

# Food Protection

## Lesson 13

### Hazard Analysis Critical Control Point: A Food Protection System

**Hazard Analysis Critical Control Point System (HACCP)** was pioneered by the Pillsbury Company in the 1960's. At this time, the space program was escalating and there was a great need to provide a safe food supply for astronauts.

This system follows the flow of food through every step, from the time the raw products are brought into the establishment to when the finished product is ready to be served to the consumer. By observing food at each step of the production process, it is easy to recognize potential problems and take action to prevent problems before they occur.

The system is based on the following concepts: .

**Hazard.** A hazard is any condition in which microorganisms, foreign matter or chemicals contaminate foods and in which the microorganisms are allowed to grow or survive.

**Analysis.** This is the process by which a food item is studied to determine the problems that are likely to occur and how these can be prevented. Not only the ingredients are studied but the analysis also includes the available equipment, personnel and the population to be served.

**Critical Control Point.** This is the step at which action **must** be taken to prevent, reduce or eliminate a hazard. Failure to do so at this point will render that food unfit for human consumption. Critical control points will vary depending on the food ingredients, method of preparation and whether it is a hot or a cold food. In every food preparation process, some action can be taken at every step to prevent problems. However, at critical control points, some action **must** be taken.

## Frequently Found Hazards

- **Microorganisms are allowed to grow by:**
  - Improper cooling procedures—not using a method that will reduce food from 140°F to 70°F within 2 hours and from 70°F to less than 41°F in an additional 4 hours.
  - Inadequate hot holding: holding prepared foods at less than 140°F while awaiting service.
  - Inadequate reheating: previously cooked foods not reheated rapidly to 165°F within 2 hours using a stove or an oven.
- **Microorganisms are allowed to survive by:**
  - Inadequate cooking: not cooking potentially hazardous foods to the required temperatures.
  - Improper sanitization: dishes, utensils and equipment are not subjected to adequate temperatures or chemicals to destroy microorganisms.
- **Microorganisms, chemicals and foreign matter are allowed to contaminate food by:**
  - Poor personal hygiene: food workers do not wash their hands before handling food and food-related equipment.
  - Ill food workers: food workers allowed to work while having an illness that is transmissible through foods.
  - Cross-contamination: allowing ready-to-eat foods to come into contact with raw foods or contaminated equipment.
  - Use of contaminated food or ingredient: using shellfish from unapproved source or meat and meat products from un-inspected or unreliable suppliers.
  - Storing acidic foods in metal containers: storing barbecue sauce in galvanized containers.

The HACCP system, as described by the International Association of Milk, Food and Environmental Sanitarians, has a series of seven inter-related steps to protect food:

**Step #1. Identify Hazards and Assess Their Severity and Risks**

The first step in this system is to review recipes to identify potentially hazardous foods or foods containing potentially hazardous ingredients, set out the preparation process in a flow chart and identify the hazards that can occur at each step in the process.

**Step #2. Determine Critical Control Points**

The second step is to identify the critical control points, that is, those steps where action **must** be taken to prevent, reduce or eliminate a hazard.

**Step #3. Institute Control Measures and Establish Criteria to Ensure Control (Determine Critical Limits)**

The third step is to determine the measures or the actions that are needed to prevent, reduce or eliminate hazards that are anticipated.

**Step #4. Monitor Critical Control Points and Record Data**

The fourth step is to monitor what is being done at each critical control point to determine whether the hazards are controlled by the actions set up in the third step.

**Step #5. Take Actions Whenever Monitoring Results Indicate Criteria Are Not Met**

The fifth step is to put in place immediate corrective action if the hazards are not controlled at the critical control points.

**Step #6. Verify That the System Is Working As Planned**

The sixth step is to review the system to ensure that it is working, that hazards are identified, corrective actions are taken and that a safe food product is produced.

**Step #7. Record-Keeping**

The seventh and the last step is record-keeping. This allows managers to review the plan from time to time to help verify that the system is working.

## THE FOOD-FLOW DIAGRAM

The following diagram shows the various steps of HACCP in a model that uses the preparation of fried chicken as an example.

Process	Hazards	Critical Control Point	Criteria for Control	Monitoring Procedure	Action when Criteria Not Met
Receiving	Unapproved source  Salmonella contamination  Out of proper temperature zone	No	Inspect source  Temperature 41°F  No foreign matter	Check inspection stamp  Measure temperature  Inspect for spoilage	Return to supplier or discard
Storage	Insufficient refrigeration space  Improper equipment temperature  Raw stored over cooked	No	Check food and refrigerator temperatures  Store cooked over raw  Practice First In First Out	Place thermometer in refrigerated equipment  Check food temperatures  Date products  Observe storage practices	Provide more refrigeration space and efficient units  Discard food if temperature is between 41°F and 70°F for more than two hours or at 70°F or higher  Implement rapid cooling procedures if temperature is between 41°F and 70°F for less than 2 hours.
Preparation	Too much chicken out at one time  Use of contaminated equipment	No	Practice batch preparation using sanitized equipment	Maintain food at 41°F and ensure only amount of food is out that can be processed within two hours	Discard food if temperature is more than 41°F for more than two hours or at 70°F or higher
Cooking	Required temperature not reached resulting in survival of salmonella	Yes	Uninterrupted cooking to 165°F	Measure temperature at thickest part of food	Continue cooking until food temperature at thickest part is 165°F.

Hot holding  (Same day service)	Insufficient equipment  Improper holding temperature  Patron contamination	Yes	Enough equipment  Food at 140°F  Use sneeze guards and utensils	Check equipment and food temperature every hour	If food is below 140°F for more than 2 hours, discard it  If food is below 140°F for less than 2 hours, reheat to 165°F
Cooling (left over food)	Slow cooling allows for growth of microorganisms	Yes	Reduce from 140°F to 70°F within 2 hours and to below 41°F within an additional 4 hours.  Work with small portions of meat and shallow containers	Measure temperature every hour.  Keep foods uncovered during cooling.	If food temperature is between 140°F and 70°F for more than 2 hours, discard food  If temperature is between 70°F and 41°F for more than 4 hours, discard food
Reheating	Improper equipment  Slow reheating  Food in Temperature Danger Zone	Yes	Reheat to 165°F within two hours using stove or oven	Check food temperatures every hour	If temperature is less than 165°F, continue reheating  Discard if food was never reheated to 165°F and more than two hours have elapsed.

The food-flow chart and an HACCP evaluation can be applied to any potentially hazardous food item or food containing potentially hazardous ingredients. The critical control points will vary in foods depending on the ingredients, method of preparation and whether served hot or cold.

The following food flow diagram for **tuna salad** shows the critical control points for this food item.

Process	Hazards	Critical Control Point	Criteria for Control	Monitoring Procedure	Action when Criteria Not Met
Receiving cans of tuna and jars of mayonnaise	Unapproved source  Defective cans  Home prepared	No	Inspected source  No home-canned products	Check cans for various defects	Return to supplier or discard
Storage	Under sewer lines	No	Keep in storage area, away from sewer lines	Observe storage	Discard.
Preparation	Not using pre-chilled ingredients  Mixing with bare hands  Ill food workers  Use of contaminated equipment	Yes	No bare hand contact  Send ill workers home  Cold food at 41°F or below  Equipment and utensils clean and sanitized	Maintain food at 41°F  Use pre-chilled ingredients  Wash & sanitize equipment and utensils  Use of gloves or utensils  Observe proper hand washing technique  Observe worker's health.	Discard food if : Temperature is between 41°F and 70°F for more than two hours or at 70°F or higher  Direct bare hand contact with ready-to-eat foods  Prevent Ill food workers from working until fully recovered  Wash, Rinse and Sanitize Equipment/utensils that are contaminated
Cold holding (Same day service)	Food not held at 41°F or below  Ineffective refrigeration equipment  Patron	Yes	Keep food temperature at 41°F  Effective refrigeration equipment  Use sneeze	Measure food temperature during holding every hour	Discard food if temperature is higher than 41°F for more than two hours or at 70°F or higher  Implement rapid cooling procedures if temperature is higher

	contamination.		guards and utensils		than 41°F but less than 70°F for less than two hours
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This system is an invaluable tool when there is cooperation between management and staff. Department of Health inspectors are familiar with this food safety system and are willing to provide guidance.

Appropriate equipment must be provided in sufficient quantities and workers properly trained in its use. Staff must be trained to identify hazards and be provided with written procedures on how to prevent, reduce or eliminate them. These procedures must be reviewed periodically and updated when changes are necessary.