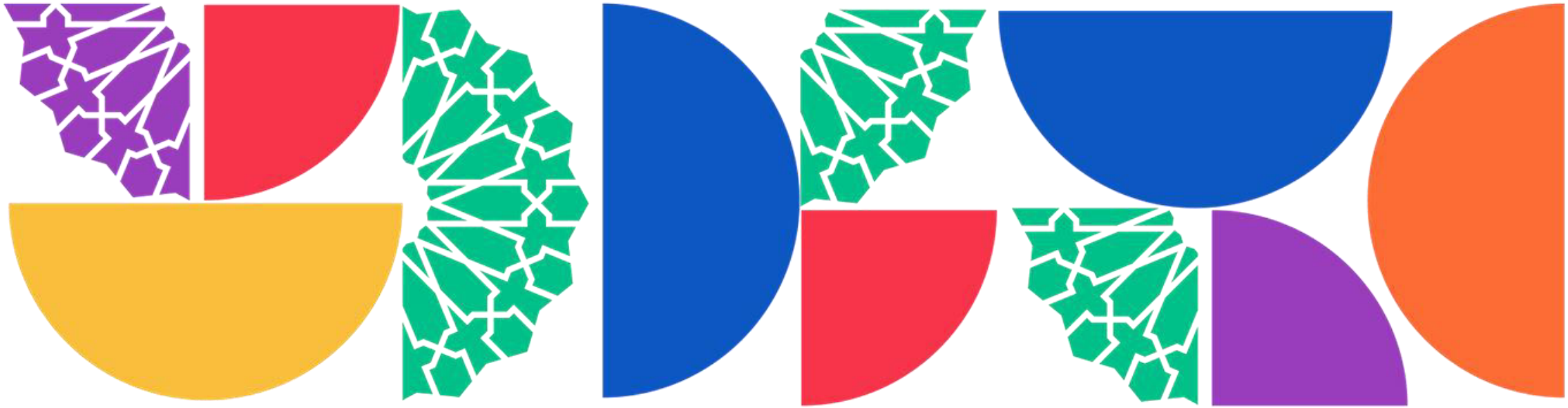
Health Awareness and Nutrition

Food Safety

Department of Clinical Nutrition and Dietetics
College of Health Sciences



Food Safety

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Food safety refers to the handling, preparation, and storage of food in ways that prevent foodborne illness.

Safe foods:

- Free of health hazards

Unsafe foods:

- Illness
- Food poisoning
- Health hazards

Food Safety

The aims of food safety are to:

- Prevent health hazards
- Raise consumer awareness about the seriousness of foodborne illness
- Provide solutions for easy and safe food handling in the food institutions and our own kitchens
- Assist groups at higher risk of food poisoning such as the elderly, pregnant women, infants, young children, and people with chronic disease

Types of Hazards

Physical hazards:

Foreign objects found in food products that enter the food item either during harvesting, transport or during processing. *E.g.*: Broken manufacturing equipment, broken glass, plastic shards, hair, nails, debris, dirt and metal shavings.

Chemical hazards:

Presence of harmful substances found in food naturally, or added unintentionally during processing. *E.g.*: Poisonous chemicals, food additives at unacceptable levels, pesticides, etc.

Biological hazards:

Contamination of food by microorganisms (bacteria, viruses and parasites).

Types of Microorganisms

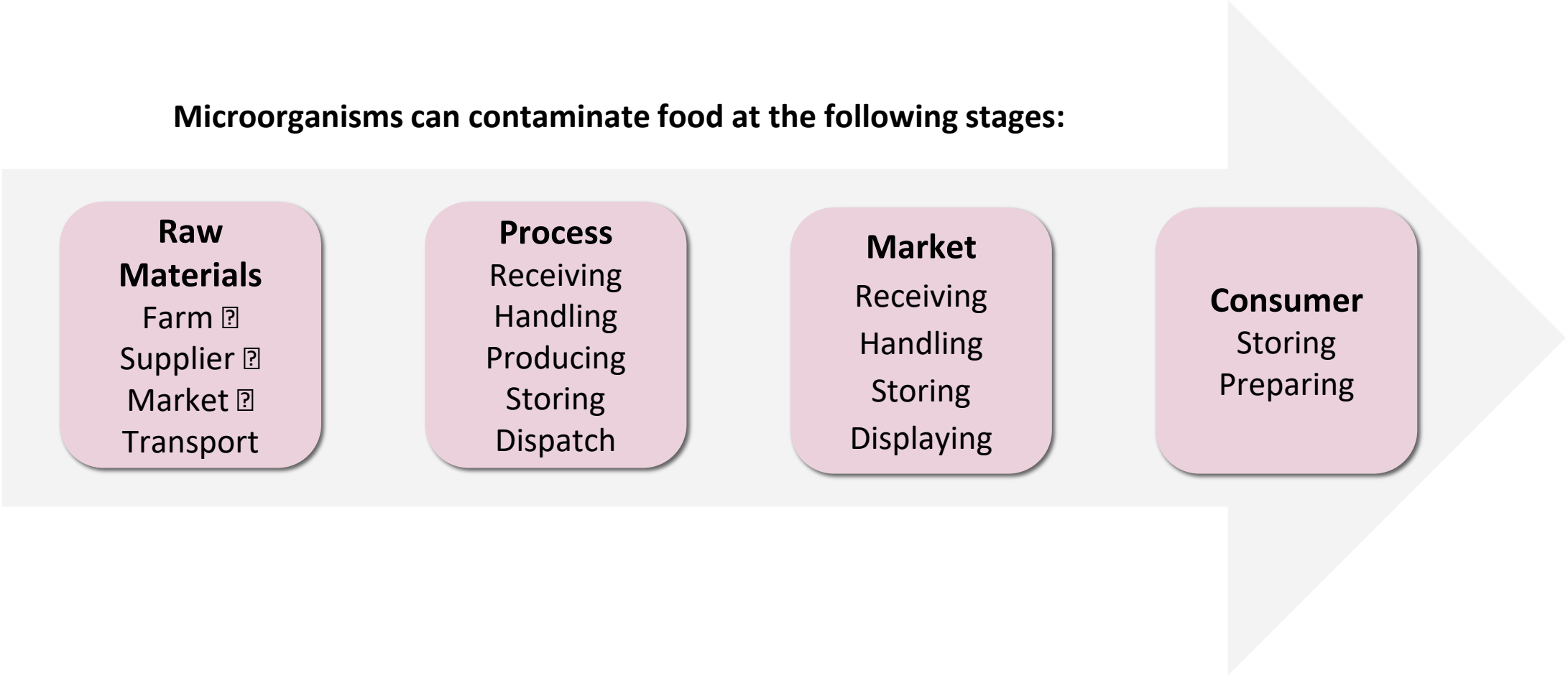
Microorganisms that contaminate food can be broadly classified into two types: **pathogenic and non-pathogenic**.

Non-pathogenic microorganisms are also referred to as spoilage causing microorganisms. They can be easily identified by the changes observed in the food product (color, texture, odor, consistency).

Pathogenic microorganism contaminated food detection is difficult. It would cause the consumer to fall sick (vomiting, diarrhea, etc.)

Food Safety Chain

Microorganisms can contaminate food at the following stages:



Foodborne Illnesses

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Foodborne Illness:

Any illness resulting from the consumption of contaminated food.

Foodborne Poisoning (Outbreak):

Two or more people become sick with a similar illness (symptoms) from the consumption of the same food from the same source.

Example: 2015 SALMONELLA OUTBREAK

A Salmonella Poona outbreak that caused 907 illnesses was linked to cucumbers from Mexico. This massive outbreak affected 40 states, hospitalized 204 people, and caused 4 deaths.

E Coli O157: H7

The 17-state outbreak began in late 2018 but did not end until February 2019. Out of 62 cases, 25 to 40 percent of patients required hospital treatment.

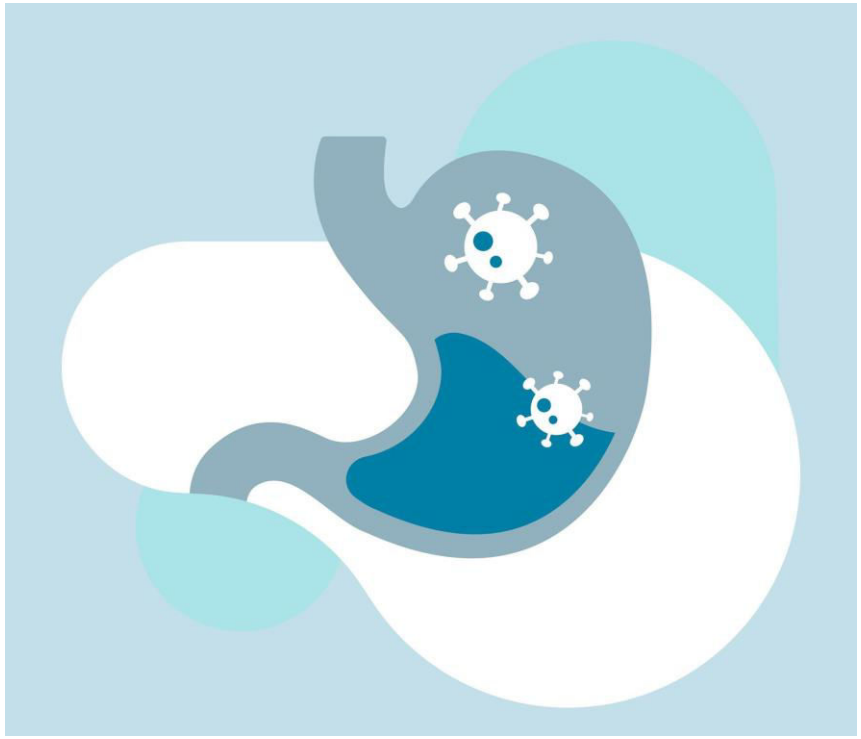
The investigation into this outbreak was extensive, causing FDA to “strongly recommend the entire leafy green supply chain adopt traceability best practices and state-of-the-art technology to assure quick, accurate and easy access to key data elements from farm-to-fork when leafy greens are involved in a potential recall or outbreak.”

Foodborne Illnesses

Causes of foodborne illnesses:

- Consumption of food/water that contain living disease-causing microorganisms (**bacteria, parasite, virus**) or a harmful **chemical or toxin** produced by bacteria.
- Ingestion of toxins naturally present in many foods like mushrooms and some seafood.
- Consumption of food containing toxic chemicals (**contaminants**) such as heavy metals and some pesticides.

Foodborne Illnesses



How does foodborne illness occur?

- Contaminated foods carry microbes into the body.
- Some microbes can overcome the body's defenses and cause infections.
- It is also possible that the microorganism grows within the food item and produces toxins. Upon cooking, the microorganism may die, however, the toxins are still present within the food (some are heat resistant) which can cause illness.

Foodborne Illnesses

Incidence of foodborne illnesses:

- Ignoring necessary regulations in production and handling of foods (Safe Food Handling)
- Poor personal hygiene
- Temperature abuse
- Cross-contamination
- Poor sanitary practices

Foodborne Illnesses

Abdominal Pain | **Diarrhea** | **Fever** | **Nausea Vomiting** | **Malaise**

What are its typical primary symptoms?

- Nausea
- Vomiting
- Abdominal cramps
- Diarrhea

Illness caused by microorganisms may have to be treated with antibiotics. However, if the illness is caused because of toxins, antibiotic therapy would be useless.

Common Foodborne Illnesses

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Illness	Symptoms	Potential Sources
Salmonella	Diarrhea, fever, abdominal cramps, vomiting	Poultry Eggs Contaminated raw foods
Listeria	Very dangerous for pregnant women, could cause premature delivery	Unpasteurized milk Soft cheeses made with unpasteurized milk
Escherichia Coli	Diarrhea, fever, abdominal cramps, vomiting	Water or food contaminated with human feces
Clostridium Botulinum	Double vision, blurred vision, drooping eyelids, slurred speech, difficulty swallowing, dry mouth	Canned foods/honey (infants)
Norovirus	Diarrhea, vomiting, nausea, and stomach pain	Shellfish, ready-to-eat foods

Key Recommendations

To avoid microbial foodborne illness:

Separate raw and cooked, ready-to-eat foods while shopping, preparing, or storing foods.

Cook foods to a safe temperature to kill microorganisms.

Chill (refrigerate) perishable food promptly.

Clean hands, food contact surfaces, and fruits and vegetables.

Key Recommendations: Separate

Separate to prevent cross contamination.

What is cross-contamination?

When one food item may cause contamination in other food item. For example, raw meat can contaminate a fruit/vegetable salad.

While keeping the food for chilling, care should be taken to store cooked foods in the top sections of the refrigerator. Uncooked foods can be stored at the bottom shelves.

Keep raw and ready-to-eat foods separate.

Keep raw meat and cooked food separate.

Key Recommendations: Cook

- Harmful bacteria are destroyed when food is **cooked to proper temperatures**.
- Licking or tasting food using the same spoon would **contaminate** the food item being prepared.

Key Recommendations: Chill

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- **Refrigerate** perishable food promptly to below 4°C.
- Never keep a perishable food outside the refrigerator or freezer for more than 2 hours.
- Regular refrigerator and freezer temperature checks are essential to food safety.
- Meat or any other frozen food product should be kept for thawing in the refrigerator or the microwave.
- The food item should **never** be kept on the countertop at room temperature for thawing purposes.

Key Recommendations: Clean

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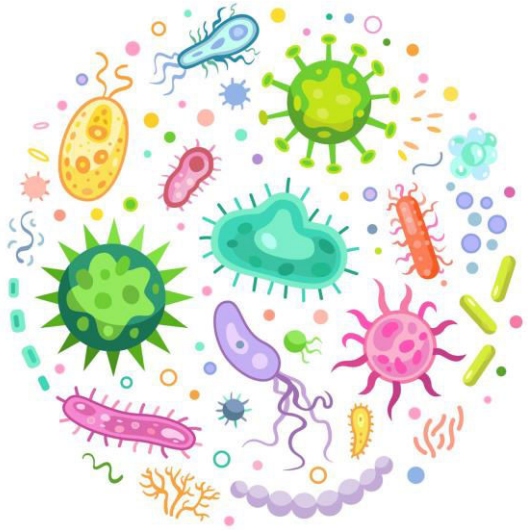
Wash hands often before and after you:

- Prepare food
- Eat or feed children
- Handle raw foods
- Use the restroom or change a diaper
- Cough or sneeze
- Handle garbage, dirty dishes, or cigarettes

Wash raw produce before cutting, cooking or eating
Wash utensils and cutting boards after each use
Keep kitchen surfaces clean
Dry your hands using disposable paper towels
Finger nails could be a source of contamination

Key Recommendations: Clean



Sanitizers can quickly reduce the number of germs on hands in many situations.

However:

- Sanitizers do **not** get rid of all types of germs.
- Hand sanitizers may not be as effective when hands are visibly dirty or greasy.
- Hand sanitizers might not remove harmful chemicals from hands like pesticides and heavy metals.

Temperature Danger Zone

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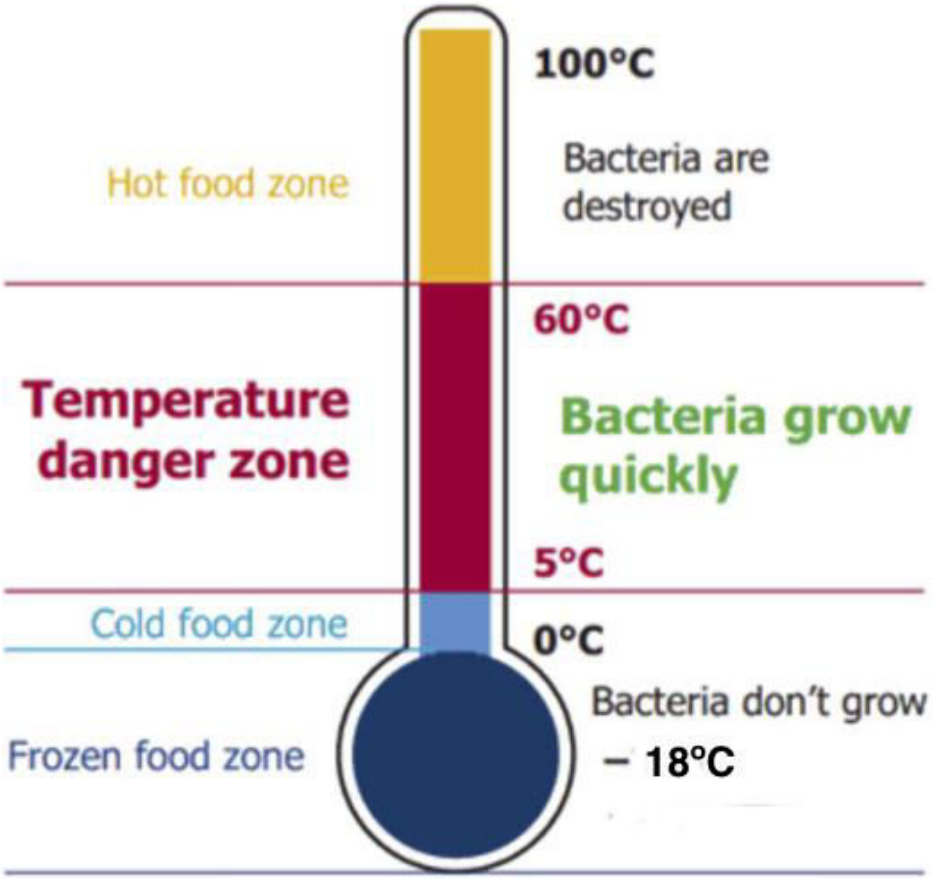
- The temperature danger zone is between 5°C and 60°C, when it is easiest for harmful bacteria to grow in food
- Minimise the time that food spends at these temperatures in order to keep food safe
- Refrigerated food needs to be kept at 5°C or below
- Hot food needs to be kept at 60°C or above



Heating and Reheating Safely

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Check that food is **properly cooked**.

When reheating, make sure the food is **piping hot**.

Only reheat the food **once**.

Waste

Make sure you have a **bin** nearby when you cook.

Collect food waste on newspaper or in a bowl on the table – place in the bin or compost after you have cooked.

Recycle used food packaging.

Key Recommendations for Specific Populations

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Populations at risk:

Infants, young children, pregnant women, older adults, and other people who have a low immunity should be very careful.

Avoid:

- Raw (unpasteurized) milk or any products made from unpasteurized milk
- Foods containing raw eggs
- Raw or undercooked meat, poultry, and sushi
- Unpasteurized juices
- Deli and cold cuts of meat

*Only eat certain deli meats and frankfurters that have been reheated to steaming hot.

Food Safety Systems

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There are various international systems that manage food safety hazards at the retail level/ industry:

HACCP: (Hazard Analysis Critical Control Point) The HACCP concept is designed to counter health hazards by identifying potential food safety problems before they happen.

ISO 22000: A proactive management plan for food safety relevant for any organization along the food supply chain.

GMP: (Good Manufacturing Practices) are internationally recognized quality assurance guidelines for the production of food, beverages, cosmetics, pharmaceuticals, dietary supplements and medical devices.