**Module 8**

**Chapter 14 – Epidemiology**

**Pathology, Infection and Disease**

* Pathology: the scientific study of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Pathogen: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Three areas of primary concern in pathology
  + Etiology: the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a disease
  + Pathogenesis: how the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Disease: an abnormal state in which the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Infection: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the body by \_\_\_\_\_\_\_\_
  + Can include presence of microbe not normally found in that part of body
* Possible to have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ without detectable \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Normal Microbiota*

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ microbiota: microbes that colonize human \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Aka “normal flora”
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ microbiota: microbes that colonize human for a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ without causing disease
  + Days, weeks, months
* Specific microbes are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + *Propionibacterium* – \_\_\_\_\_\_\_\_\_\_\_ eyes
  + *Lactobacillus* – mouth, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Many factors affect distribution, composition of normal microbiota
  + Diet, age, health, stress, hygiene, etc …
* Microbial \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ overgrowth of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ microorganisms, aka “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”
  + Protect host against \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Protect simply by \_\_\_\_\_\_\_\_\_\_\_\_, taking \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* *Clostridium difficile* has problems growing in intestines due to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + *C. difficile* commonly causes gastrointestinal infections \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Many normal microbiota \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ingested to provide beneficial effect
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ bacteria can prevent growth of pathogens
  + *Lactobacterium, Bifidobacterium*

*Relationship between host and microbe*

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: relationship between microbes and host; “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: a type of symbiosis in which one organism \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, the other is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Many \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are commensals
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: a type of symbiosis in which \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + *E. coli* in large intestine produces Vitamin K
  + *E. coli* obtains nutrients
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: a type of symbiosis in which one organism \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the other
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are parasites

*Opportunistic Microorganisms*

* *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*: normally \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ bacteria that cause \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in certain conditions
* Under certain conditions, \_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_ microbes can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Some \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are opportunistic pathogens
  + *E. coli* is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in intestines, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in bladder
  + Gain access through puncture wounds, in weakened or compromised patients

**Classifying Infectious Diseases**

* Every disease alters body structures and functions in particular ways
  + Characteristic of disease
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: a change in body function that is felt by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as a result of disease
  + “\_\_\_\_\_\_\_\_\_\_\_\_\_\_” changes not apparent to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Eg, Aches and pains, malaise
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: a change in a body that can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as a result of disease
  + “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_” changes that can be seen by
  + Eg, temperature, swelling, hives
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: a specific group of signs and symptoms that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ disease: a disease that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from one host to another
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ disease: a disease \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from one host to another
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ disease: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ host to host

*Occurrence of disease*

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: number of people in a population who \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ over a specified time
  + Indicator of \_\_\_\_\_\_\_\_\_\_\_\_\_ of disease
  + *Incidence* of AIDS in US in 2004 was 40,000
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: number of people in a population who \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with a disease at a specified time
  + Indicator of how \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a disease affects a population
  + Includes both \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cases
  + *Prevalence* of AIDS in 2004 was 900,000

*Occurence of a Disease*

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ disease: a disease that occurs only \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ disease: a disease that is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in a population
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ disease: acquired by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in a given area over a relatively \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ disease: an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ disease that occurs \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Severity or Duration of a disease*

* \_\_\_\_\_\_\_\_\_\_\_\_ disease: develops \_\_\_\_\_\_\_\_\_\_\_, lasts \_\_\_\_\_\_\_\_ time
* \_\_\_\_\_\_\_\_\_\_\_\_ disease: develops \_\_\_\_\_\_\_\_\_\_\_, disease is continual or recurring for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_ disease: intermediate between \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_ disease: causative agent remains \_\_\_\_\_\_\_\_\_\_\_\_ for a time, but then becomes \_\_\_\_\_\_\_\_\_\_\_\_\_ to produce disease
* Rate at which disease spreads depends on \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a population
  + \_\_\_\_\_\_\_\_\_\_\_\_\_ can provide barriers to \_\_\_\_\_\_\_\_\_\_\_ of disease
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ people can be protected from communicable disease if majority of population is vaccinated
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: population in which \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ people are present

*Extent of Host involvement*

* \_\_\_\_\_\_\_\_\_\_\_\_\_ infection: pathogen is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the body
* \_\_\_\_\_\_\_\_\_\_\_\_\_ infection: pathogen (or products) are spread \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_ infection: \_\_\_\_\_\_\_\_\_\_\_\_\_ of local infection to another \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of body
  + Tetanus, dentist infections
* \_\_\_\_\_\_\_\_\_\_\_: toxic inflammatory condition arising from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_: systemic infection arising from multiple \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, aka blood poisoning
  + Most common example of \_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_ infection: acute infection that causes the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_ infection: infection by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ after a primary (predisposing) infection \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Sometimes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than primary infection
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_\_\_\_\_\_\_\_\_\_\_) infection: does not cause \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Reservoirs of Infection**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the pathogen
* Provides conditions for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + - Sick people; \_\_\_\_\_\_\_\_\_\_\_ may have inapparent infections
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + - Aka **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + - Soil, water
* Pathogens can be transmitted by three routes

*Transmission of Disease*

\_\_\_\_\_\_\_\_\_\_\_\_\_ transmission

* Direct: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + No \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ involved
* Indirect: via \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ object
  + Spread by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ objects)
* Droplet: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)
  + Travel only \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, < \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_\_\_\_\_\_\_\_\_\_\_\_\_)

\_\_\_\_\_\_\_\_\_\_\_\_\_ transmission - transmission by a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Waterborne: pathogens spread \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Contaminated with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sewage
* Foodborne: pathogen transmitted \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Usually \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, poorly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Airborne: spread by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Small droplets can remain airborne \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from one host to another

* Arthropods most common
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ transport of pathogens on body parts
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ process
  + Usually from bites
  + Involves complex life cycle

**Nosocomial Infections**

* Disease that does \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of being present at time of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Acquired as a result of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Source of infection

* Microbes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Hospital is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for microbes
  + Many \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Weakened or compromised state of host
  + Compromised host – patient whose \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Chain of transmission
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_

**Epidemiology**

* **Epidemiology**: study of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ diseases occur, how they are \_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_ of disease
* **Centers for Disease Control and Prevention (CDC)**
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_ epidemiological information in the United States
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:collection and \_\_\_\_\_\_\_\_\_\_\_\_ of data
  + Snow
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: controlled \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Semmelweis
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:comparison of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ group and a \_\_\_\_\_\_\_\_\_\_\_ group
  + Nightingale
* Epidemiologist looks at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, important factors and \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the people affected
* **Case reporting**: health care workers report \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to local, state, and national offices
* **Nationally notifiable diseases**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are required to report occurrence

*The CDC*

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a specific notifiable disease
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ from notifiable diseases
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: number of people affected in relation to the total population in a given time period
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: number of deaths from a disease in relation to the population in a given time
* Emerging Infectious Diseases: Diseases that are new, increasing in \_\_\_\_\_\_\_\_\_\_ or showing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to increase in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_