Foodborne diseases

- Definition: illness or disease that occurs as a result of consuming food that serves as the carrier of the causative agents

- Foodborne infection
- Foodborne intoxication
- Foodborne toxicoinfection
**Foodborne infection**

- Caused by consumption of food containing viable pathogens
- Food serve as a carrier of the microorganisms
- Growth of microorganisms in food may not necessary but with growth chances of infection increase

- Virus
- Bacteria
- Hepatitis
- Salmonellosis
Foodborne intoxication

- Caused by consumption of food containing the toxins (produced by microorganism)
- Toxin causes the illness
- Viable microorganism need not to be present in the food at the point of consumption

Botulinum toxin  Botulism
Staphylococcal enterotoxin  Stap. Food Poisoning
Foodborne toxicoinfection

- Combination of food intoxication and infection
- The microorganism grows to very high number in food and continues its growth in the GI tract
- Toxin is released to cause symptom

Clostridium perfingen ⇒ Perfringens food poisoning
### Conditions requires for foodborne disease outbreaks

<table>
<thead>
<tr>
<th>Food infection</th>
<th>Food intoxication</th>
</tr>
</thead>
<tbody>
<tr>
<td>▸ M/O must be present in food (viable)</td>
<td>▸ M/O must be present in food</td>
</tr>
<tr>
<td>▸ Food must be suitable for survival or growth of M/O</td>
<td>▸ Food must be suitable for the growth of M/O</td>
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<tr>
<td>▸ Food must be consumed</td>
<td>▸ M/O must grow to large number before toxin is produced</td>
</tr>
<tr>
<td>▸ M/O must colonize and grow in the GI tract</td>
<td>▸ Food must be consumed</td>
</tr>
<tr>
<td>▸ Host must be susceptible to the M/O</td>
<td>▸ Host must be susceptible to the M/O</td>
</tr>
</tbody>
</table>

Food toxicoinfection: M/O must grow in gut and release toxin
## Cost of foodborne illness

<table>
<thead>
<tr>
<th>Individual</th>
<th>Industry cost</th>
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</thead>
<tbody>
<tr>
<td>Medical</td>
<td>Product recall</td>
</tr>
<tr>
<td>Income</td>
<td>Plant close and clean up</td>
</tr>
<tr>
<td>Pain and suffering</td>
<td>Product liability</td>
</tr>
<tr>
<td>Time</td>
<td>Reduce product demand</td>
</tr>
<tr>
<td>Childcare</td>
<td>Public health surveillance and investigation</td>
</tr>
</tbody>
</table>
Sources of microorganism in food

- Microorganisms associated with the raw and unprocessed food
- Microorganisms added during
  - harvesting
  - handling
  - processing
  - storage
- Microorganisms survived of the processing
Primary sources of microorganism found in foods

Each bacterial genus has its own particular nutritional requirement

- Soil and water
- Plant and plant product
- Food utensil
- GI tract of humans and animals
- Food handler
- Animal feeds
- Animal hides
- Air and dust
Raw food microflora

- Plant, fruits, and vegetable
- Animals
  - Surface or skin
  - Respiratory tract
  - Intestinal tract
  - Waste
  - Water
  - Soil
  - Air
Sources of microorganism in processed foods

- Raw food ingredients
- Process survivors
- Equipment
- Insects
- People → Hygiene
- Storage and distribution
- Point of consumption
Quiz 1

1. Who are at greatest risk of getting foodborne illness?
2. What is danger zone?
3. What is foodborne disease?
4. Define 3 types of foodborne diseases