

Food Safety



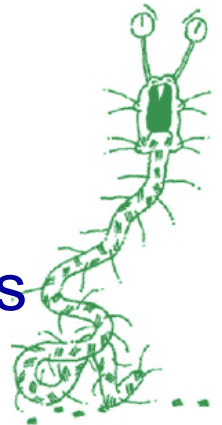
*For safe and
wholesome foods*

Jang H. Kim

NMC-CREES

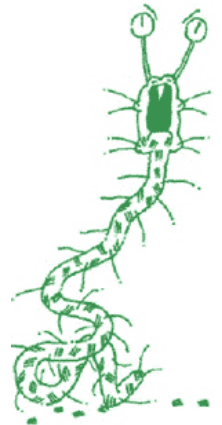
Food poisoning

- Illness from consuming food that contains a harmful substance, harmful microorganisms or their toxins.
- Common symptoms:
 - stomach aches
 - vomiting
 - diarrhoea
 - fever
- Can result in long-term diseases and death.
- Often caused by food that looks, smells and tastes normal.



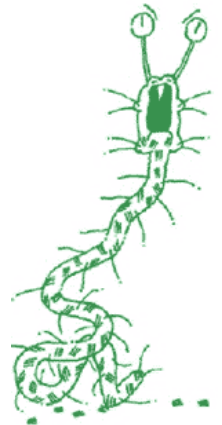
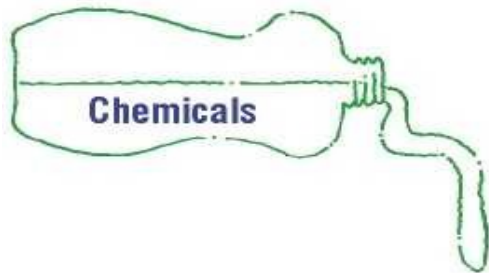
Types of hazard in food

- Food can be contaminated by:
 - Chemical hazard
 - Physical hazard
 - Biological hazard



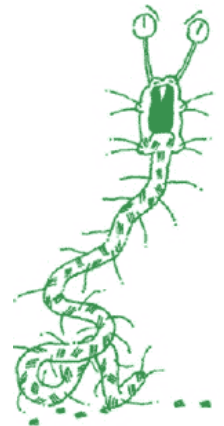
Chemical hazards

- Chemicals in the home include those used:
 - to clean kitchen surfaces and equipment
 - as pesticides.
- Chemicals can be very harmful if they are:
 - spilt on or near food
 - mistaken for food or drink.



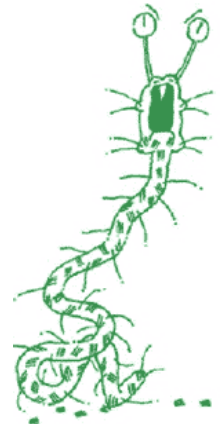
Chemical hazards: Natural toxins

- Toxins are poisonous substances produced by some micro-organisms, plants and animals.
- Most toxins that cause food poisoning are tasteless and remain toxic even after cooking.



Physical hazards

- Foreign matter can:
 - physically injure people
 - introduce harmful bacteria into food.
- Examples of foreign matter include:
 - dead insects
 - hair
 - jewellery
 - glass
 - pieces of metal.



Biological hazards

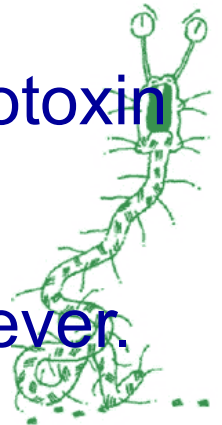
- The microorganisms that can make us sick include:
 - Viruses (rotavirus, norwalk virus..)
 - Bacteria (*Salmonella*, *E. coli*, *Listeria*...)
 - Parasites (*Toxoplasma gondii*, *Trichinella spiralis*..)
 - Mould (*Aspergillus flavus*..)
- Microorganisms such as viruses and bacteria are the most common causes of food poisoning.



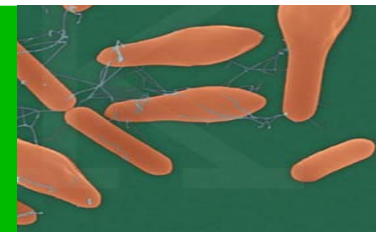
Salmonella



- Sources – intestines of people and carriers, animals and animal food, raw meat and poultry, raw milk, raw eggs.
- Common food vehicles – undercooked or contaminated cooked meat, raw milk and eggs.
- Incubation period – 6- to 72 hrs to produce endotoxin in intestine.
- Symptom – Abdominal pain, diarrhoea, vomit, fever.



Clostridium botulinum



- Sources – Fish intestine, soil, and vegetables.
- Common food vehicles – Low acid processed food contaminated after canning or vacuum packaging.
- Incubation period – 2 hrs to 5 days. Heat resistant neurotoxin produced in foods.
- Symptom – Difficulties in swallowing, talking and breathing. Double vision and paralysis.
- Characteristics – Sporeformer. Spores and exotoxin will survive under normal cooking Temp.



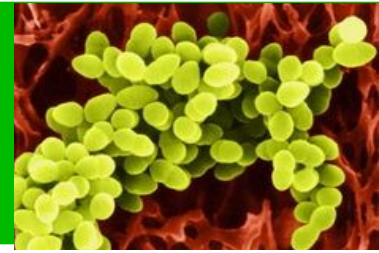
Escherichia coli O157:H7



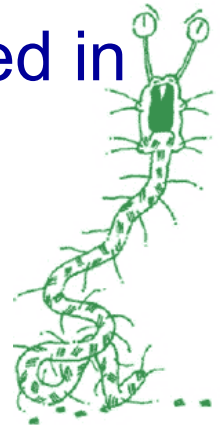
- Sources – Animal intestine, soil, and water.
- Common food vehicles – Undercooked or raw meat, vegetables, unpasteurized milk and apple juice, contaminated water.
- Incubation period – 2 to 5 days.
- Symptom – watery or bloody diarrhea, nausea, vomiting, cramps, fever.
- Characteristics – Hemolytic Uremic Syndrome (HUS).
Acute kidney failure in children



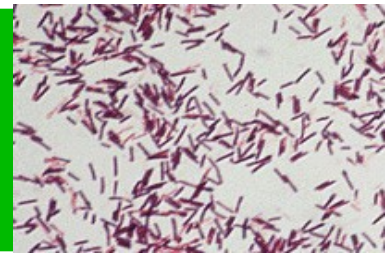
Staphylococcus aureus



- Sources – Human nose, mouth, skin, hands, spots, boils, septic cuts, etc.
- Common food vehicles – Dairy products, cold cooked meat and poultry, etc.
- Incubation period – 1 to 7 hrs. Exotoxin produced in foods.
- Symptom – Abdominal pain, diarrhea, vomiting, subnormal temperature.
- Characteristics – Heat resistant toxin, salt tolerant.



Bacillus cereus



- Sources – Dust and soil.
- Common food vehicles – Cereals, corn flour, steamed rice, spices, etc.
- Incubation period – 1 to 5 hrs. Exotoxin produced in foods.
- Symptom – Abdominal pain, diarrhea, vomiting, subnormal temperature.
- Characteristics – Sporeformer. Spores and exotoxin will survive under normal cooking Temp.

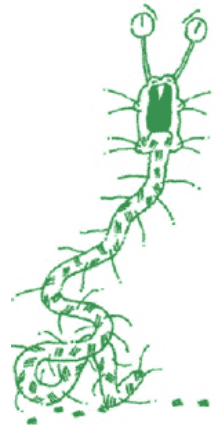


Foodborne illness causing agents

Microorganism	Source	Symptoms	Onset Time
Norwalk-like viruses	Feces, vomitus Contaminated foods	Nausea, vomit, diarrhea, abdominal cramps, headache	12-48 hrs
<i>Campylobacter Jejuni</i>	Raw or undercooked poultry, water, milk, feces	Diarrhea, abdominal cramps, fever, nausea	2-5 days
<i>Salomonella spp.</i>	Poultry and egg, milk, beef, fruits	diarrhea, fever, cramps	12-36 hrs
<i>E. Coli O157:H7</i>	Ground beef, fruits, vegetables, milk, water	Watery or bloody diarrhea, nausea, cramps Hemolytic Uremic Syndrome	2-5 days
<i>Clostridium botulinum</i>	Raw fish and meat Fruits and vegetables	Paralysis, diarrhea	12-36 hrs
<i>Staphylococcus aureus</i>	Human nose, throat, ears, skin Septic wounds Animals and raw milk	Vomiting Abdominal pain Low temperature	1-7 hrs

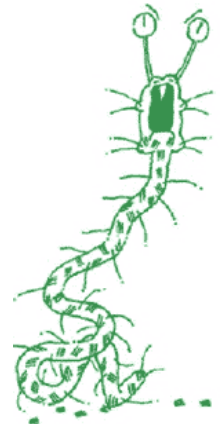
Transmission

- Contamination can occur at several points along the food chain
 - On the farm or in the field
 - At the slaughter point
 - During processing
 - At the point of sale
 - At home

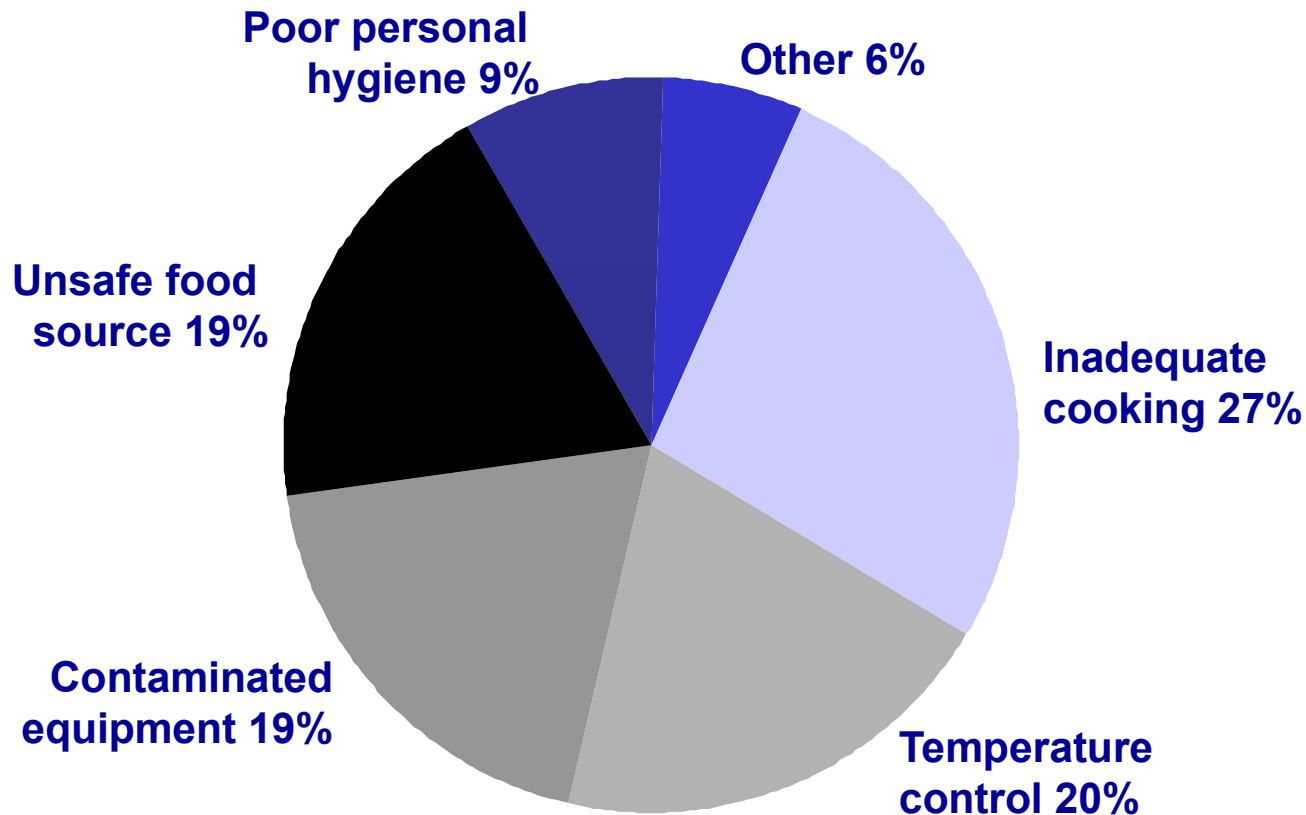


Risk in the produce processing

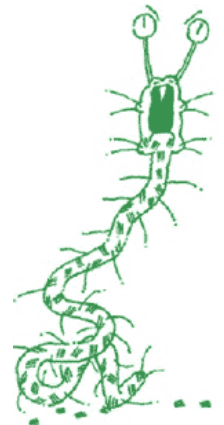
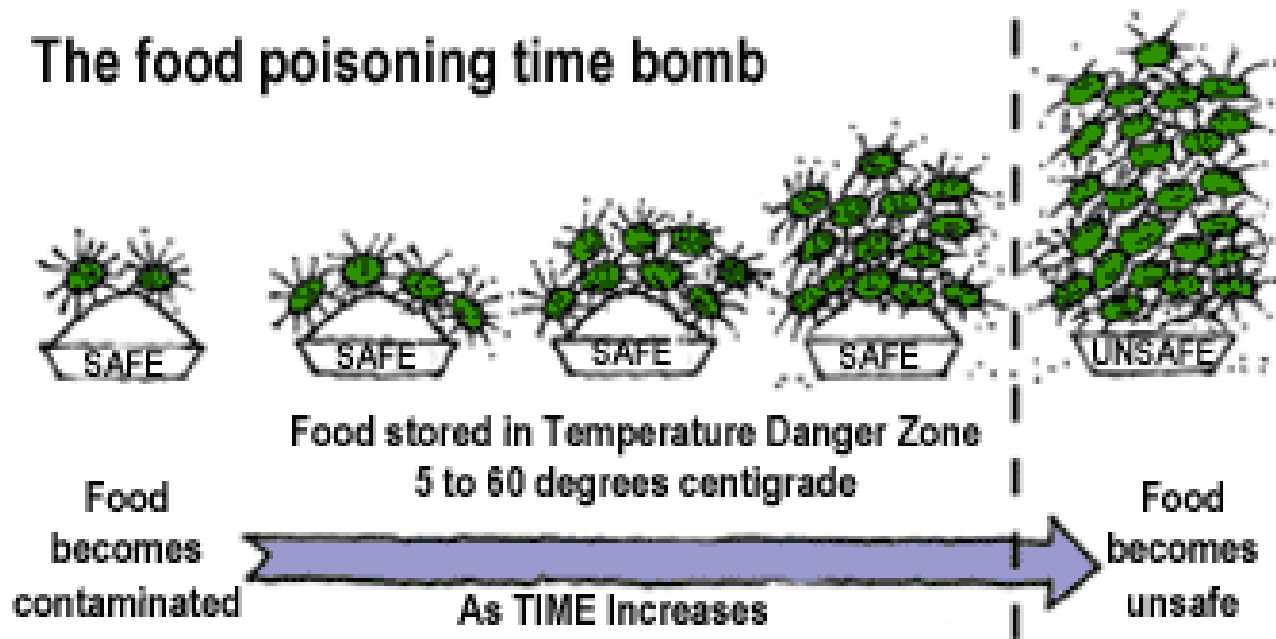
Event	Contamination Source
Production and harvest - Growing, picking, bundling	Irrigation water, manure, poor filed sanitation
Initial Processing - Washing, waxing, sorting, packaging	Washing water, handling
Distribution - Transportation	Ice, transportation vehicle
Final Processing - Slicing, squeezing, shredding, peeling, canning	Washing water, handling, cross-contamination



Factors contributing to food poisoning outbreaks 1980 - 1995



The food poisoning time bomb



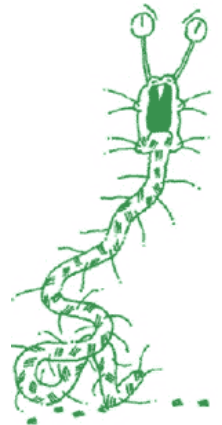
Strategies to prevent food poisoning

To ensure food does not become contaminated:

1. Keep hands and nails clean
2. Keep the kitchen clean
3. Handle food safely.

To kill or slow down the growth of micro organisms:

4. Cook high-risk foods thoroughly
5. Keep hot food hot and cold food cold.



Keeping hands and nails clean

We need to:

- wash hands and nails thoroughly with warm, running water and soap
- dry hands thoroughly
- cover cuts and infections on hands.



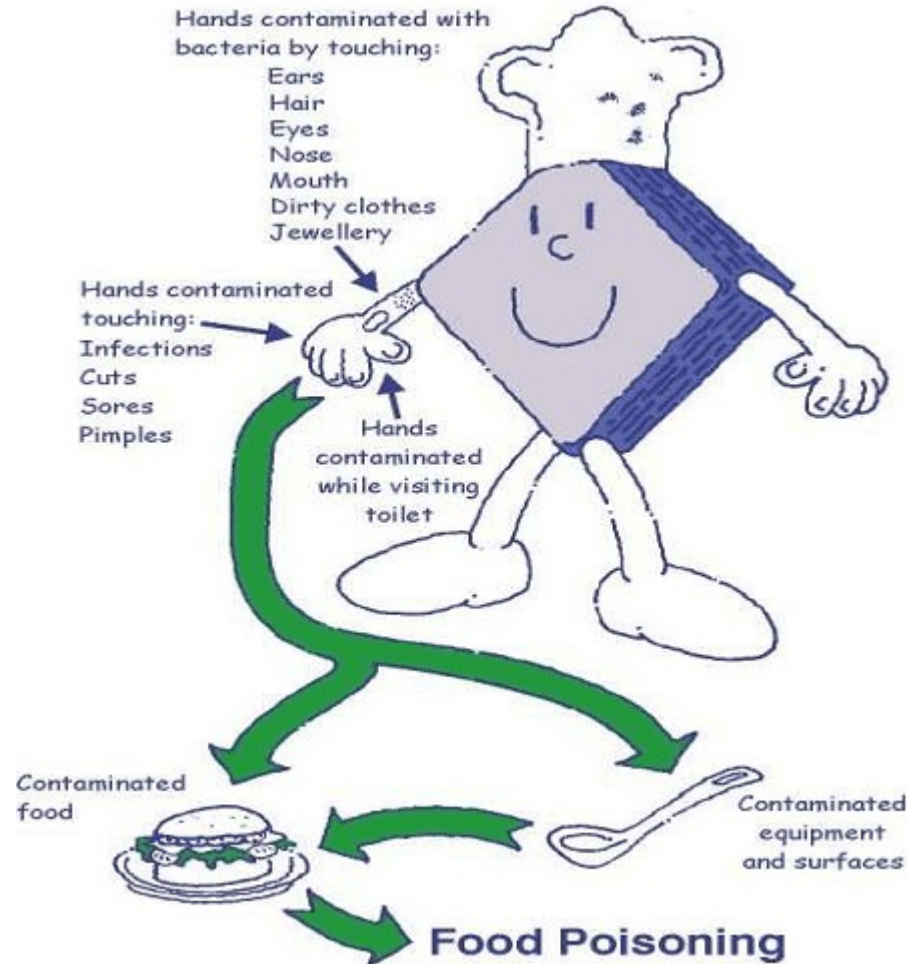
Washing hands and nails thoroughly with warm, running water and soap

We should wash our hands:

- before eating, preparing or handling food
- between handling raw meat, poultry and seafood, and handling cooked food or food that will be eaten raw
- after coughing and sneezing, using a handkerchief etc
- after going to the toilet
- after handling rubbish
- after touching animals
- after handling chemicals (e.g. cleaning products).



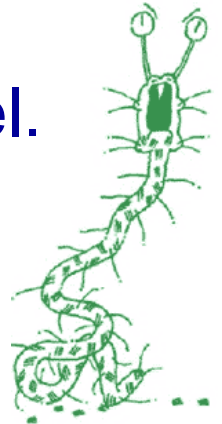
Transfer of microorganisms by hands



Keeping the kitchen clean

When cleaning plates and equipment, we need to:

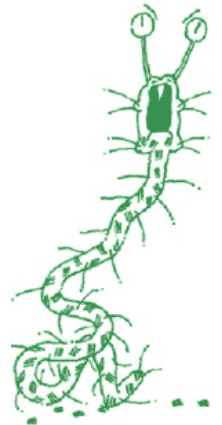
- scrape and rinse off surface food
- wash in clean, soapy water
- rinse in clean water
- air dry where possible
- if drying immediately, use only a clean, dry towel.



Keeping the kitchen clean: Pest control and animals

We need to:

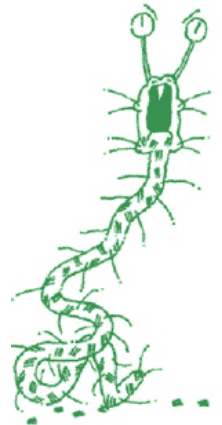
- stop pests such as cockroaches and mice coming into the area where food is kept
- discourage pests by not leaving food or dirty dishes out on the benches
- keep animals out of the kitchen.



Handling food safely

We need to:

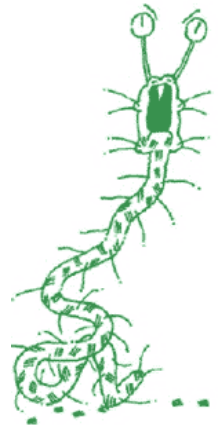
- avoid preparing food when sick or feeling unwell
- keep raw meats, poultry and seafood separated from cooked food and food to be eaten raw
- protect food in the refrigerator by placing in covered containers or covering with plastic wrap
- use clean equipment, plates or containers to prevent contamination of cooked food (or food that will be eaten raw) with traces of raw food



Handling food safely (continued)

We need to:

- use clean equipment, rather than hands, to pick up food
- wear clean clothes or a clean apron
- wash fruit and vegetables to be eaten raw under running water.



Cooking high-risk foods thoroughly

We need to cook thoroughly food such as:

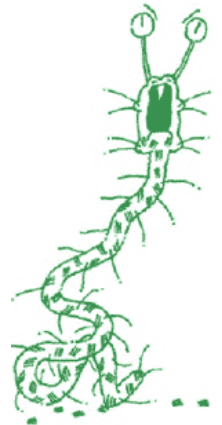
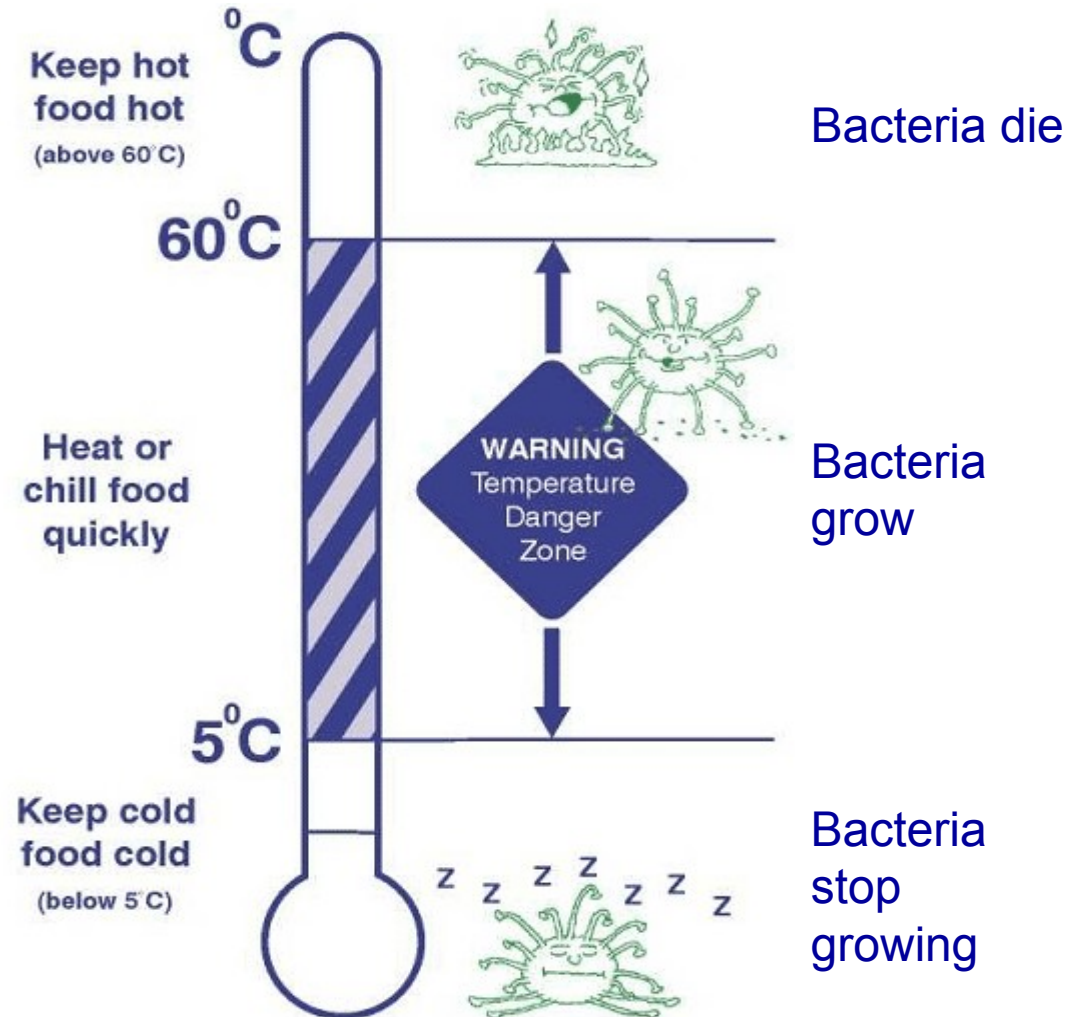
- mince
- burger patties
- sausages
- rolled roasts
- stuffed meats
- rabbit
- seafood
- poultry



Keeping hot food hot and cold food cold

Avoid keeping food in the temperature danger zone of

5°C - 60°C

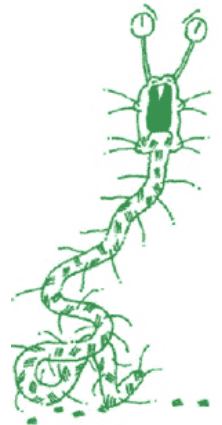


Keeping hot food hot

Avoid keeping food in the temperature danger zone of 5°C - 60°C.

We need to:

- keep cooked food at 60°C or above until served
- refrigerate or freeze food that is to be prepared well in advance and reheat until steaming hot before serving
- cook or reheat packaged food strictly in accordance with any directions on the label.



Keeping cold food cold

Avoid keeping food in the temperature danger zone of 5°C - 60°C.

We need to:

- take cold groceries home to the refrigerator quickly as possible
- keep chilled and frozen food cold if it will be a long time before it can be placed in a refrigerator or freezer
- store cold food at 4°C or less
- keep cold food in the refrigerator as much as possible
- thaw frozen food in the refrigerator or microwave
- store and handle cold food according to any directions on the label
- check the temperature of the refrigerator regularly.



Summary:

Preventing food poisoning in the home

We need to:

1. keep hands and nails clean
2. keep the kitchen clean
3. handle food safely
4. cook high-risk foods thoroughly
5. keep hot food hot and cold food cold.

