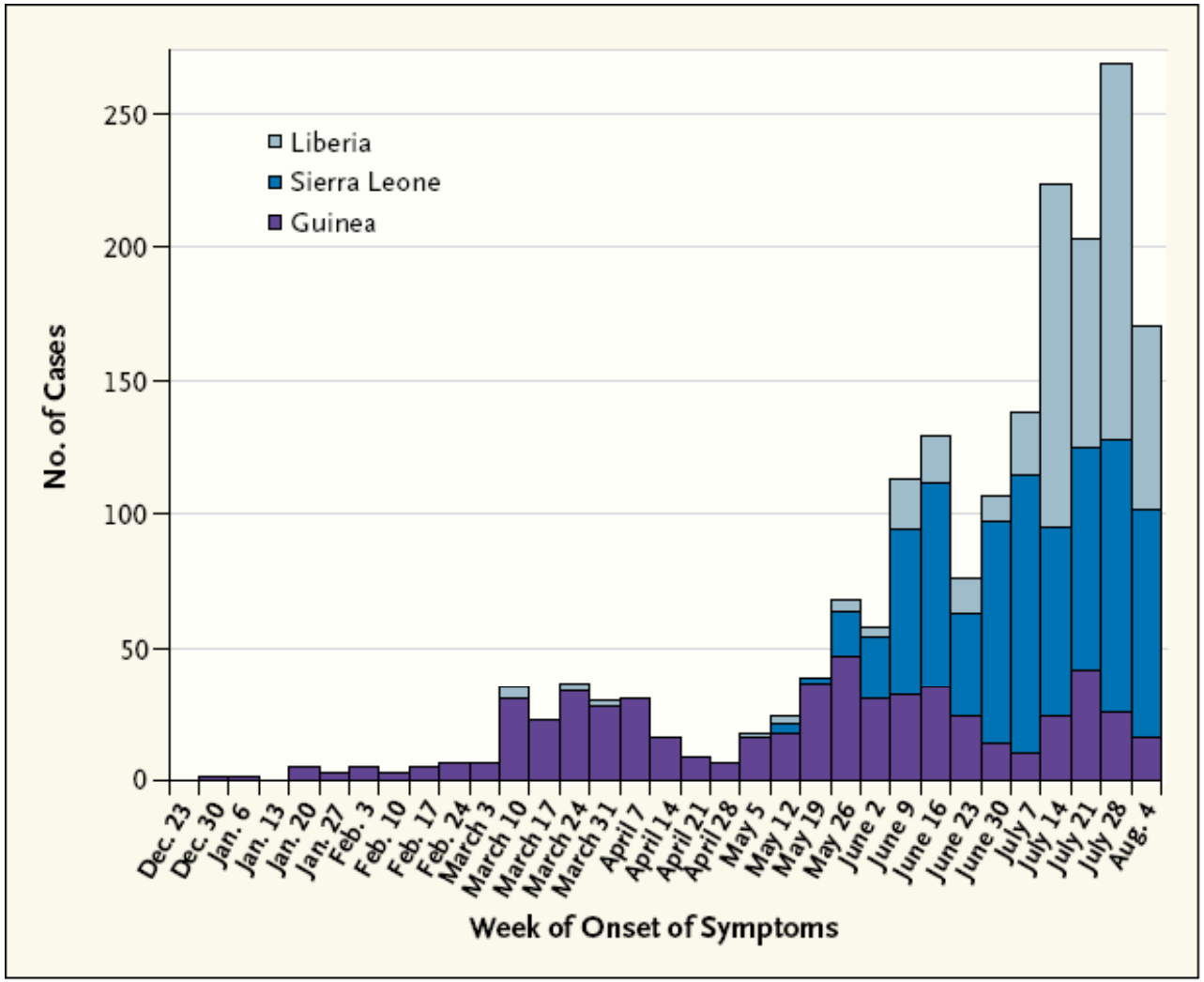
- Previously know as Ebola Hemorrhagic fever
- Viral infection – RNA virus
  - Filaviridae family (filovirus)
  - Has 5 distinct species
  - 3 of these associated with large outbreaks
- First appeared in 1976 in 2 outbreaks
  - Sudan
  - Democratic Republic of Congo
- In Congo occurred in a village near the Ebola river
- More than 20 outbreaks in Africa since than


Ivory Coast, 1994
1 case / survivor
Sudan, 1976
284 cases / 53% lethality
Sudan, 1979
34 cases / 65% lethality
Durba, Uganda, 2000/2001
394 cases / 38% lethality
Congo, 2003
143 cases / 89% lethality
Gabon, 1994
Unknown cases
Gabon, 1996
50 cases / 50% lethality
Gabon, 1996/1997
60 cases / 75% lethality
Gabon, Congo 2001/2002
92 cases / 75% lethality
Democratic Republic of the Congo, 1976
318 cases / 88% lethality
Democratic Republic of the Congo, 1995
315 cases / 77% lethality

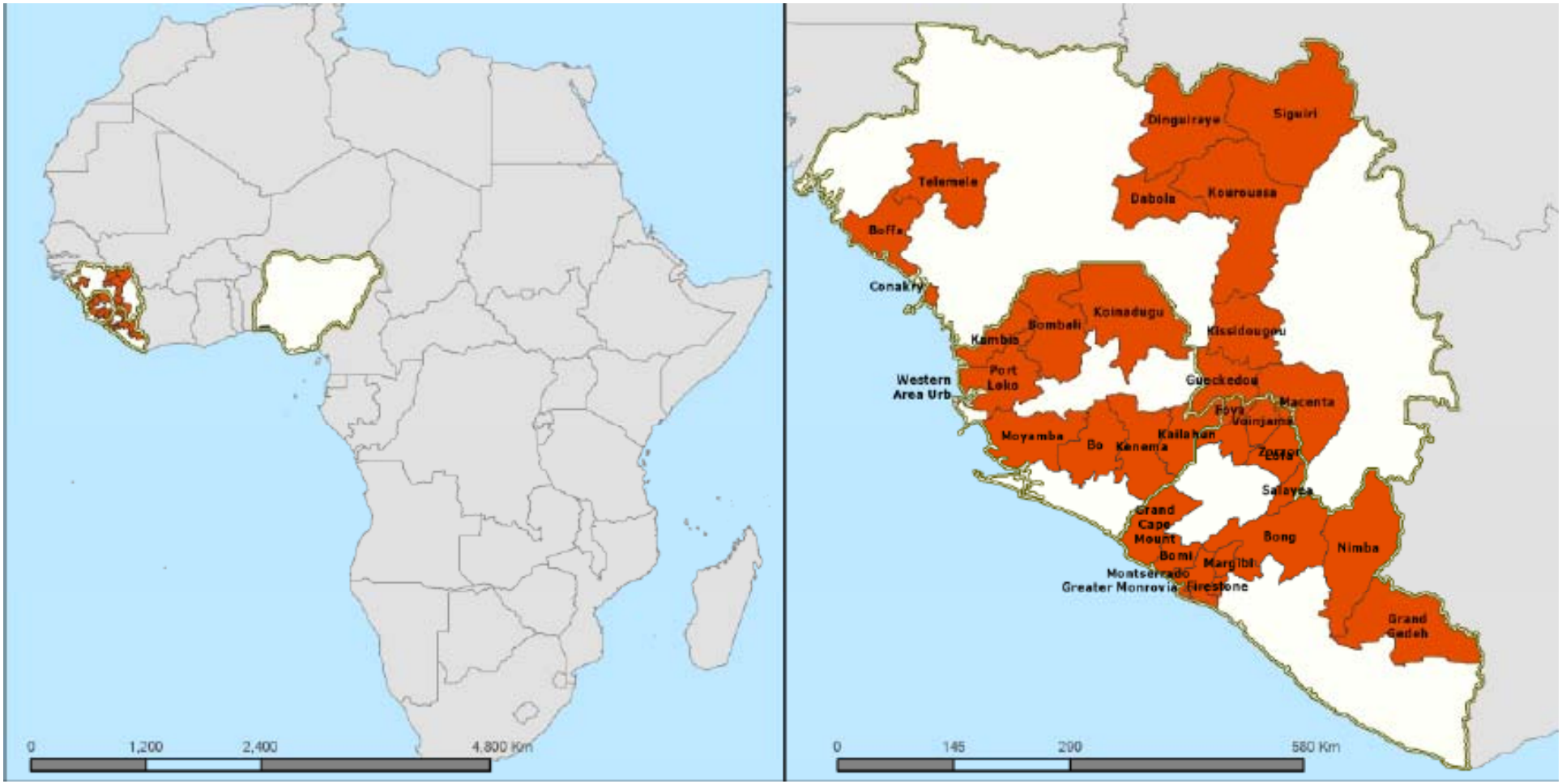
So why the concern now?

- No previous Ebola outbreak has been as large and as prolonged as this one
- No previous out break has spread beyond East and Central Africa
- The number of cases from this outbreak exceeds the number from all previous outbreak combined
- The world is getting smaller – air travel has increased tremendously over the last 15 years

Increasing cases in 3 countries

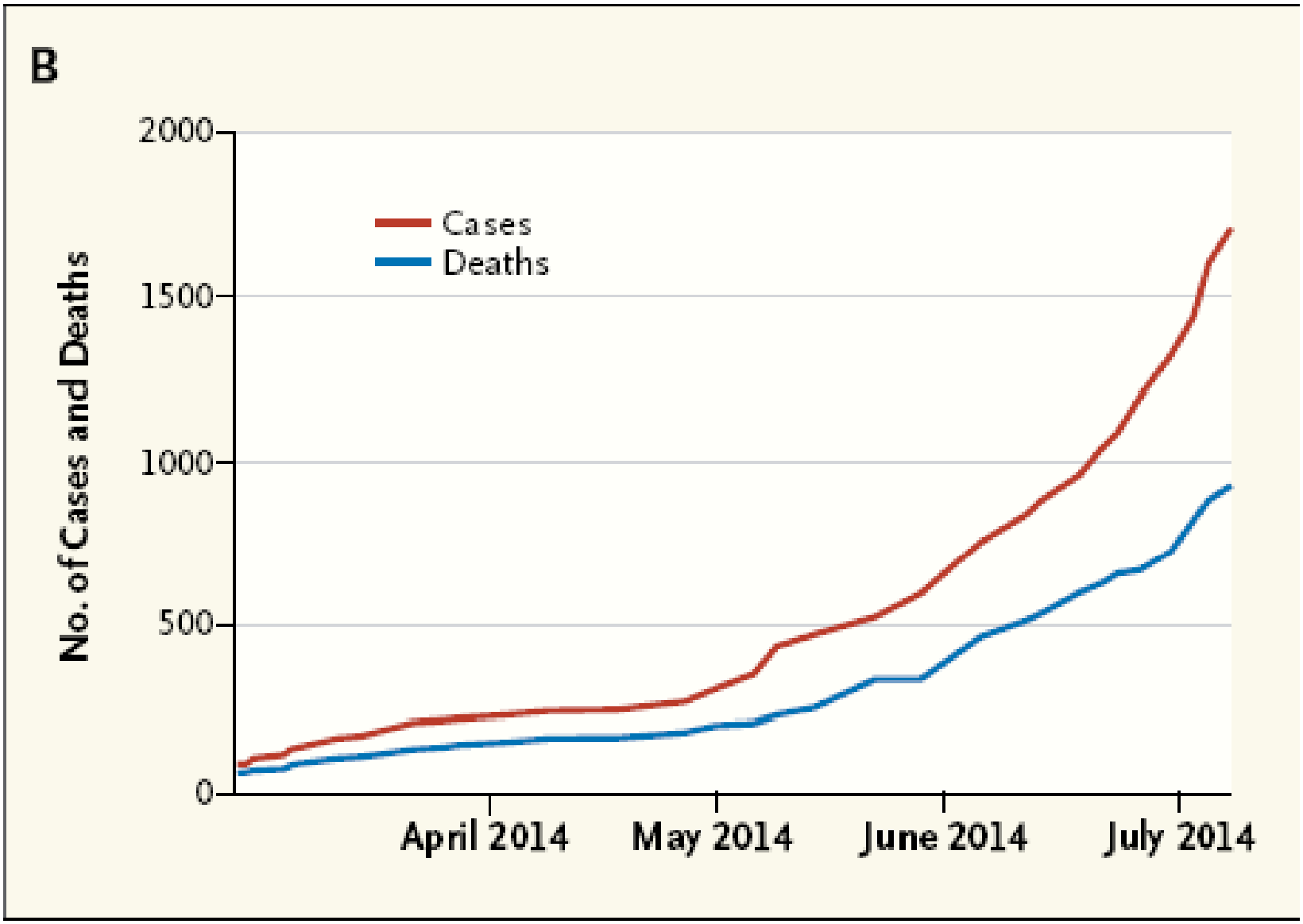


Numbers of Confirmed and Probable Ebola Cases Reported Weekly from Guinea, Sierra Leone, and Liberia from December 23, 2013, to August 11, 2014.



Current situation 2014


Gambia
Senegal
Guinea-Bissau
Guinea
Conakry
Freetown
Sierra Leone
Monrovia
Liberia
Bamako
Mali
Burkina Faso
Ouagadougou
Niamey
Niger
Chad
Benin
Abuja
Togo
Ghana
Côte d'Ivoire
Yamoussoukro
Porto Novo
Lagos
Lome
Accra
Nigeria
Central African Republic
Cameroon
Malabo
Yaounde
Sao Tome and Principe
Equatorial Guinea
Gabon
Congo
Sao Tome
Libreville
EVD West Africa - as of 27 July 2014
Capital city
Travel route
Affected areas
Area reporting an imported case
0
250
500
1,000 Km
ECDC



Ebola – Current situation

Current situation

As of 16th August 2014

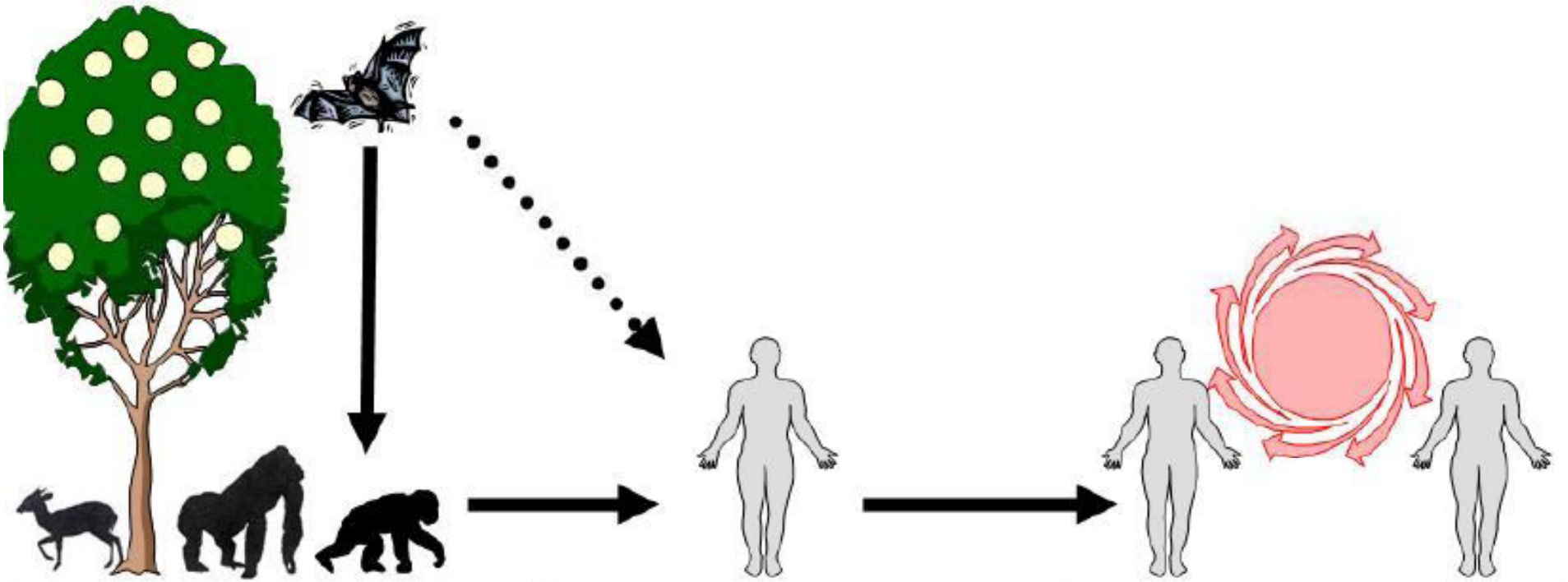
- 2240 cases (confirmed, probable or suspect)
- 1229 deaths
- From Guinea, Liberia, Nigeria, Sierra Leone
- No confirmed case from India

HOW DOES IT SPREAD ?

EBOLA

1. Virus reservoir : Fruit bats

The virus maintains itself in fruit bats. The bats spread the virus during migration.

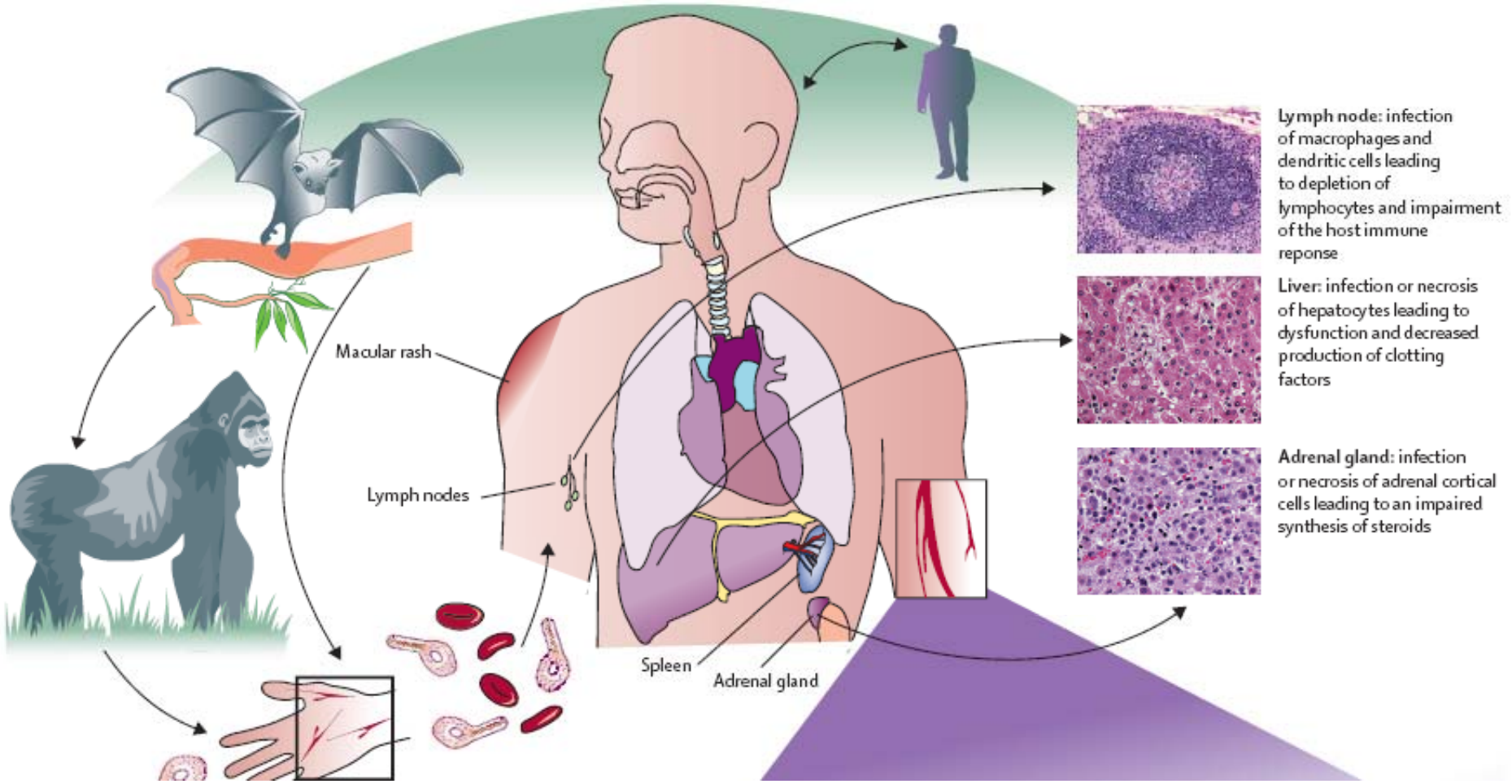


2. Epizootic in primates

3. Primary human infection

4. Secondary transmission

Ebola : spread and it's effects



Spread of Ebola

- Enters human population though close contact with blood, secretions, organs and body fluids of infected animal –chimpanzee, monkeys, fruit bats, gorillas etc.

- Spreads in community through human to human contact
  - Direct contact (through broken skin& mucus membrane) with blood, secretions, organs or body fluids
  - Indirect contact with environment contaminated with such fluids
- Close contact and health care workers get frequently infected while treating the patient

Type of contact	Type of contact
Very low or no recognised risk	Casual contact with a feverish, ambulant, self-caring patient. Examples: sharing a sitting area or public transportation; receptionist tasks.
Low risk	Close face-to-face contact with a feverish and ambulant patient. Example: physical examination, measuring temperature and blood pressure.
High risk	Close face-to-face contact without appropriate personal protective equipment (including eye protection) with a patient who is coughing or vomiting, has nosebleeds, or who has diarrhoea. Percutaneous, needle stick or mucosal exposure to virus-contaminated blood, body fluids, tissues or laboratory specimens in severely ill or known positive patients

You can't get Ebola through food

You can get Ebola from touching body fluids of a person who is sick with or has died from Ebola, or from exposure to contaminated objects like needles

There is currently no significant risk of Ebola infection in India

Clinical Features

- Incubation period – 2 to 21 days
- No risk of transmission during incubation period
- Initial symptoms
  - Sudden onset fever
  - Weakness
  - Muscle pain
  - Headache
  - Sore throat

- Followed by
  - Vomiting
  - Diarrhea
  - Rash
  - Impaired kidney and liver functions
  - Internal and external bleeding -30 to 40%
  - May develop septic shock like picture

Frequency of Symptoms Reported in 103 Cases of Ebola Virus Disease in Kikwit, Democratic Republic of Congo, in 1995.*

Symptom	Percent of Patients with Symptom
Fever	≥90
Weakness	80–90
Diarrhea	80–90
Nausea and vomiting	70–80
Abdominal pain	60–70
Headache	50–60
Sore throat, odynophagia, dysphagia	50–60
Arthralgia or myalgia	50–60
Anorexia	40–50
Rash	10–20
Bleeding	
Any type	40–50
Gingival	10–20
Hematemesis	10–20
Melena	0–10
From puncture sites	0–10
Hemoptysis	0–5

- People are infectious as long as their blood and secretions contains the virus
- Has been isolated in semen even after 61 days of the onset of illness

When to suspect Ebola infection ?

- Symptoms can mimic many illnesses
- Suspect Ebola infection -

- In patients with clinically-compatible symptoms

+

- A history of travel or residence in affected areas in the 21 days prior to symptom onset, or contact with known confirmed or probable cases in the 21 days

Suspected Case

- Inform authorities
- Isolate person in a single room
- Take personnel protection precautions
- Patient to shifted to a designated isolation facility till diagnosis confirmed or ruled out

Laboratory test to confirm the diagnosis

Timeline of Infection	Diagnostic tests available
Within a few days after symptoms begin	- Antigen-capture enzyme-linked immunosorbent assay (ELISA) testing - IgM ELISA - Polymerase chain reaction (PCR) - Virus isolation
Later in disease course or after recovery	- IgM and IgG antibodies
Retrospectively in deceased patients	- Immunohistochemistry testing - PCR - Virus isolation

Vaccine and Treatment

- No licensed vaccine – several vaccines being evaluated
- Treatment is mainly supportive
  - Volume and electrolyte management
  - Intravenous nutrition
  - Fever medication
  - Medication for GI distress
  - Management of secondary infection/ shock
- Newer drugs being evaluated

Emerging treatments

- ZMapp (*Mapp Pharmaceuticals*)
  - Combination of 3 monoclonal antibodies that bind to the protein of the virus
  - Labeled as '*secret serum*' my media
  - Experimental drug - not been tested in humans
  - Tested in infected monkeys – 43% survival
  - Given to 2 American infected with Ebola
  - Antibody grown inside tobacco plants

Emerging treatments

- TkM- Ebola (*Tekmira Pharmaceuticals*)
  - Cocktail of small interfering RNA which when given prevents the production of key vial proteins
  - FDA has now allowed testing of this drugs in patients
  - Encouraging results in macaques
- BCX4430 (*Biocryst Pharmaceuticals*)
  - Works by terminating RNA synthesis
  - Preclinical studies in monkeys have shown it to be effective
- AVI-7537
  - Targets EV protein

Take Home messages

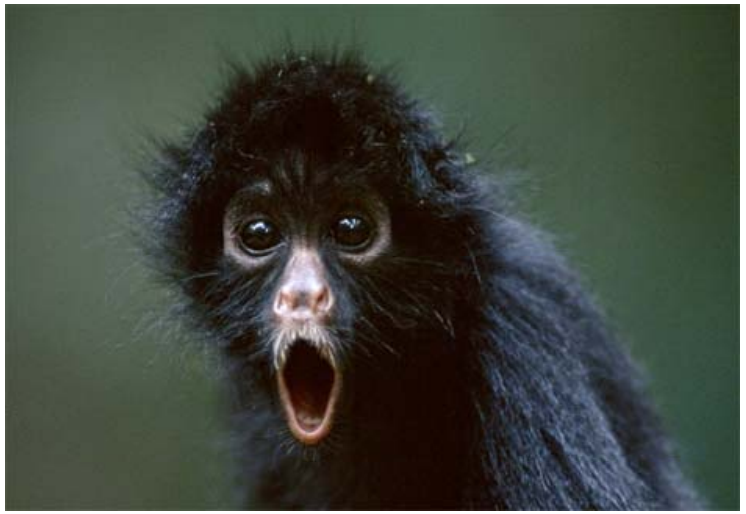
- EVD is a serious illness with a high mortality
- There have been no cases in India
- Concern is there about cases coming from Africa
- Contact with the body fluids of an infected person is the only way the disease can spread
- Currently there is no vaccine or proven drug against the disease


Thank You

Risk level	Type of contact
Very low or no recognised risk	Casual contact with a feverish, ambulant, self-caring patient. Examples: sharing a sitting area or public transportation; receptionist tasks.
Low risk	Close face-to-face contact with a feverish and ambulant patient. Example: physical examination, measuring temperature and blood pressures.
Moderate risk	Close face-to-face contact without appropriate personal protective equipment (including eye protection) with a patient who is coughing or vomiting, has nosebleeds or who has diarrhoea.
High risk	Percutaneous, needle stick or mucosal exposure to virus-contaminated blood, bodily fluids, tissues or laboratory specimens in severely ill or known positive patients


Gambia
Senegal
Guinea-Bissau
Guinea
Mali
Sierra Leone
Liberia
Ivory Coast
CDC
TELIMELE
PITA
BOFFA
FRIA
DUBREKA
Conakry
DABOLA
DINGUIRAYE
SIGUIRI
KOUROUSSA
KAMBIA
BOMBALI
PORT LOKO
Freetown
TONKOLILI
KOINADUGU
KISSIDOUGOU
KONO
GUECKEDOU
MACENTA
MOYAMBA
BO
KENEMA
KAILAHUN
LOFA
BONTHE
PUJEHUN
GRAND CAPE MOUNT
MONTSERRADO
BONG
NIMBA
BOMI
MARGIBI
Monrovia
GRAND BASSA
RIVERCESS
Ebola treatment center
Field laboratory
National laboratory
National capital
Areas with confirmed and probable cases
Areas reporting suspect cases
0 25 50 100 Miles
0 37.5 75 150 Kilometers

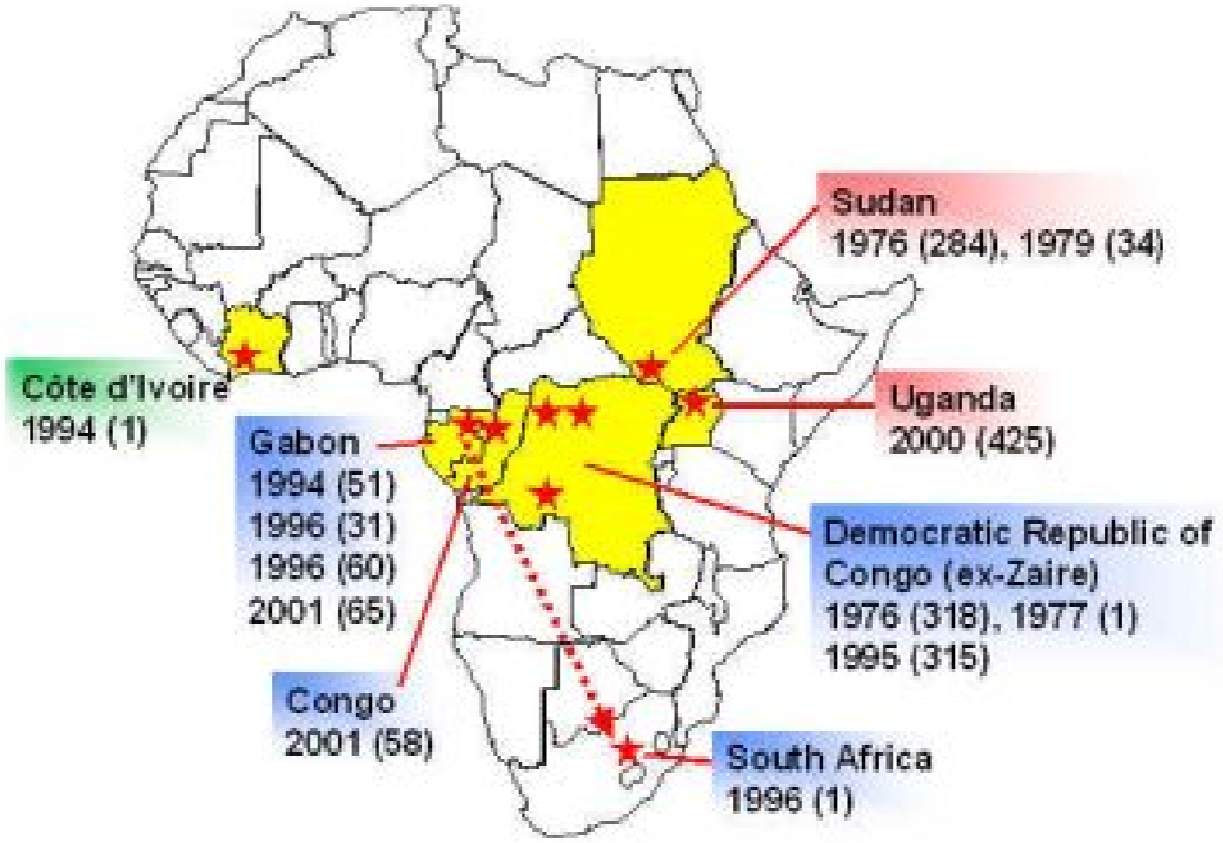
Transmission between species



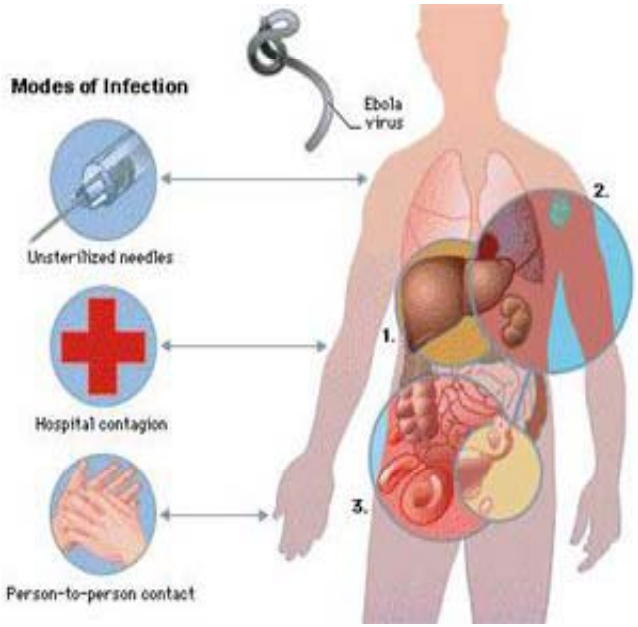
Transmission between species

?

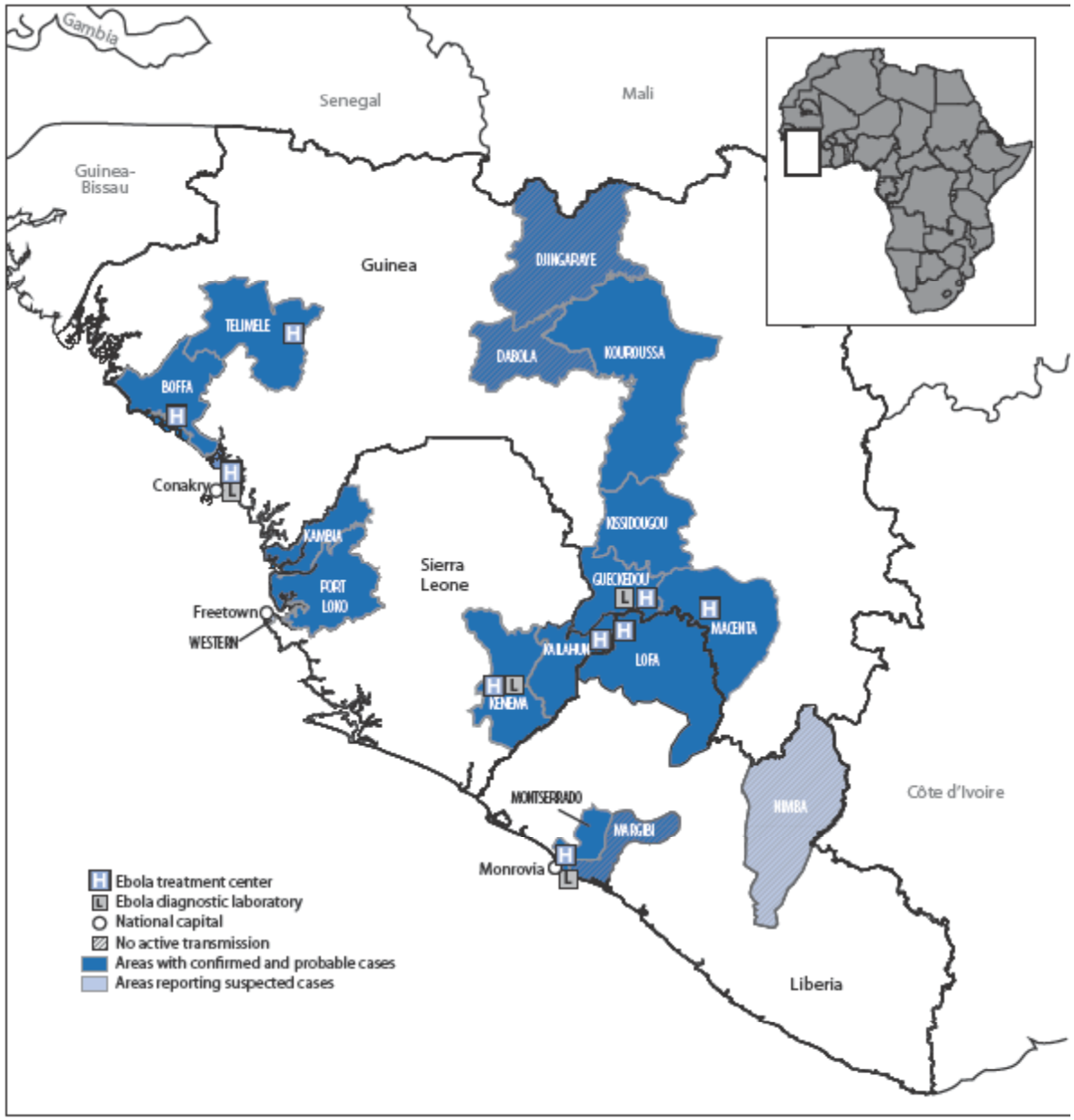
Geographical distribution

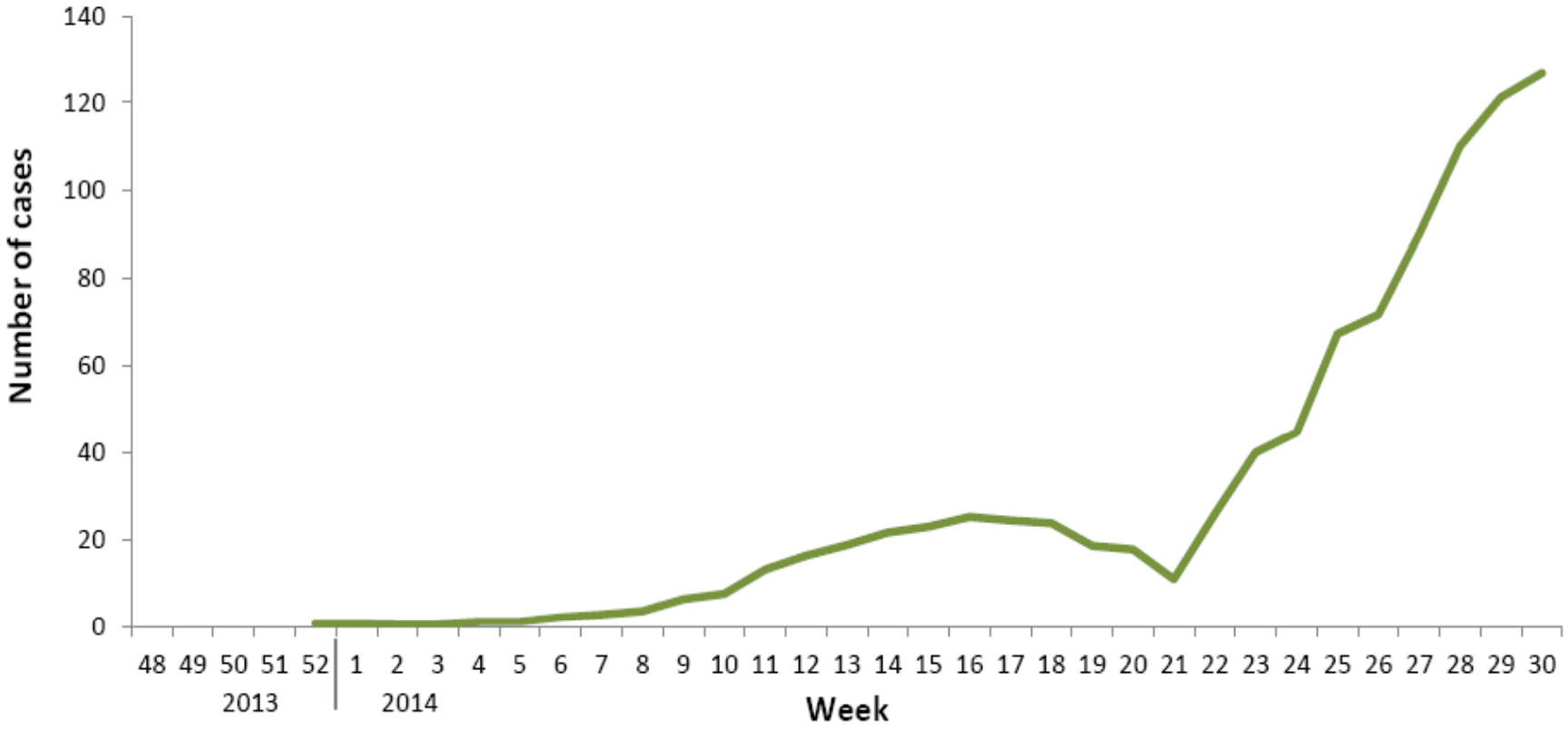


http://openlearn.open.ac.uk


Modes of Infection
Ebola virus
Unsterilized needles
Hospital contagion
Person-to-person contact
1.
2.
3.


Ebola is still limited to parts of Africa
A hemorrhagic rash appears over entire body
A.D.A.M.


Gambia
Senegal
Mali
Guinea-Bissau
Guinea
DJINGARAYE
DABOLA
KOUROUSSA
TELIMELE
BOFFA
Conakry
KAMBIA
PORT LOKO
Freetown
WESTERN
Sierra Leone
KISSIDOUGOU
GUECKEDOU
KAILAHUN
KENEMA
MACENTA
LOFA
MONTSERRADO
MARGIBI
Monrovia
NIMBA
Côte d'Ivoire
Liberia
Ebola treatment center
Ebola diagnostic laboratory
National capital
No active transmission
Areas with confirmed and probable cases
Areas reporting suspected cases


Number of cases
140
120
100
80
60
40
20
0
48 49 50 51 52 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
2013
2014
Week