

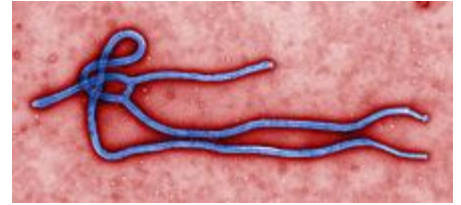
## Ebola

### Name(s)

- Ebola, Ebola Virus Disease (EVD), Ebola Hemorrhagic Fever (EHF)

### Type of Virus

- filamentous virus ( )



### Description/Statistics

- first documented in Sudan and Zaire ( ) in 1976
- 1976 to 2013, ~1700 cases reported; since 2014 >28,600 cases with ~50% mortality
- average mortality is 50% but >90% mortality depending on strain and treatment conditions
- recent epidemic in western Africa but spread to other parts of Africa and the world
- (as of March 2016, new cases were still occurring in Liberia, Guinea, and Sierra Leone)
- In 2017, 8 cases in Democratic Republic of Congo ( )
- In early 2018, 39 cases in Democratic Republic of Congo (19 deaths); later a new outbreak in Kivu province, >=1000 cases with several hundred deaths ( )
- CDC ( ) estimated that by January 2015 up to 1.4 million infections in western Africa (the current epidemic is slowing down so this estimate is now considered high; current estimates are for <1 million)
- 5 types of ebolaviruses; Zaire ebolavirus is the most deadly and most common cause of outbreaks/epidemics
- an apparently harmless ( ) form of Ebola is Reston Ebola Virus ( ) as in Reston, Virginia! ( )

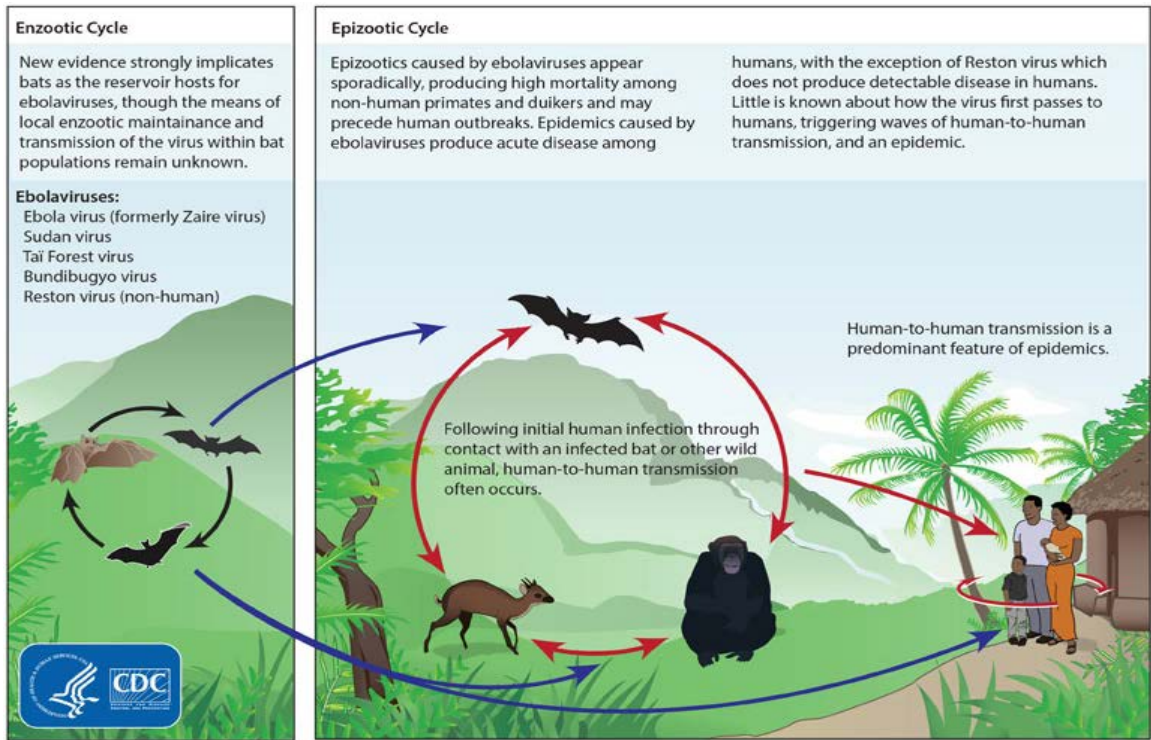
### Outbreaks/Epidemics

- since 1976 there have been ~30 outbreaks (most of these were small outbreaks and not considered epidemics)
- most but not all were in Africa (others include US, Philippines, Italy, Russia, England)

### Transmission

- from animals ( ) to humans, then human to human transmission via bodily fluids (blood, vomit, semen, saliva, sweat, mucous, breast milk, urine, feces)
- objects contaminated with the above bodily fluids can transmit Ebola
- entry points ( ) include the nose, mouth, eyes, or open wounds, cuts and abrasions
- no evidence for insect transmission ( )

- no evidence for human airborne transmission ( )



**Symptoms**

- symptoms require 2 days to 3 weeks to develop ( )

- Fever (greater than 38.6°C or 101.5°F)
  - Severe headache
  - 
  - Weakness
  - Diarrhea
  - 
  - Abdominal (stomach) pain
  - Unexplained hemorrhage ( )
- (CDC website)

- Ebola does not liquefy organs but it does interfere with clotting causing bleeding and breaks down blood vessels leading to bleeding and fluid accumulation

**Prevention/Treatment**

- barriers:
- not reusing equipment unless properly sterilized
- education of healthcare workers on proper procedures
- education of general population on how avoid contact with Ebola
- quarantine suspected or known infected individuals for 3 weeks
- boiling at least 5 minutes kills Ebola ( )

- disinfectants are effective (alcohol sanitizers, bleach, detergents etc.)
- embalming should not be done with Ebola victims ( ) and burial practices need special attention to prevent transmission (hermetically sealed caskets)
- dead bodies are infectious for a period of time (how long???)
- supportive care like hydration and symptomatic treatments (for pain, fever, nausea etc.)
- serum from recovered patients contains antibodies which may be used treat other patients
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- As of January 2015, human trials began –one vaccine showed such effectiveness, it is begin stockpiled prior to regulatory approval
  - rVSV-ZEBOV vaccine
- some antiviral drugs specific for Ebola are being developed and “fast-tracked” but drugs used to treat HIV and influenza may be effective
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- October 15, 2015: Evidence of Ebola virus transmission between a disease survivor and his female partner has been confirmed. The female patient was reported to have had recent sexual intercourse with a male partner who had survived Ebola virus disease and had been declared Ebola negative in early October 2014. The female patient died in March.
- Apparently, Ebola can “hide” in a recovered survivor’s body for months or years(?) and later reactivate or be transmitted to others!!!!!!!!!!!!!!!!!!!!!!

## **Controversy**

- bats are hunted for food ( ) and for sale; for sustenance and profit
- blood and feces of bats spread disease
- hunters ( ) presumably come in contact with Ebola by being bitten and scratched
- sellers ( ) presumably come in contact with Ebola by cutting up dead bats and exposing themselves to blood and feces
- bat meat often considered a luxury item by urban dwellers which increases profitability of hunting bats by poor and low income rural people
- high quality healthcare systems in many African countries are poor to nonexistent
- inadequate supplies and lack of proper training contribute transmission and death
- violence toward aid workers, looting, and murder contribute to the epidemic
- local people blame doctors and healthcare workers for spread of Ebola

- violence against healthcare workers has occurred frequently during past Ebola epidemics
- vaccines and drugs being “fast-tracked” ( )
  - long term effects unknown because of lack of study time
  - Are pharmaceutical companies and governments liable for deaths associated with fast-tracked drugs?
- whole blood transfusions from recovered patients may not be effective and may transmit other blood borne infections ( )
- more of a global response is needed ( )
- no disease stays in isolation for long
- epidemics that affect one country will eventually affect all countries
- We are a global society, travel from one side of the planet to the other occurs in day!
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### Study Objectives

1. What kind of virus is Ebola?
2. Where and when was Ebola first documented?
3. What is the average mortality rate for Ebola?
4. Where have most of the Ebola outbreaks/epidemics occurred?
5. Describe how Ebola is transmitted?
6. Describe the typical symptoms of Ebola.
7. How long does it take for symptoms to occur?
8. Describe how Ebola is transmitted.
9. Describe how to prevent the transmission of Ebola.
10. Describe how Ebola can be treated.
11. Describe the controversies surrounding the hunting and selling of fruit bats, violence, fast-tracking drugs/vaccines, using whole blood transfusions, and a mentality of isolationism.

