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Physical Hazards

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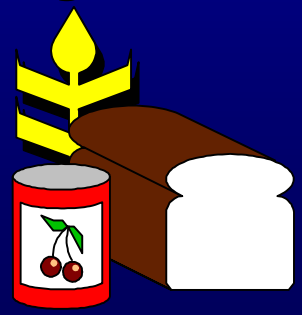


HACCP and Food Safety Help for Small Meat and Food Processing Operations

Hazard Analysis

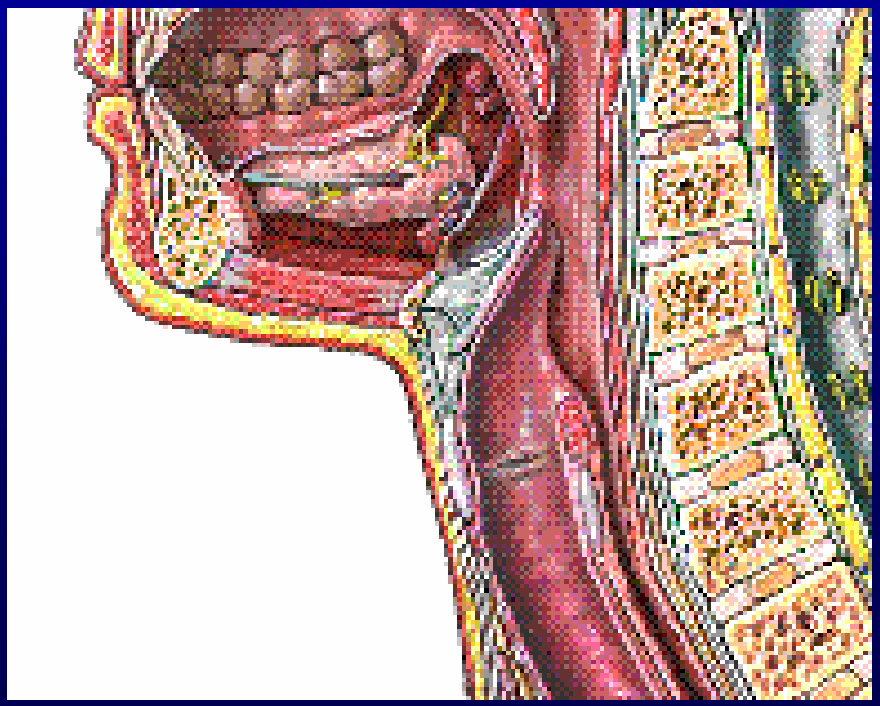
- Assure that your are dealing with safety issues.
- Physical Hazard = A physical property that may cause a food to be unsafe for consumption.
- Quality and economic issues (not involving safety) must be excluded.

What Parts of the Human Anatomy are at Risk from Physical Hazards?

- **Digestive Tract**
- **Respiratory Tract**
- **Mouth and Teeth**
- **Extremities (Hands)**

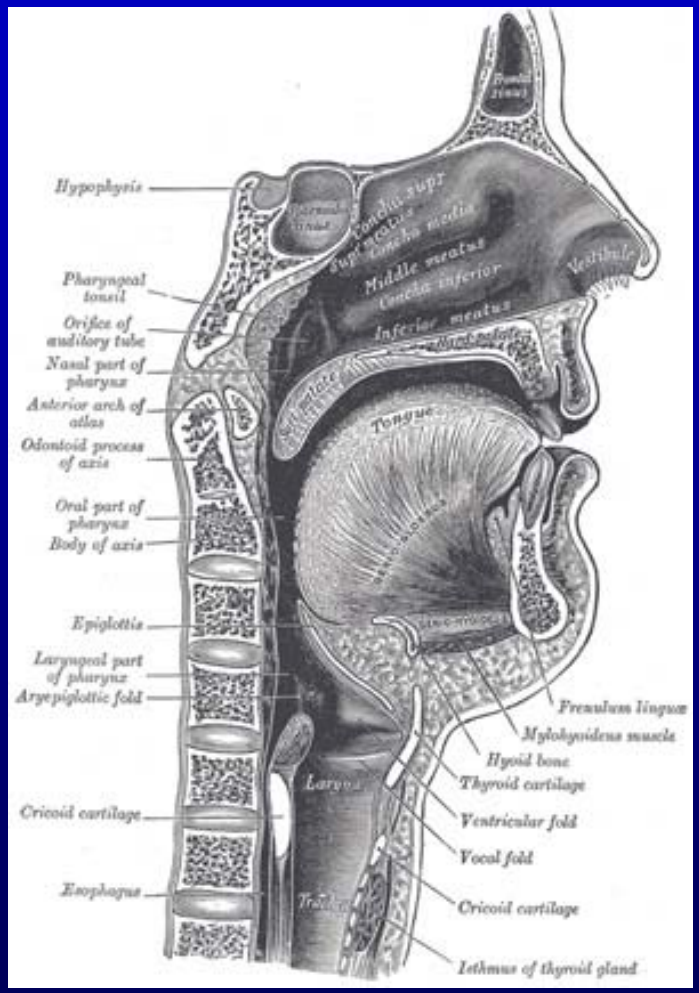
Hazards to the Digestive Tract

- Esophageal laceration
- Esophageal perforation
- Fistula formation
- Laceration or perforation of other portions of the digestive tract
  - Pharynx
  - Stomach
  - Intestine



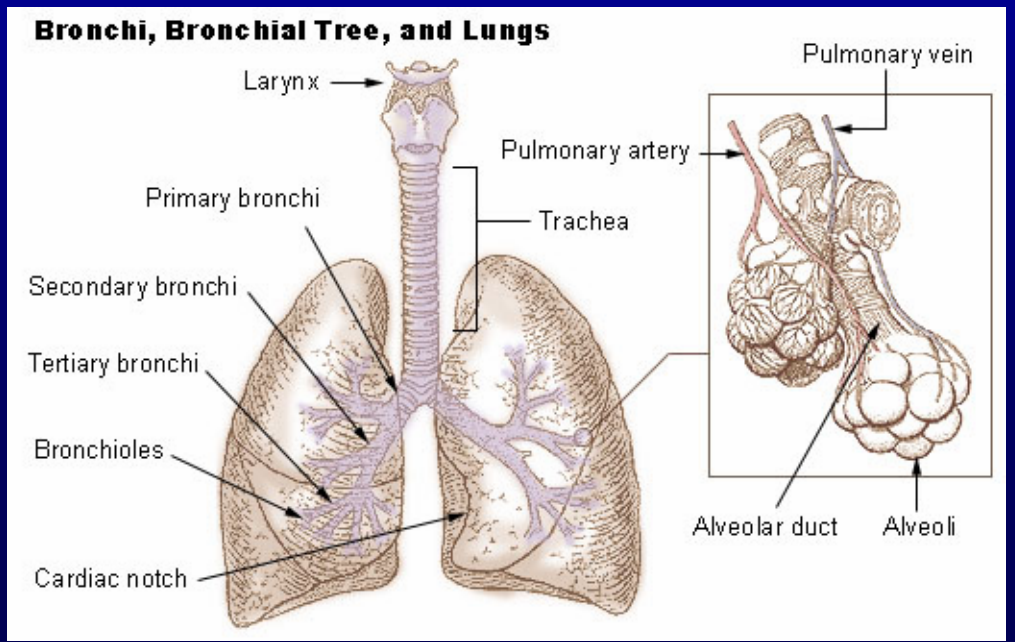
Hazards to the Respiratory Tract

- Choking--occlusion of the airway
  - Children under age 3 at greatest risk
  - Common hazards are foreign objects (coins or toys) or food, *though not foreign objects in food*
  - Objects may become lodged in the upper esophagus and cause choking/asphyxiation by compression of the trachea



Hazards to the Respiratory Tract

- Aspiration--inhalation of foreign matter into the bronchial tree--may result in:
  - partial lung collapse
  - secondary infection
  - destruction of lung tissue from retained material



Hazards to the Mouth and Teeth

- Lacerations of the mouth
- Lacerations of the tongue
- Chipped teeth
- Broken fillings
- Damage to prosthetics

Other Hazards

- Lacerations on the hands occurring during food preparation
- Illness complaints
  - Nausea and vomiting
  - Diarrhea
  - Headache, fever and dizziness
  - Chest pain

Characteristics of Foreign Materials that May be Hazardous

Size of the Object

- **Consumer Product Safety Commission (1995): spherical objects < 1.75 inches in diameter are dangerous to children under 3 years (choking, ingestion or aspiration)**
- **CPSC uses a Small Parts Test Fixture (a cylinder) to judge other non-spherical objects for choking hazard**

Characteristics of Foreign Materials that May be Hazardous

Size of the Object

- **FDA Health Hazard Evaluation Board conclusions in cases of foreign materials (1972-1997) found that 56% of objects 1-6 mm might pose a limited acute hazard**
- **For objects > 6 mm, only 2.9% were judged to present no hazard**

Clinical Observations about Foreign Body Ingestion

- About 80% of foreign body (FB) ingestions occur in the pediatric age group
- 80-90% of FBs ingested will pass spontaneously over 4-7 days
- Estimated that 1-5% of FBs ingested will result in injury

Clinical Observations about Foreign Body Ingestion

- Sharp objects account for about 10% of FB ingestions, but a disproportionate number of injuries
- In a review of FDA consumer complaints of foreign materials in food, the most frequently reported injury was mouth or throat laceration
- In the FDA review glass was the foreign material most frequently reported as causing illness or injury

Characteristics of Foreign that May be Hazardous Materials

Size of the Object

- **FSIS in its 1995 Public Health Hazard Analysis Board on bone particles concluded:**
  - **bone particles < 1 cm not a safety hazard;**
  - **particles 1-2 cm are a low risk;**
  - **particles > 2 cm have the potential to be a safety hazard and may cause injury**

Characteristics of Foreign Materials that May be Hazardous

Size of the Object

- **FSIS (1995): The presence of foreign material other than bone may pose a potential hazard, and each instance should be considered on a case-by-case basis, irrespective of size**

Characteristics of Foreign Materials that May be Hazardous

Size of the Object

- **FDA/ORA Compliance Policy Guide**
  - **Criteria for direct reference seizure: Hard or sharp objects 7-25 mm and RTE**
  - **Criteria for recommending legal action :**
    - **7-25 mm and requires additional preparation**
    - **< 7 mm and intended for special-risk group**
    - **> 25 mm in length**

Reference for Physical Hazards

- Olsen, A.R. 1998. Regulatory action criteria for filth and other extraneous materials. I. Review of hard or sharp foreign objects as physical hazards in food. Reg. Tox. Pharm. 28:181
- Concluded that any sharp pointed object equal to or greater than 7 mm would be considered a health hazard.

Analysis of Physical Hazards

- The decision to include a physical hazard control in a HACCP plan may depend on
  - Past complaints from consumers
  - Assessment of the plant GMP's
  - The extent of HACCP Prerequisite records and monitoring.

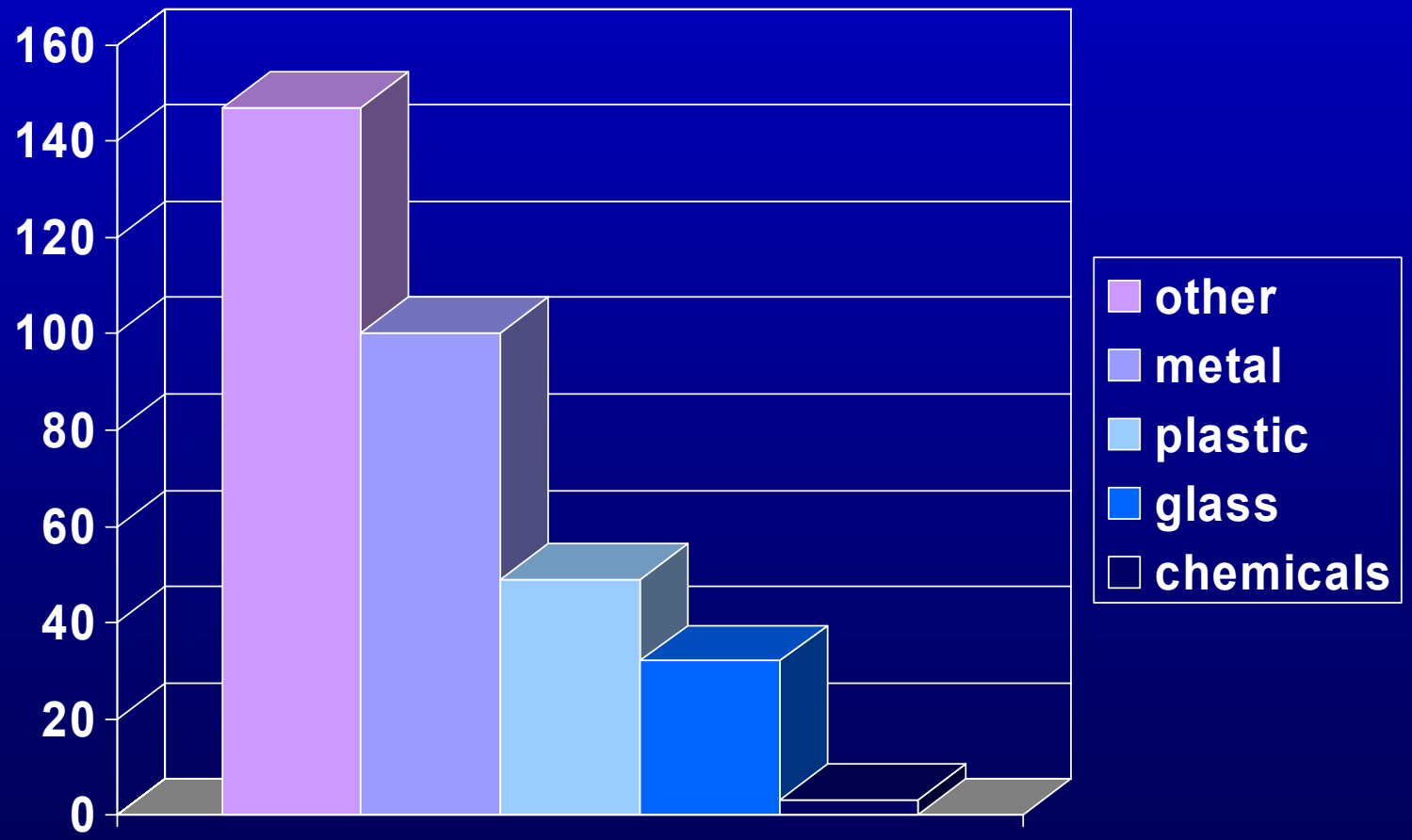
Consumer Complaint Monitoring System (CCMS) by FSIS

- CCMS is a passive surveillance system designed to document and track all consumer complaints that are reported to the Food Safety and Inspection Service.
- A consumer complaint is any complaint reported to FSIS that is initiated by a consumer, or on behalf of a consumer, that is related to an FSIS- inspected product

What has CCMS found ?

- N= 1309 from 01/01/02 to 09/13/02
- Foreign material (FM) complaints = 331
  - 25% of all CCMS complaints
  - injury n = 20 or 6%
  - illness n = 24 or 7%
- **5% of foreign material in food results in minor to serious injury Hamilton and Polter 1989 Hyman 1993**

Breakdown of foreign materials (n = 331)



Glass n = 32

- 10% of foreign material complaints
- Allegedly resulted in 4 injuries (12%) and 2 illnesses (6%)

Metal n = 100

- Represents 30% of foreign material consumer complaints
- 5% allegedly resulting in injury
- Lacerations to tissues of mouth, gums, and throat
- Multiple broken teeth

Plastic n = 32

- Represents 15% of foreign material complaints
- 4% allegedly resulted in illness, one case requiring surgical intervention
- 10% allegedly resulted in injury/choking
- Special concern is for young children

Chemicals n = 3

- To date, these complaints in CCMS resulted in no injury or illness
- Complainants identified through smell, taste, and sight

Other n = 147

- Consists primarily of wood, fingernails, and stones
- Represents 44% of foreign material complaints
- 4% allegedly resulted in injury (wood=lacerations, stones=dental)
- 12% allegedly resulted in illness (most not lab confirmed)

Hazard Analysis

- The HACCP Team must identify and list all physical hazards.
- Finished product
- Ingredients
- Handling procedures
- Manufacturing operations
- Storage
- Distribution

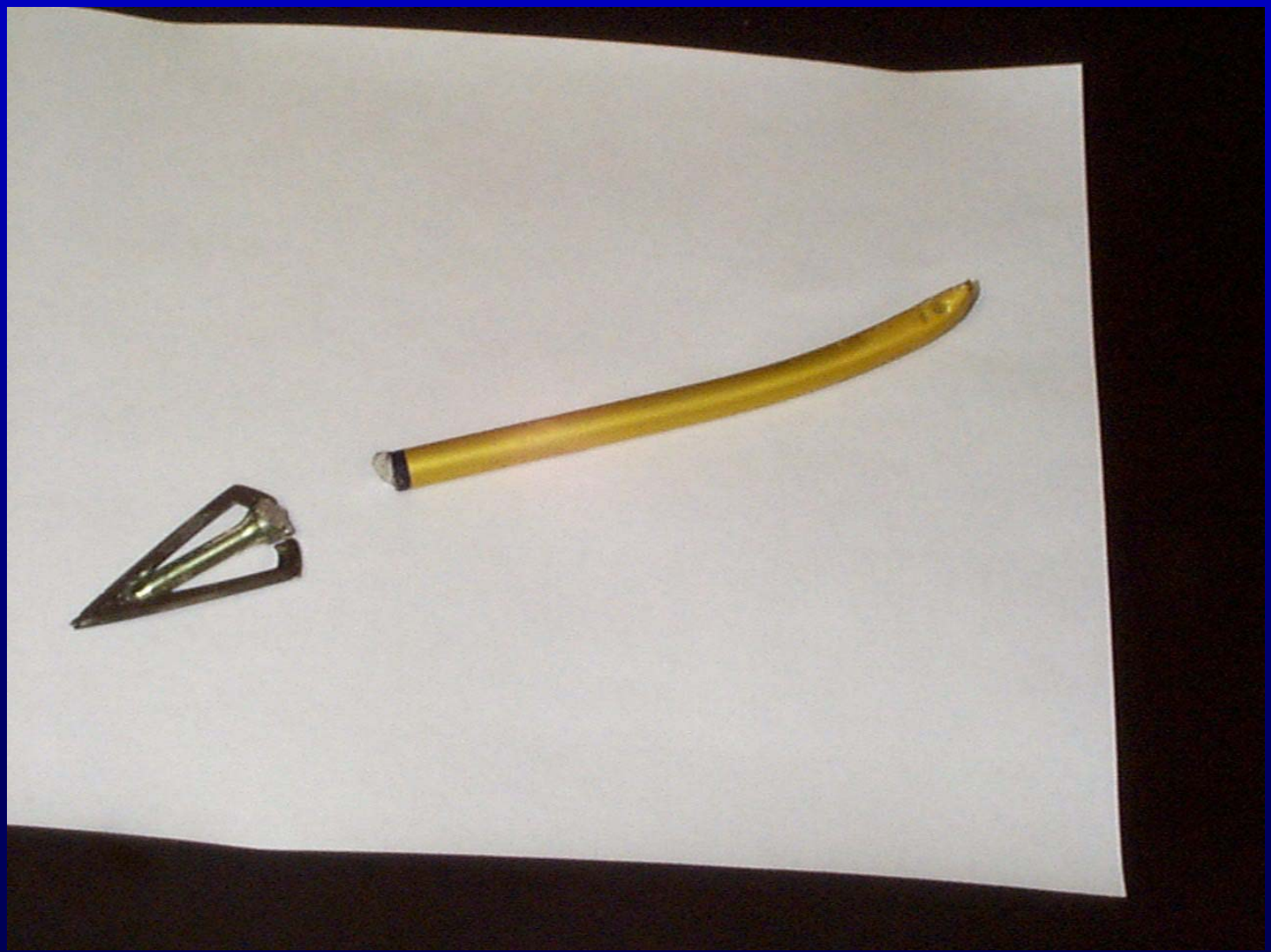
Physical Hazards

- What are some physical hazards you have found in meat or food?

- Section 7 of your book (Table 3 page 38906 Federal Register Vol. 61, No. 144)
- Chapter 7 of your FPI book

- What is the most unusual physical material you have found?

Arrow in a Beef Carcass



Physical Hazards

- Glass
- Metal
- Wood
- Stones
- Plastics
- Bone
- Bullet/BB Shot/Needles
- Jewelry (tongue studs)

Physical Hazards

- Insects
- Hair
- Rodent droppings
- Gum
- Paint flakes
- Band-aid
- Writing pens
- Carcass ID tags
- Feathers
- Gasket materials
- Arrows
- Wire clips
- String
- Plastic Straps or bags
- Knives
- Meat hooks

Eight Most Common Foods in Foreign Object Complaints

- Bakery 10.2%
- Soft drinks 8.4%
- Vegetables 8.3%
- Infant Foods 6.9%
- Fruits 6.7%
- Cereals 6.6%
- Fishery 5.3%
- Chocolate 4.8%
- Meat ???

When Conducting the Hazard Analysis Consider the Sources of Physical Hazards

- Raw Materials
- Facility
- Processing Equipment
- Employee Practices

Controls for Physical Hazards / Foreign Material

- Plant GMP's
  - Employee programs (training)
  - Ingredient specifications
- Prerequisite programs for HACCP
  - Letters of guarantee
  - Practices to identify and record sources of physical hazards
  - Monitoring and documenting controls
- CCP's in the HACCP plan
  - Last steps in the processing