AMERICAN SOCIETY OF
SAFETY PROFESSIONALS

Nigeria Chapter

Working together for a safer, stronger future.

Advancing Food Safety Initiatives

Understanding the Unseen Hazards

Henry Igho Avwata (WSO-CSM)

ASSP Past President

Overview

- Food Safety Background
- Food Borne Illness
- Major Food Hazards
- Importance of Time-Temperature Control and Effect
- How Food Become Unsafe for Consumers
- Mode and Vehicle of Food Contamination
- Food Safety Best Practice
- HACCP/Catering and Hygiene Inspection Form

Background

Over the years, there are several cases of outbreak of food related incidents that led many to their early graves. In developed countries, the situation may be slighted better but avoidance or reduction in this unseen food borne related hazards could be avoided when food handling best practices and high level of hygiene is maintained.

Several food industries, restaurants, hotels, etc have been thrown out of business as a result of litigation, statutory notifiable incidents or prohibition notice due to food poisoning (worst with deaths records). World Health Organization (WHO) estimates that foodborne and waterborne diarrhea diseases taken together kill about 2.2 million people annually. In 2008, Director General of the National Agency for Food and Drugs Administration and Control (NAFDAC), Late Professor Dora Akunyili said, over three million cases of acute poisoning and 20,000 deaths occur annually due to exposure to food to pesticides. In the oil and gas and general industries, several man hours are lost daily due to foodborne related illness.

Improvement in Food Safety could only be achieved by embarking on massive awareness drive through training and re-training of all food handlers and anyone that eats food.

This awareness package is aimed at providing adequate information to both private and public sectors with required knowledge to overcome the ugly trend of Unseen Hazards in food we eat

In the United States, the U.S. Centers for Disease Control and Prevention (CDC) estimates food borne pathogens to have cause 76 million illnesses per year, 325,000 hospitalizations per year, 5,000 deaths/year. An estimated annual cost of $5 billion

Mead, P.S., et al. 1999. Food-Related Illness and Death in the United States. *Emerging Infectious Diseases.* 5(5)

Common Terms & Key Facts.

The objective of the Food Safety Awareness is to provide us with:

1. An overview of food safety and the basics that allow you to recognize and identify factors that:
   - Compromise food safety
   - Inhibit food borne illness from occurring
2. General introduction to food safety best practices.

Food

Is any nutritious substance, liquid or solid other than drugs, that we eat or drink for nourishment, growth and development.

What is a Food Borne Illness?

An illness caused by eating contaminated food that has a harmful substance present in it. It can be biological, chemical or physical.

Food Safety

Is a scientific discipline describing preparation, storage, and handling of food in ways that prevent food borne illness

Common Terms & Key Facts.

Food Poising:

Is an illness caused by bacteria or other toxins in food, typically with vomiting and diarrhea

Food infection:

Food-borne infections are caused by swallowing live pathogens that grow within the body, usually in the intestinal tract.

Food Intoxication:

Food intoxications is a condition caused by swallowing preformed toxins produced by microorganisms in the food

The Two-Hour Rule

It takes about two hours for microorganisms in food to grow to dangerous amounts when not at the recommended storage temperatures. Never let food remain in the temperature danger zone for more than two hours.

Higher-Risk Foods

Higher-risk foods are potentially hazardous foods, that when eaten raw or undercooked, have a higher potential for food borne illness occurring.
These include: Raw and rare meats, undercooked poultry and pork, raw oysters and undercooked seafood, raw or undercooked eggs

Common Terms & Key Facts.

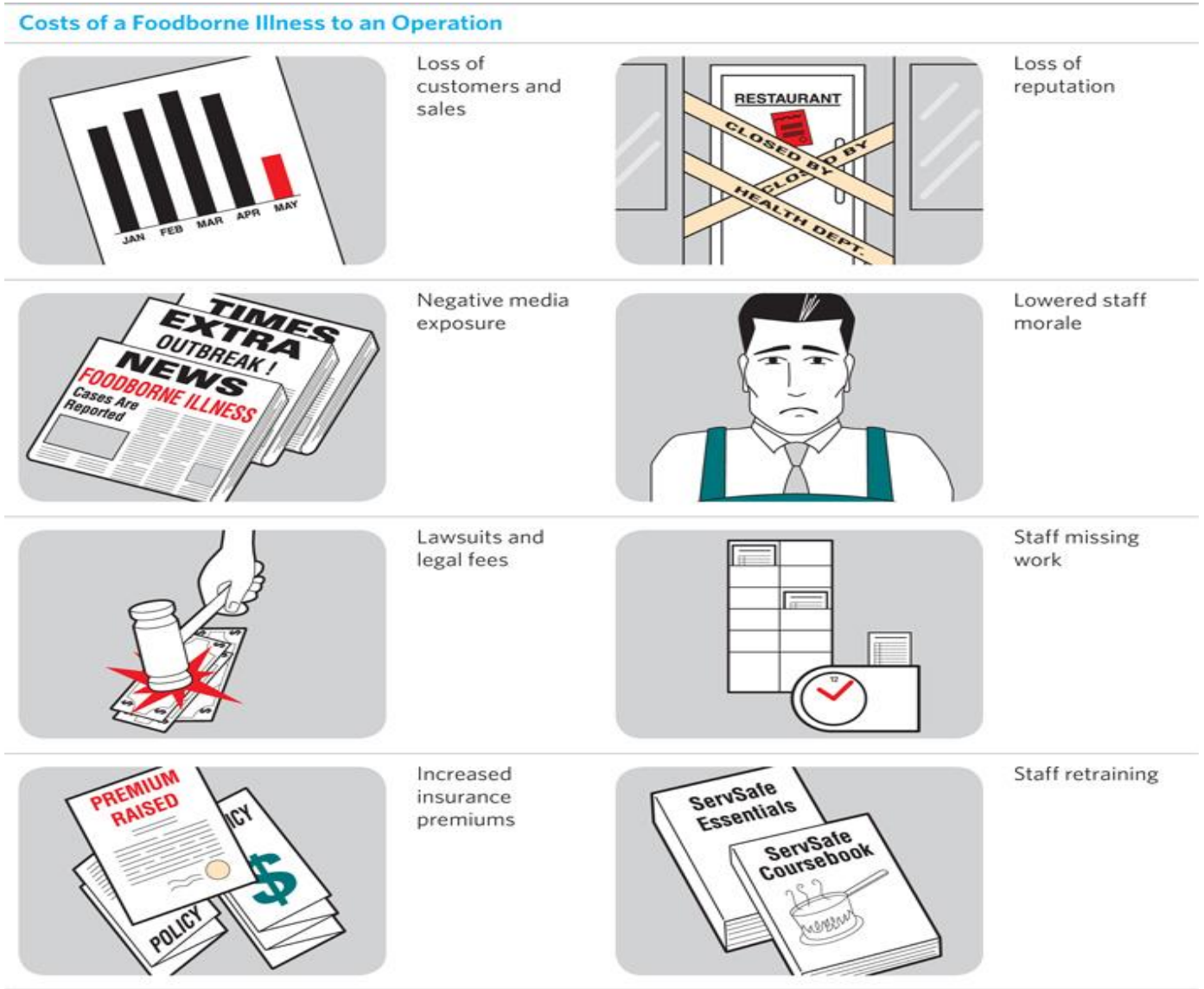
Water Activity (^{A}W): The water activity (aw) represents the ratio of the water vapour pressure of the food to the water vapour pressure of pure water under the same conditions and it is expressed as a fraction. Thus a food with a water activity (aw) of 0.7 would produce an ERH of 70%. The water activity scale extends from 0 (bone dry) to 1.0 (pure water) but most foods have a water activity level in the range of 0.2 for very dry foods to 0.99 for moist fresh foods. Water activity is in practice usually measured as equilibrium relative humidity (ERH).

Organism	Requirement
Osmophile	Sugar
Halophile	Salt
Thermophile	Heat
Psychrophile	Cold
Acidophile	Acid
Alkaliphile	Alkaline

Common Terms & Key Facts.

What does Food Safety have to do with you?

You might be working in a position that has the potential to make many people sick, possibly even causing them to suffer from serious medical complications if you do not follow some basic Food Safety rules. You could be a victim

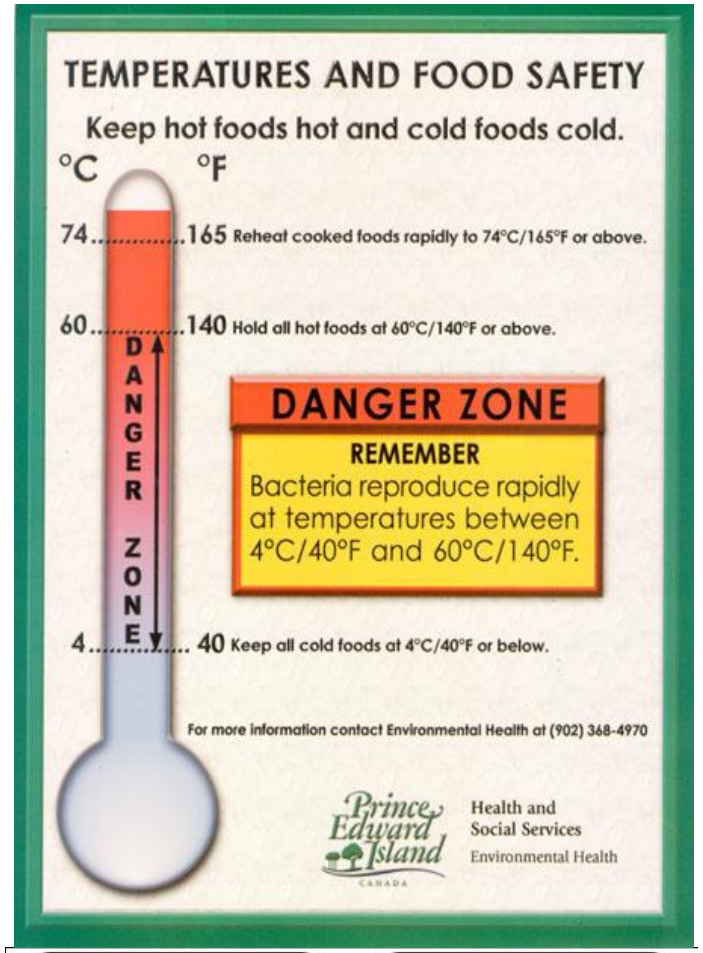


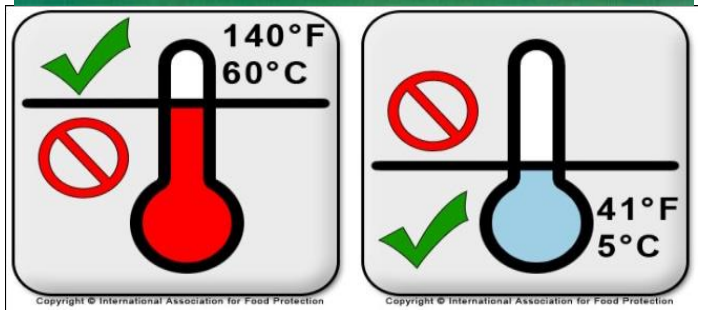
Common Terms & Key Facts.

Time Temperature Abuse is what happens when *Potentially Hazardous Foods* are left in the *Temperature Danger Zone* for too long.

A Potentially Hazardous Food is any food that will support the growth of harmful microbiological organisms. Food items high in protein such as meats, soy products, and dairy items are usually considered potentially hazardous foods and need special handling care.

The Temperature Danger Zone is the temperature range in which harmful microbiological organisms grow / reproduce most rapidly.





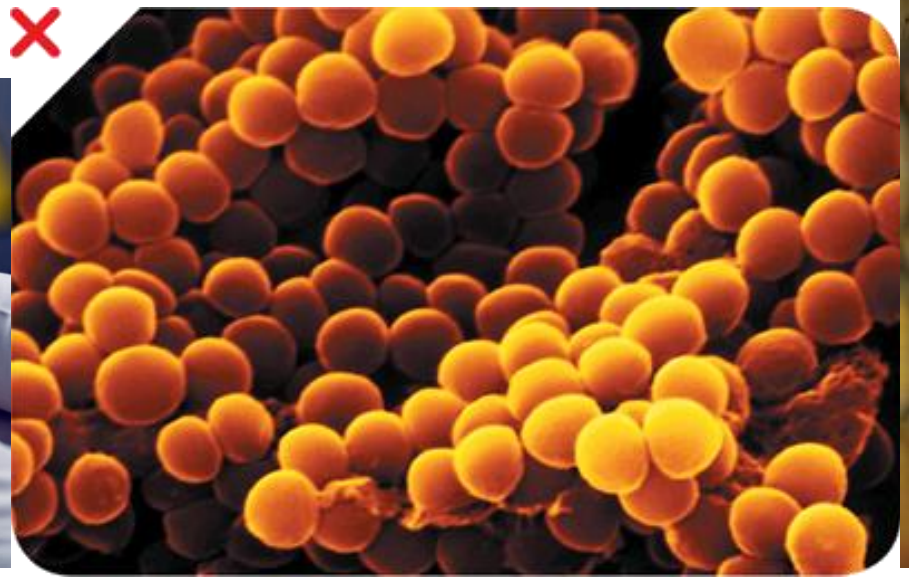
Basic Food Hazards

- Biological
- Chemical
- Physical

Biological Hazards

Biological hazards include:

- Viruses
- Bacteria
- Parasites
- Fungi



Encouraging Foodborne Pathogens

F OOD

A CIDITY

T IME

T EMPERATURE

O XYGEN

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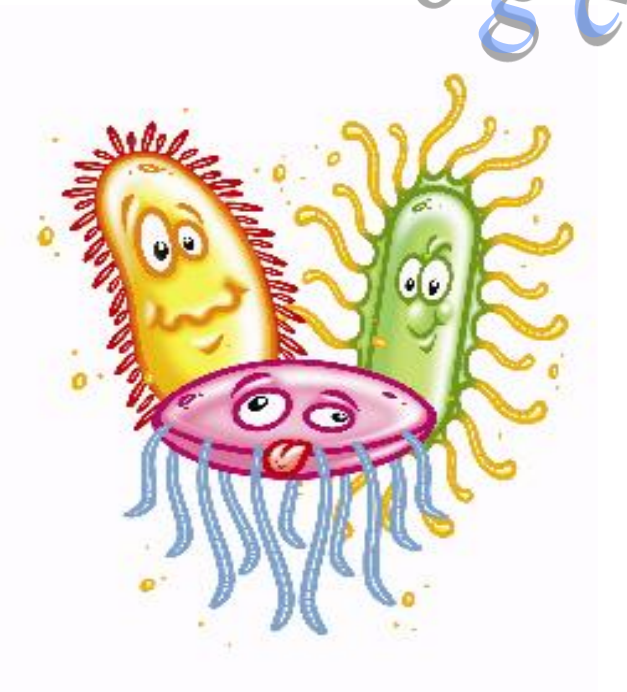

FOOD

A T T O M

Foodborne microorganisms need nutrients to grow. These are commonly found in potentially hazardous food, such as meat, poultry, dairy products, and eggs.

F

ACIDITY

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pH is a measurement of how acidic or alkaline a food is.

pH 0-6.9 = acidic foods

pH 7.1-14 = alkaline

pH 4.6-7.6=neutral to slightly acid (bacteria grows best)

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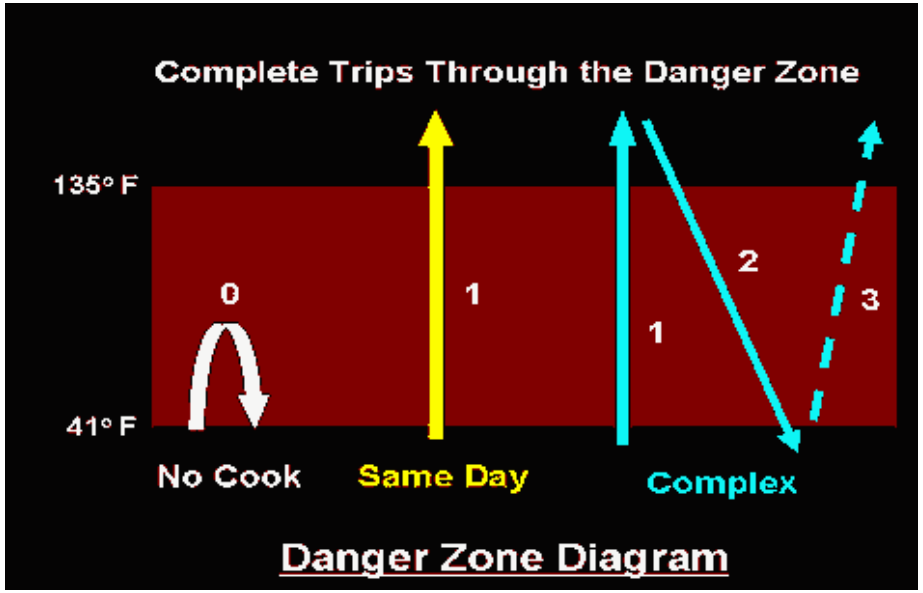
TEMPERATURE



Temperature Danger Zone = 41-135° F

Food must be handled very carefully when it is:

***Thawed** ***Cooked**

***Cooled** ***Reheated**

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Foodborne microorganisms need sufficient time to grow!

They are capable of doubling their population every twenty minutes.

If potentially hazardous food remains in the temperature danger zone for four hours or longer, foodborne microorganisms can grow to levels high enough to make someone ill.

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OXYGEN

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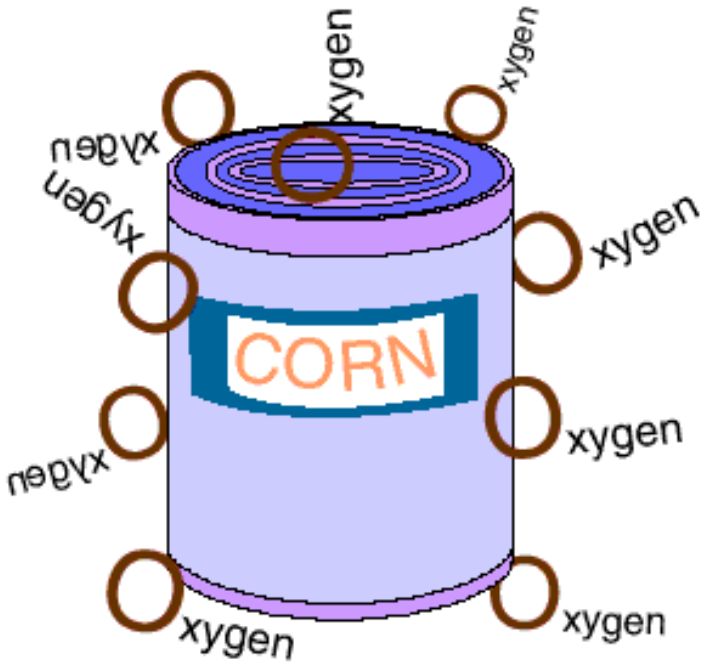


While most microorganisms need oxygen to grow, some do not!

Examples of foods that are associated with bacteria that do not need oxygen to grow are:

- Cooked rice
- Untreated garlic-and-oil mixtures
- Baked potatoes

FATTO

MOISTURE

Perishability

Water Activity	Food Examples
0.95	Fresh Fruit, Meat, Milk
0.95-0.9	Cheese
0.9-0.85	Margarine
0.85-0.8	Salted Meats
0.8-0.75	Jam
0.75-0.65	Nuts
0.65-0.6	Honey
0.5	Pasta
0.3	Dried Vegetables
0.2	Crackers

Chemical Hazard

Naturally Occurring Chemicals

Certain Fish: Tuna, mahi-mahi,
Nuts, Seafood: Some species produce an allergic reaction in sensitive people
Corn : Certain mold that grows on corn can create toxin, eg aflatoxin
Mollusca/ Shell fish: Microorganism and plant they feed from can produce toxin eg, domoic acid that affect the people but not the fish

Unintentionally or Incidentally Added Chemicals:

Agricultural chemicals: e.g., pesticides, fungicides, herbicides, fertilizers, antibiotics and growth hormones)
Prohibited substances: eg bromate in baked products
Toxic elements and compounds: e.g., lead, zinc, arsenic, mercury, cyanide)
Secondary direct and indirect: Plant chemicals (e.g., lubricants, cleaning compounds, sanitizers, paint)

Intentionally Added Chemicals

These chemicals are intentionally added to food at some point during food processing and distribution (food additives). Intentionally added chemicals are safe when used at established safe levels but can be dangerous when those levels are exceeded.

- Preservatives (e.g., nitrite and sulfiting agents)
- Nutritional additives (e.g., niacin)
- Color additives

Chemical Hazards

Chemical Hazards include:

- Cleaners
- Sanitizers
- Polishes
- Machine lubricants
- Toxic metals

Maximum Limits of Contaminants in Fruit Juice and Nectars

Contaminant in Fruit Juice/Nectars:	Maximum Limits (mg/kg)
Arsenic (As)	0.2 mg/kg
Lead (Pb)	0.1 mg/kg
Tin (Sn)	200 mg/kg
Copper (Cu)	5 mg/kg
Zinc (zn)	5 mg/kg
Iron (Fe)	15 mg/kg
Sum of Copper, Zinc and Iron	20 mg/kg
Toxins	0
Mycotoxins	0
Patulin (in apple juice and apple juice ingredients)	50 µg/kg

Mineral impurities insoluble in 10% of hydrochloric acid shall not exceed 25mg/kg (only for clarified juices)

Source: *NAFDAC – Fruits, juice and nectar regulations 2018*

Physical Hazards

Physical Hazards include:

- Hair
- Dirt
- Bandages
- Metal staples
- Broken glass
- Natural objects

(e.g., fish bones in a fillet)

Cross Contamination

Cross-contamination occurs when:

Physical, chemical, or biological hazards are transferred from one food or surface to another.

Poor Personal Hygiene

Poor personal hygiene occurs when food handlers:

- Don’t wash their hands right after using the restroom
- Come to work while sick
- Cough or sneeze on food
- Touch or scratch infected wounds and not wash their hands

How Can Food Handlers Contaminate Food?

Food handlers can contaminate food when they:

- Have a food borne illness and handle food
- Have open wounds that contain a pathogen
- Have contact with a person who is ill
- Touch anything that may contaminate their hands and don’t wash them
- Have symptoms such as diarrhea, vomiting, or jaundice—a yellowing of the eyes or skin

Unsafe Act- Can Contaminate Food:

A. Scratching the scalp

B. Running fingers through hair

C. Wiping or touching the nose

D. Rubbing an ear

E. Touching a pimple or infected wound

F. Wearing a dirty uniform

G. Coughing or sneezing into the hand

H. Spitting in the operation

Safe Food Handling

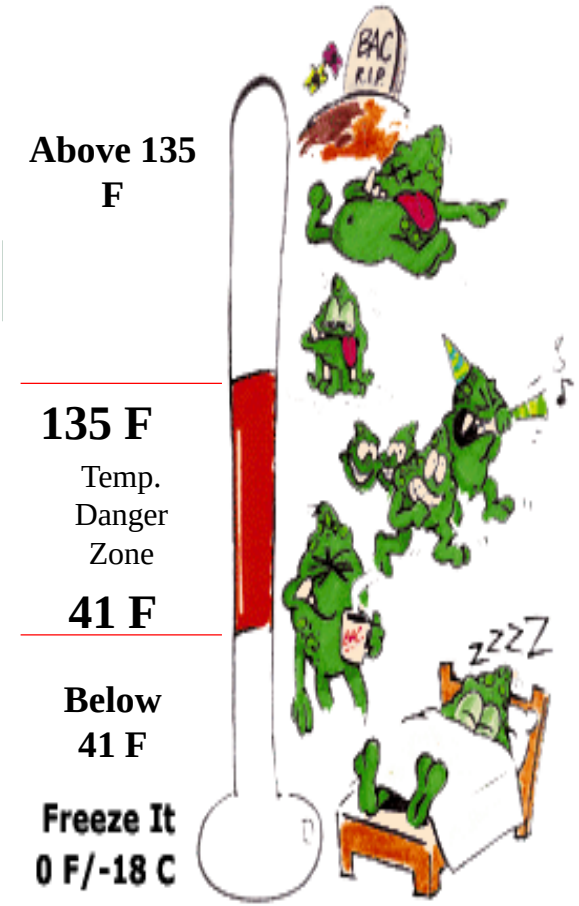
Three simple ways that you can practice **Safe Food Handling**

- Time Temperature Abuse
- Cross Contamination
- Practice Good Personal Hygiene

Preventing Time and Temperature Abuse

Avoid time-temperature abuse

- Keep food out of the temperature danger zone.
- Keep Hot Foods Hot and Cold Foods Cold
- Make sure your work area has a thermometer that is appropriate for taking food temperatures.
- Regularly record temperatures of hot and cold foods and record each time the temperature is taken.
- Take corrective actions if time-temperature standards are not met.



Preventing Cross Contamination

Use separate equipment for different types of food

- Cooked Foods vs. Raw Foods
- Meats vs. vegetables

Prepare food at different times

- Prepare raw meat, seafood, and poultry at different times than ready-to-eat food (when using the same prep table)

Clean and Sanitize

- Clean and sanitize all work surfaces, equipment, and utensils after each task

Being a Safe Food Handler

Good personal hygiene includes:

- Maintaining personal cleanliness
- Wearing proper work attire
- Following hygienic hand washing practices
- Avoiding unsanitary habits and actions
- Maintaining good health
- Reporting illnesses

Wash regularly

- No offending odors and no strong perfumes

Keep finger nails trim, neat, and clean

- No dirt, grease, or oils under your nails or on hands
- No fake finger nails

Proper Attire

Food handlers should:

- Wear a clean hat or other hair restraint
- Wear clean clothing daily
- Remove aprons when leaving food-preparation areas
- Remove jewelry from hands and arms when working with food or when working around preparation areas

How to Wash Your Hands Properly

Glove Use

Single-use gloves used for handling food:

- Must *never* be used in place of hand washing
- Must never be washed and reused
- Must fit properly

When to change gloves:

- As soon as they become soiled or torn
- Before beginning a different task
- After handling raw meat, seafood, or poultry and before handling ready-to-eat food

Eating and Drinking Policy…

Food handlers must not:

- Eat, drink, smoke, or chew gum or tobacco…...

When:

- Preparing or serving food
- Working in food preparation areas
- Working in areas used to clean utensils and equipment

Storing Food

All food must have a label that includes:

- Name of the food
- Date by which it should be sold, eaten, or thrown out

Discard food that has passed the manufacturer's expiration date.

Ready-to-eat food that was prepared in-house:

- Can be stored for 7 days at 41°F (5°C) or lower
- Must be thrown out after 7 days

Storing Food

Rotate food to use the oldest inventory first

- Identify the food item's use-by or expiration date
- Store items with the earliest use-by or expiration dates in front of items with later dates
- Use items stored in front first

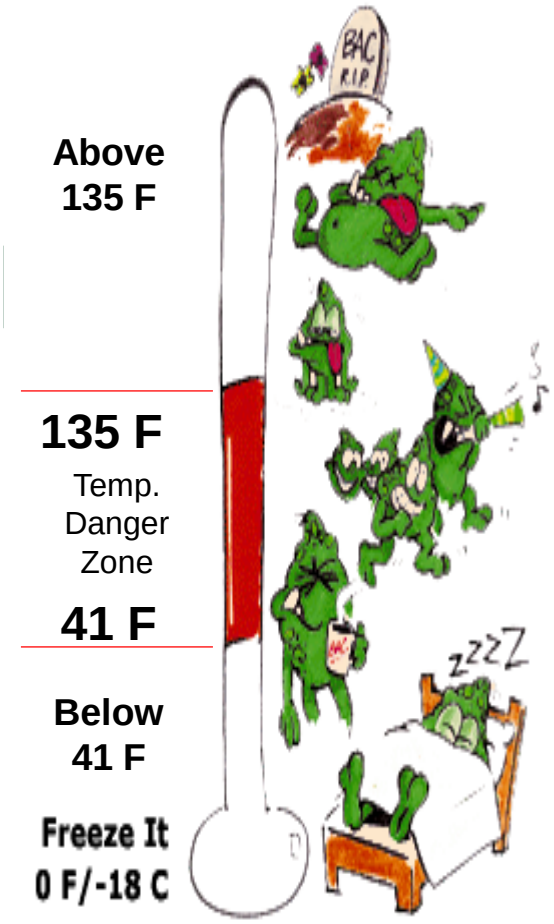
FI-FO Vs LI-FO

Storing Food

Store food items in the following top-to-bottom order:

- Ready-to-eat food
- Seafood
- Whole cuts of beef and pork
- Ground meat and ground fish
- Whole and ground poultry

Cooking and Holding Food



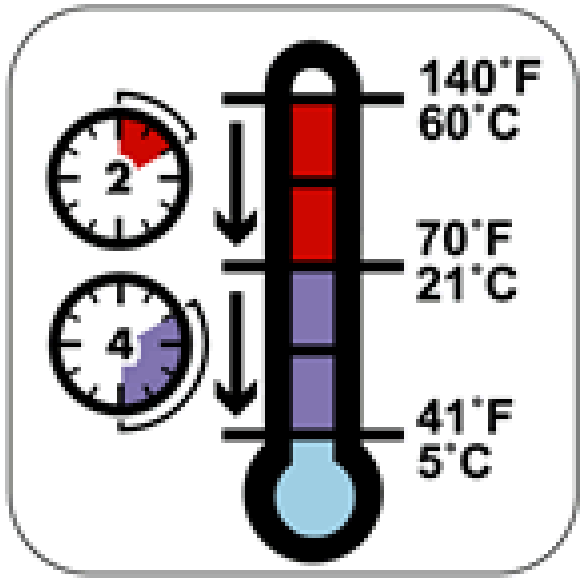
- Cook hot foods to their appropriate internal temperature
- All hot foods must be held at or above 135 degrees F.
- When cooking in a microwave all food must be 165 degrees F.

Chilling the Food

Cool down food quickly

- Put in shallow pans.
- Use the ice wands or ice paddles.
- Leave uncovered in the FREEZER.
- Check and record the temperature often.
- Leave loosely covered in cooler overnight.

- **Food must be cooled to 70 degrees in 2 hours and to 41 degrees or below in an additional 4 hours.**
- **Remember to date and label the food.**



Reheating Food

Food Reheated for Service or Hot-Holding

Must be reheated to an internal temperature of

165°F (74°C) for 15 seconds within 2 hours

Serving Food

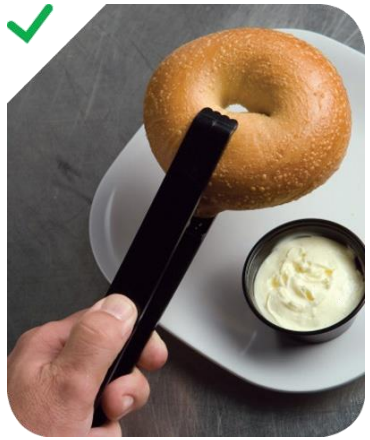
To prevent contamination when serving food:

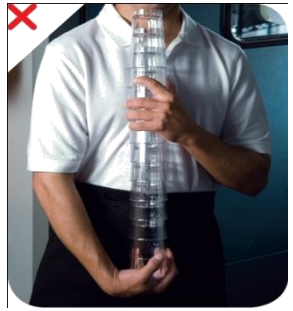
- Handle ready-to-eat food with tongs, deli sheets, or gloves
- Use clean and sanitized utensils for serving
  - Use separate utensils for each food
  - Clean and sanitize utensils after each task

Store serving utensils correctly between uses

- On a clean and sanitized food-contact surface
- In the food with the handle extended above the container rim

Handling Utensils and Food





Dishwashing

Guidelines

- Clean the machine as often as needed
- Scrape, rinse, or soak items before washing
- Use the correct rack for the items being washed
- Check racks for soiled dishes as they come out of the machine
- Air-dry all items
- Check the machine’s water temperature and pressure
- Temperatures may vary depending upon equipment.

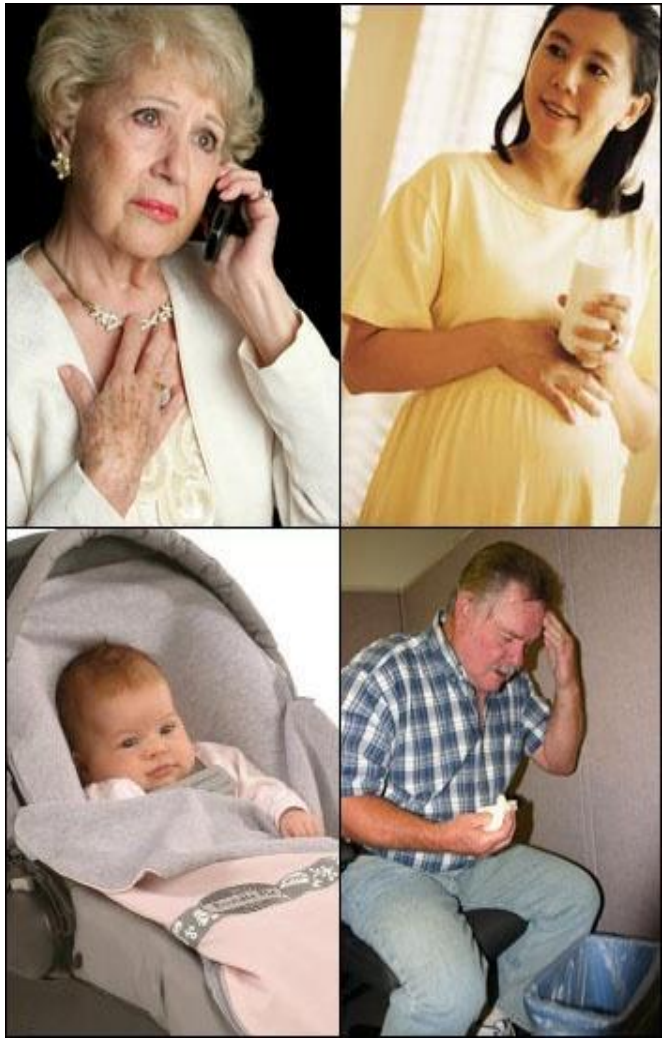
Prevention & Control Of Food Poisoning

- Food Buying
- Food Transport
- Food Storage
- Kitchen Control

- Personal Hygiene/Medical fitness
- Waste Management/Disposal.

Food Buying

- ✉ Spoilage/Putrefaction
- ✉ Quantity that can be preserved
- ✉ Do not buy Expired products
- ✉ Look at Package materials
- ✉ The Environment
- ✉ The Seller.



Food Transport

- ✉ Use vehicles with frozen Storage facility
- ✉ Cold preservation for Perishable items
- ✉ Wrap all ready-to eat foods with foils.
- ✉ Avoid denting of containers
- ✉ Do not keep Chemicals and Food together.
- ✉ Observe hygienic off-loading

Food Storage

- ✉ Store food 25cm off the ground on shelves.
- ✉ Vegetables should be separate
- ✉ Separate fish which taints other foods
- ✉ Adhere to "First-In First -Out"
- ✉ Control Time and Temperatures

Process Control

- ✉ **Separate raw from Ready -To- Eat Foods**
- ✉ **Use separate equipment for raw and cooked foods**
- ✉ **Disinfect surfaces, equipment &utensils**
- ✉ **Reduce germs multiplication through cold storage**
- ✉ **Restrict visitors.**

Personal Hygiene

- ✉ Keep yourself clean always
- ✉ Wash hands before and after handling food
- ✉ Stay away if medically unfit (nose/throat troubles)
- ✉ Cover all wounds properly
- ✉ Dress properly and Cover your hair completely
- ✉ Keep finger nails short
- ✉ Curb bad habits (picking the nose)
- ✉ Remove jewellery
- ✉ Smoking
- ✉ Report Illness to Medical Team
- ✉ Proper waste management and control

CONCLUSION

- **Food poisoning is an Unseen Hazard……. only awareness, enforcement and effective control can eliminate outbreak of food poisoning and food infection**

- **Therefore our effort to minimize food borne illness is a collective responsibility through incessant awareness drive**

Questions?

If you have questions, please contact the Presenter:

Presented by: Henry Igho Avwata (WSO- CSM)
henryavwata@yahoo.com – Tel: +2348033125614