

## COMMUNICABLE DISEASES

### Facts

- More educated populations tend to be healthier.
- The prevention of deaths from a particular disease does **not** increase the life expectancy in direct proportion to its decreased mortality.
- Mortality levels are determined by the complicated interplay of a variety of sociocultural, personal, biological, and medical factors.
- For most effective interruption of disease transmission, interventions must be targeted at all three legs of the epidemiologic triangle (host, environment, agent, and in the case of vectors, also reservoir and its environment).

### Basic stages of infection:

- Incubation period (no clinical signs during this period & usually not infectious)
  - Carrier state
  - Fulminate infection/convalescence (overt physical manifestations of pathology)
  - Remission/immunity/post-convalescence
- Behavioral changes require a willingness on the part of the population to take protective measures to ensure the safety of themselves, but also of others.
  - Smallpox is the only infectious disease to have been actively eradicated by human beings (due to vaccination). Polio was also greatly reduced in a similar manner.

### Vaccines:

- Do **not** prevent every case of disease in a population
- They reduce the number of new infections so agent(s) cannot establish and replicate continuously in the population
- Lead to "herd immunity"

### Vectorborne (arthropodborne) Diseases:

- Include malaria, yellow fever, plague, dengue, West Nile virus, Japanese encephalitis, Lyme disease, Chagas disease, sleeping sickness, and leishmaniasis
- **Most common infectious diseases in the world**
- Insect serves as a vehicle for transmitting an infectious agent to a human host
- Example: Myiasis (fly larvae infestation via blow flies)

### Ticks:

- **Deer tick** (a.k.a., bear tick, sheep tick)
  - Formal name **Ixodes**
  - Vector for **Lyme disease** (*Borrelia burgdorferi*)

- **Dog tick** (a.k.a., wood tick)
  - o Formal name **Dermacentor**
  - o Vector for **Rocky Mtn. Spotted Fever, Tularemia, & Colorado Tick Fever**

Mosquitoes:

- **Aedes aegypti**
  - o Vector for **Dengue Fever** (a.k.a., Breakbone fever), **Yellow Fever**
- **Culex spp.**
  - o Vector for **West Nile Virus**
- Control measures include
  - o Source Reduction
    - Emptying water containers
    - Clearing clogged gutters
  - o Biocontrol
    - Use of natural enemies to manage
  - o Larviciding
    - Use of methoprene
  - o Adulticiding
  - o Oil Drip
    - Thin layer of oil on water
    - 2–20 gallons of kerosene per acre added to water
- DDT banned in most *developed* countries

Rabies:

- **The only known infection to cause 100% mortality in humans**
- An animal suspected of infection should be:
  - o Caged or tied up with a strong chain and isolated for 10 days
  - o If symptoms appear, the animal should be evaluated by a veterinarian
  - o If unvaccinated and suspected of harboring the virus, the animal must be confined for four months or be killed
  - o Currently, the most effective means of bat control is to screen all openings or build them out insofar as possible
  - o Fiberglass insulation will keep bats out of spaces so insulated

Tuberculosis:

- **One of the most common causes of human mortality on the planet**
- Only 5–10% of those infected will show clinical signs of disease or become infectious

CDC Category A Agents:

- Most likely to be used as potentially lethal weapons
- Include:
  - o *Bacillus anthracis* (anthrax)
  - o *Variola major* (smallpox)
  - o *Clostridium botulinum* (botulism)
  - o *Yersinia pestis* (plague)

- *Franciscella tularensis* (tularemia)
- Viral hemorrhagic fevers (Ebola virus, lassa virus)