Descriptive Studies: Person, Place and Time
Descriptive Epidemiology

• Includes activities related to characterizing the distribution of diseases within a population

Analytical Epidemiology

• Concerns activities related to identifying possible causes for the occurrence of diseases
Descriptive Epidemiology

• Epidemiological equivalent of the game “20 Questions”
  ✓ animal, mineral or vegetable?
• In Descriptive Epidemiology:
  ✓ **Who?** - person
  ✓ **Where?** - place
  ✓ **When?** - time
Descriptive Epidemiology

Think of this as the standard dimensions used to track the occurrence of a disease.
WHO is getting the disease?

Many variables are involved and studied, but factors such as sex, age & race often have a major effect.
Characteristics of Person

- Age
- Sex
- Ethnic group
- Socioeconomic status
- Nativity
- Religion
- Marital status
- Occupation
Sex

The graph shows the number of persons in thousands for different age groups and genders in the United States. The causes of death in each group are compared. The graph indicates several diseases that can cause death in different age groups.
Time

- **WHEN** does the disease occur?
  - “Temporal”
  - Range from hours to decades
- Type of disease dictates “time” element to be used
- Graphic format often used
  - y-axis (vertical) - frequency
  - x-axis (horizontal) - time
Characteristics Relating to Time

- Secular change (long-term)
- Point epidemics (short-term)
- Cyclic trends
- Seasonal variation
Secular Change

[Graph showing cases increasing from 1981 to 1990]

Year of Diagnosis
Secular Change

- Secular changes ("temporal variation") occur slowly over long periods of time
  - Longer than one year
Point Epidemics

• Short-term changes occur over limited time frames
  ✓ Hours
  ✓ Days
  ✓ Weeks
  ✓ Months

• Used for short-term exposures or diseases with short incubation and/or illness durations
Point Epidemics

The graph shows the number of cases of an epidemic over time, with the x-axis representing the date of onset and the y-axis representing cases.

- July 25-26 has the highest number of cases, with more than 10 cases.
- The graph indicates a significant increase in cases around July 25-26 and a decrease later in the month.
- There are fewer cases in August, with a noticeable peak on August 8-9.

Note: The diagram also highlights that several cases occurred after working on the river, possibly indicating a connection between water exposure and the outbreak.

Legend:
- Cases: Number of occurrences of the epidemic
- Date of Onset: Day of occurrence
- August: Time period from 4-9
Point Epidemics
Cyclic Trends

• Cyclic trends may be either long-term or short-term events.
• Some are “seasonal” while others are cyclic due to other factors:
  ✓ Immigration
  ✓ School year
  ✓ Military deployment
Cyclic Trends

For the epidemiologist to understand the cause and spread of certain diseases, the distribution-related events of the disease along an axis of time must be studied and plotted with regard for the population at risk and comparison to the unaffected population group. A term with many names as used in epidemiology, Clustering in time is often a group of cases of a disease occur close together and is a term with many names as used in epidemiology. Clustered events is when a group of cases of a disease occur close together and are not expected to occur, a time of noted pattern or distribution, but also occurs in the populations not only on a biological basis, but also on a geographical basis of the occurrence. It has been used in epidemiology to identify differences in disease clusters that have been used in identifying patterns of disease occurrence, and disease clusters that have been identified as unusual and for use in identifying unusual patterns of disease occurrence. Clustered events have been identified as unusual and for use in identifying unusual patterns of disease occurrence. Clustered events have been identified as unusual and for use in identifying unusual patterns of disease occurrence.
Seasonal Variation

- Seasonal variation can be seen for some diseases or conditions falling within a calendar year.
Seasonal Variation

- Seasonal variation can be used to suggest possible etiology.
Time Clustering

• Time clustering data can sometimes be used to trace the “beginning” to the introduction of a specific causal agent
  ✓ Thalidomide & birth defects
    First marketed in Europe in 1950’s as sleeping pill and to treat morning sickness in pregnant women
  ✓ Toxic Shock Syndrome
    Staphylococcus aureus infection in women using newly introduced hyperabsorbent tampons
Time Clustering

![Diagram showing cases over time with peaks in 1979 and 1980, indicating Rely tampons introduced and subsequently taken off market.]
Place

- WHERE are the rates higher? lower?
- Geographic location of source
- Geographic location of reservoir
John Snow and Cholera
5 Criteria of Place

- ↑ Rate observed in all ethnic groups in the area
- ↑ Rate NOT observed in persons of similar groups inhabiting other areas
- Healthy persons entering area get ill at same frequency
- People who leave do NOT show similar levels
- Similar levels of infestation in other species (if zoonotic disease)
Characteristics Relating to Place

• International
• Variation within countries
  ✓ Urban-rural
  ✓ Local
• Building Maps
Place

Distribution of AIDS in the US 1990

Legend (rate per 100,000)

- 0 - 4.9
- 5.0 - 9.9
- 10.0 - 14.9
- ≥ 15.0
Building Maps

Moderate to heavy colonies of S. marcescens

Equipment
Hall
S. marcescens aerosol
Toilets
Stairwell
Elevator
Elevator
Interactions of Time and Place

- Time-place clustering
- Migration