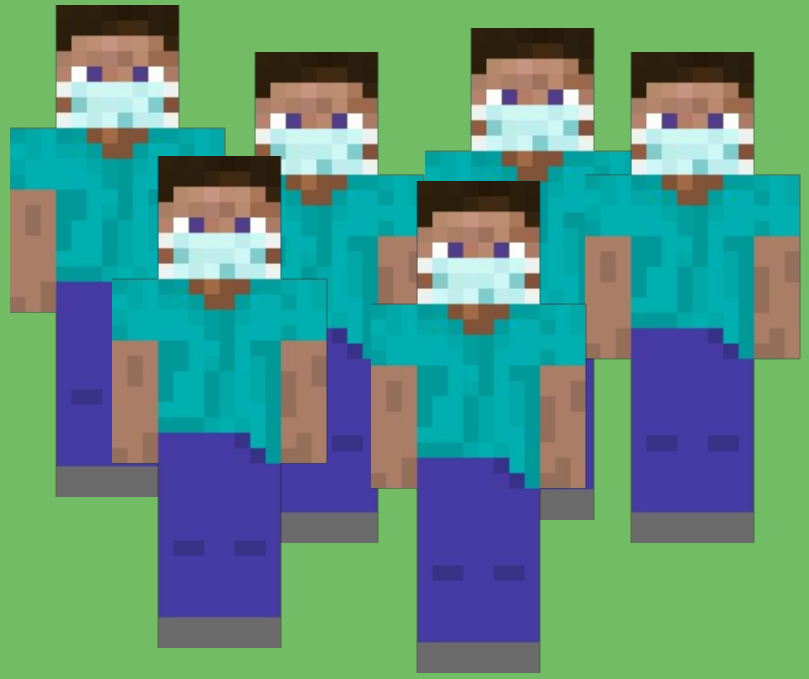
ScienceCraft

Epidemiology

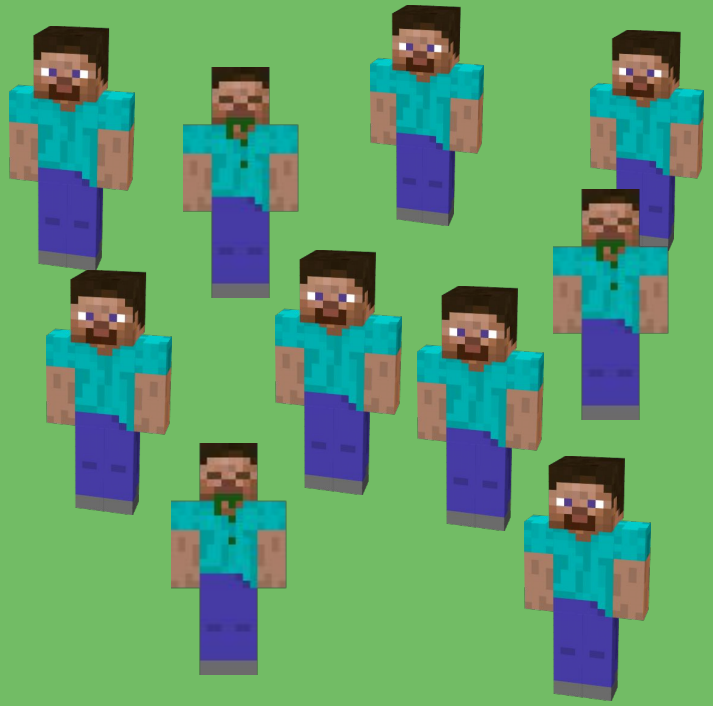
What is Epidemiology?



- **Epidemiology**
  - **Epi** - On or among
  - **Demos** - People
  - **Logos** - The study of
- The study of the **distribution** and **determinants** of health-related states or events in **specified populations,** and the application of this study to the **control** of health problems
    - John M. Last (1988)
  - The basic science of **preventive** and **social** medicine
- Has grown rapidly during the **past three decades**
  - Finally established in **medical education**

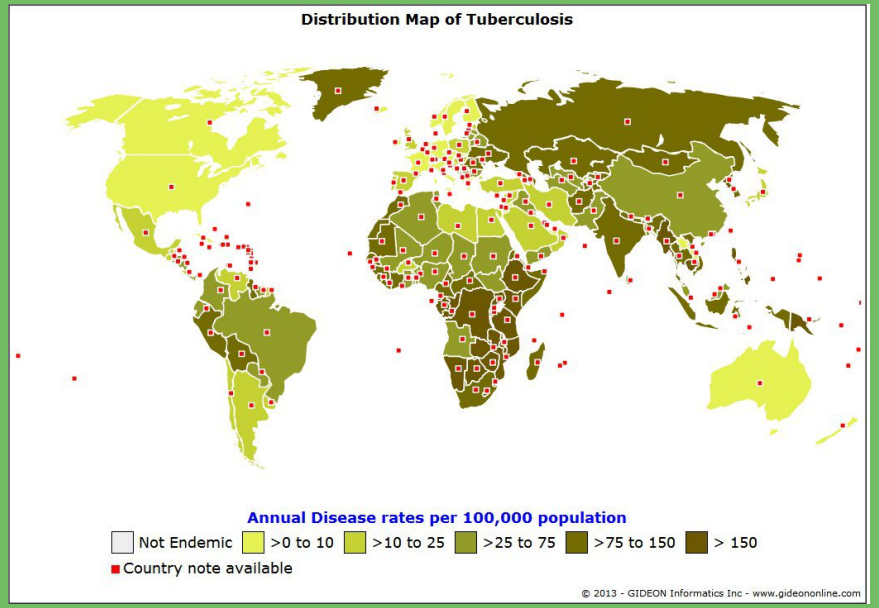
Concepts of Epidemiology

Disease Frequency



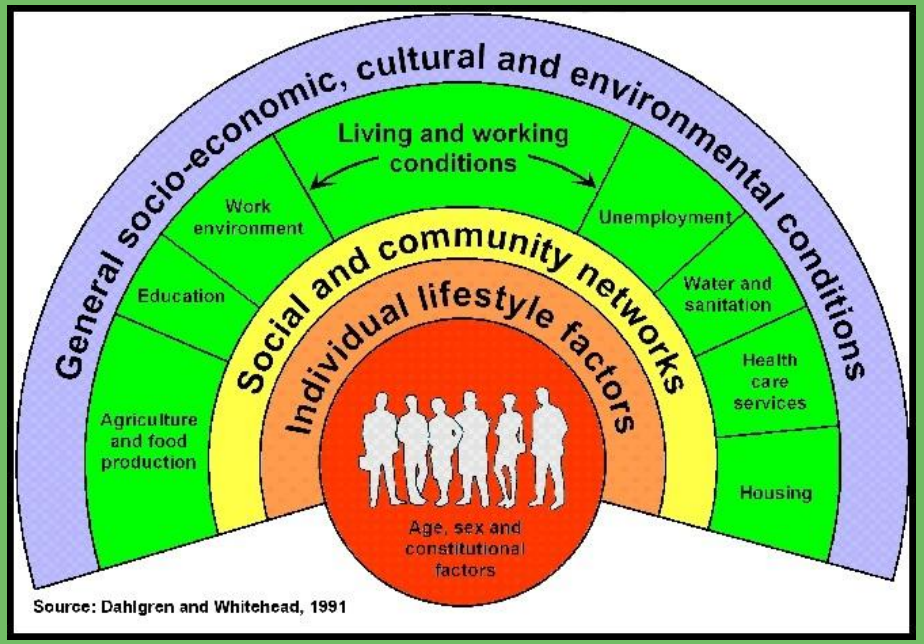
- **Disease Frequency**
  - Measurement of **how much/often** a disease, disability, or death appears within a population
  - Summarized in the form of **rates** and **ratios** (e.g. prevalence rate, incidence rate, death rate)
- **Prevalence rate**: the number of people in a population who have a disease at a given time
- **Incidence rate**: a measure of the frequency with which a disease or other incident occurs over a specified time period
- **Death rate**: the ratio between deaths and individuals in a specified population during a particular time period

Distribution of Disease



- **Distribution patterns**
  - Studied in various subgroups of the population by **time**, **place**, and **person**
  - Epidemiologists examine whether there has been an **increase** or **decrease** of disease over a **specific period of time**
- Epidemiologists also look at whether there is a **higher concentration** of disease in one **geographic area** than others
- Whether the disease occurs more often in men, in a particular age-group, etc.
  - Whether **characteristics** or **behaviour** of those affected are different than those not affected

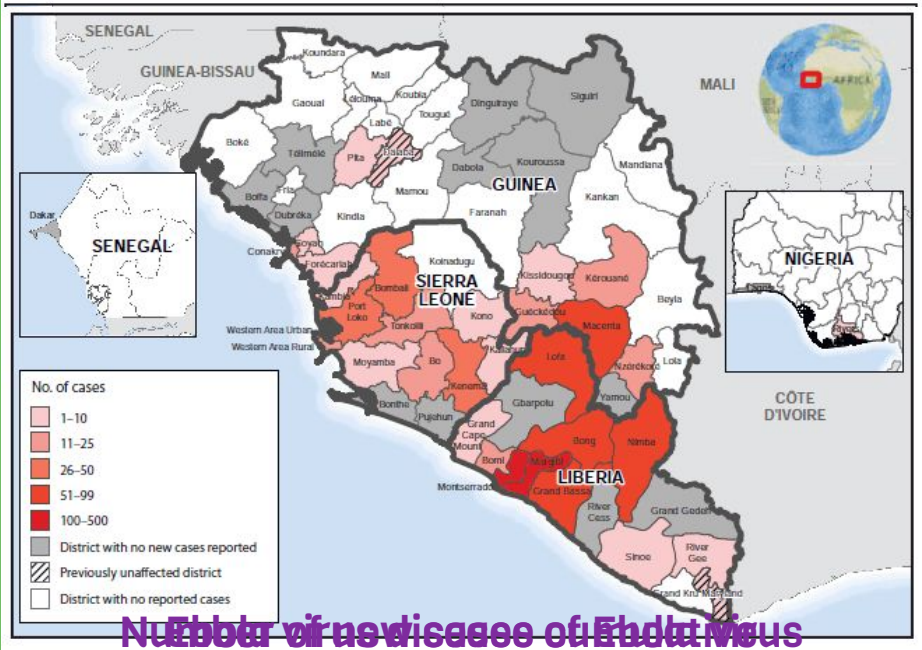
Determinants of Disease



- **Disease determinant**
  - Any of a group of variables, such as specific **disease agents** and **environmental factors**, that directly or indirectly **influence** the frequency or distribution of a disease
- **Biological** and **genetic** social determinants of health
  - Age
  - Sex
  - Family health history
  - Carriers of certain genes
  - Inherited conditions
  - etc.
- Epidemiologists test **etiological** hypotheses and identify the underlying **causes** or **risk factors** of disease

Applying Epidemiology

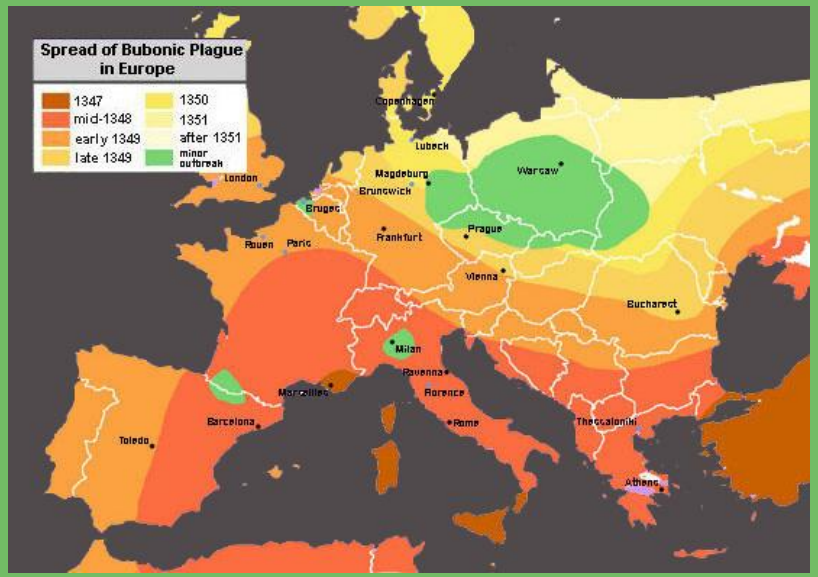
Epidemiology of the Ebola Virus



Number of new cases of Ebola virus disease reported — West Africa, August 31–September 20, 2014

- **Epidemic** – a disease that affects a large number of people within a **community**, **population**, or **region**
- **Disease frequency**
  - September 2014 Report:
    - A **total** of **6,574 Ebola cases** had been reported as of September 23 from five West Africa countries (**Guinea**, **Liberia**, **Nigeria**, **Senegal**, and **Sierra Leone**)
    - The **highest** reported case counts were from Liberia (3,458 cases), Sierra Leone (2,021), and Guinea (1,074)

Epidemiology of the Black Death



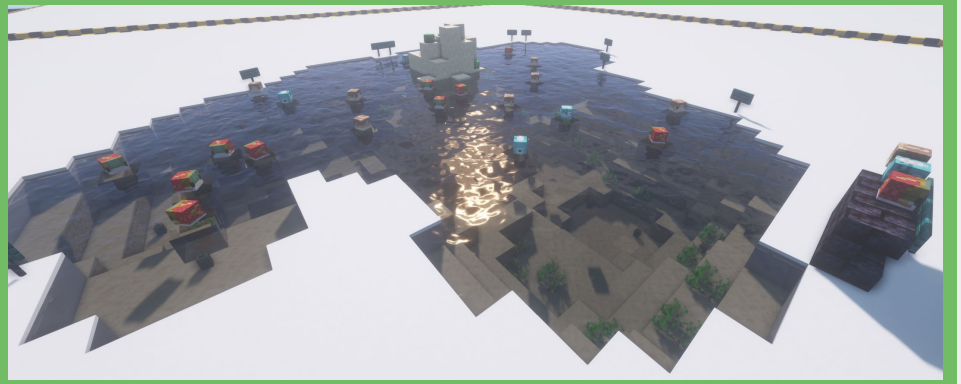
- **Pandemic** - an epidemic that's spread over multiple **countries** or **continents**
- **Disease frequency**
  - Struck **Europe** and **Asia** in the mid 1300s
  - Deadliest **pandemic** recorded in human history
  - **Mortality rates** varied based on location:
    - Italian cities: **50-60%**
    - Northern France:
      - Farming villages: **30%**
      - Cities: **30-40%**
    - England shared similar rates to France

Aims of Epidemiology

Aims of Epidemiology

- **Three main aims**:
  - To **describe** disease and other health related event **patterns** in human populations
  - To **identify** the **causes** and **risk factors** of diseases and other health related events
  - To **provide data** essential for the **management**, **evaluation**, and **planning** of services for the **prevention**, **control** and **treatment** of disease and other health related events
- Leads **effective action**

Build Challenge: Model and Analyze an Outbreak



- ✘ To model an outbreak, use mob heads to represent the population
  - ✘ Use **different** heads to represent different states (ex, infected, dead, or unafflicted)
- ✘ Calculate important numbers, such as **death rate, prevalence rate,** etc..
- ✘ You may also want to point out any interesting things regarding **distribution** and **scale** of your outbreak.

Kahoot Time!