

BSS194

# Life kills life

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# Historical cases

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- mostly flu, smallpox, cholera and plague
- ancient pandemics
  - 166 – smallpox, thousands of Romans dying daily
  - 250 - flu, half the population dead in some places, Roman Empire nearly collapsed
  - 541 – “Justinian plague” across Mediterranean, up to 100 million dead and 50% mortality

There were many more, but the ones in Mediterranean are best documented.

# Plague

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- bacteria *Yersinia pestis*
- often spread by fleas, sometimes through air
- 3 variants by progression:
  - 1) bubonic plague (through lymphatic nodes, swelling)
  - 2) septicemic plague (through blood, leads to surface necrosis)
  - 3) pneumonic plague (lung infection, highest mortality)
- it still exists

# Black Death

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- plague
- brought by Tartars through Crimea in 1347
- 100-300 million dead
- approx. half of Europe died out
- corpses piled up in streets with no one to bury them
- societal collapse, labor shortage








# America

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- Aztec empire (pop. of 25 million)
  - Spaniards arrived 1517
  - 1520 – smallpox and drought, 8 million dead
  - 1521 – conquest complete
  - 1545 – *cocoliztli* (typhoid fever), 14 million dead
- Inca Empire (pop. of 17 million)
  - 1520s – smallpox arrived (up to 50% died)
  - 1526 – first contact with Spaniards
  - 1532 – conquest mostly complete

50-90% of Native Americans killed by infections...





## Spanish Influenza

has endangered the prosecution  
of the **WAR** in Europe.

There are 1500 cases in the Navy Yard  
30 deaths have already resulted

**SPITTING SPREADS SPANISH  
INFLUENZA DONT SPIT**



# Spanish flu

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- 1918-1919
  - global population 1.75 bil.
  - WW1: 15-20 mil. dead
  - WW2: 20-50 mil. dead
  - Spanish Flu: 50-100 mil. dead
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- up to 20% mortality of deadly second wave
  - (post)WW1 had perfect conditions



# Smallpox

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- vaccine in 1796
- campaigns since 19<sup>th</sup> cent.
- 2 million deaths per year in 20<sup>th</sup> century
- eradicated in 1977
- samples retained



# Intentional use?

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- during sieges
- Native Americans
  - the infamous blankets...
- 20<sup>th</sup> century
  - use against animals
  - use in China
- some terrorism attempts
- quite ineffective and hard to control



# Ongoing pandemics

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## Malaria

- 0.5-1 million deaths per year
- sickle red blood cells adaptation

## HIV

- 1 million deaths per year (via AIDS)
- zoonosis from SIV

- both are devastating for societies

# Recent pandemic scares

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- SARS (2003) – 1000 dead, zoonosis from bats
- H1N1 “swine” flu (2009) – 100 000 dead
- zika (2015-2016) - microcephaly
- seasonal flus – 3-500 000 dead
- Ebola – avg. 50% mortality, 12 000 dead during the 2013-2016 outbreak

# Causes and complications

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- large concentrated populations
- fast travel between populations
- living in proximity with animals





# Antibiotic resistance

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<https://www.youtube.com/watch?v=yybsSqcB7mE>

- antibiotic misuse and overuse
- deaths probably already in millions, will get worse
- bacteriophages as solution?

# Zombies?

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- cordyceps
  - fungi spores
  - arthropod parasites (insects, arachnids, etc.)
- horsehair worms
  - silent, thirsty crickets
- rabies
  - change in behavior
- toxoplasmosis
  - around 1/3 of humans
  - risky behavior?



# COVID-19

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- zoonotic coronavirus, possibly from pangolins
- mortality very difficult to estimate
  - lack of testing
  - extremely sensitive to general healthiness
- “flattening the curve”
- prognosis unclear, too early to tell