Epidemics and Epidemic Curves

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Temporal patterns of disease

- **Endemic**: disease occurs at expected frequency
- **Epidemic**: disease occurs at greater than expected frequency
- **Pandemic**: huge epidemic (international)
- **Sporadic**: single case or small cluster of cases

Endemic vs. Epidemic

- **Endemic Disease**: Disease present in population or region at all times
  - Usually low and predictable level

- **Sporadic Disease**: Infrequent disease occurrence
  - Irregular and unpredictable

- **Epidemic Disease**: Incidence exceeds expected
  - Usually infectious disease or poisoning
  - In animals, occasionally referred as *epizootic* disease
  - Point (common) source or propagated
Common (point) Source Epidemic

- Single common exposure
- Does not spread
- Food-borne disease outbreaks

Point Source Transmission

This is the most common form of transmission in food-borne disease, in which a large population is exposed for a short period of time.

Epidemic Curve of Point Source Epidemic

Propagated Epidemic

Spread between animals - contagious

May involves vectors or carriers

Propagated Vector-borne Disease

- Starts slowly
- Time between the first case and the peak is comparable to the incubation period.
- Slow tail
**Propagated Epidemic Curve**

Shape depends on
- characteristics of agent (virulence) and host (susceptibility)
- contact rate
- population density, etc...
Cases may occur over prolonged period of time

**Calculation of incubation period**

Difficult for propagated epidemics
- need index peak and main peak present
Need to know
- index case
- cause (exposure)
- time of exposure (knowledge about common exposure helpful)
Assumptions
- presence of clinical signs indicates disease
- health before onset of illness

**Estimation of incubation period**

*Known point exposure on August 11*

<table>
<thead>
<tr>
<th>Day of Onset in August</th>
<th>Cases</th>
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<tbody>
<tr>
<td>6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22</td>
<td>0 5 10 15 20 25 30 35</td>
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IP: 2 - 10 days; average 6 days