



# **Food Safety and Security – NBC Warfare Protection and Prevention**

**Presented By  
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AFTERNOON **EXTRA** EDITION

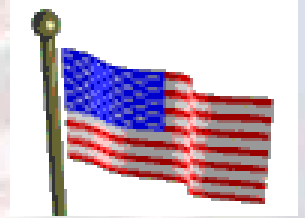
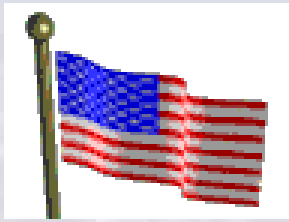
# THE CINCINNATI ENQUIRER

WEDNESDAY, SEPTEMBER 11, 2001

TERROR FROM THE AIR

## U.S. ATTACKED

Hijacked airliners lead terrorist assault on  
World Trade Center, Pentagon





**From Brooklyn Bridge**



**From Empire State Building**

# The Pentagon



Romano Gatland Food Service Consultants & Planners Worldwide

# Food and Water: Vehicles for Bioterrorism

*Data was compiled from presentations by the US Army Medical Research Institute of Infectious Diseases (USAMRIID) and the USAF Force Protection Battlelab and Disaster and Emergency Preparedness in Foodservice Operations by Puckett and Norton*

# NBC Warfare Agents

- N – Nuclear

- B – Biological

Pathogens  
Toxins

- C – Chemical

Nerve Agents  
Blister agents  
Lung-Damaging  
Agents  
Blood Agents  
Incapacitates

# Historical Use of Biological Weapons

**1346 –**

**Middle ages thru Civil War –**

**1700s –**

**WWII –**

**Vietnam –**

**Desert Storm –**

NBC weapons used by Iraqi.

# Requirements for Biological Weapon Use

- ✓ Available & easily produced
- ✓ Lethal or incapacitating
- ✓ Easily aerosolized (*not important for food*)
- ✓ Easily disseminated
- ✓ Stable after production
- ✓ Susceptible population

# Feasibility of Biological Weapons

- ✓ Low cost
- ✓ Readily available
- ✓ Low technological support
- ✓ Easily disseminated
- ✓ Difficult to detect
- ✓ Deniable
- ✓ Able to cause mass casualties

**What makes biological agents more tempting for use as a weapon?**

# Terrorist Objectives

- ◆ Induce high morbidity & mortality on target population.
- ◆ Disrupt critical event.
- ◆ Create panic & public response.
- ◆ Economic impact

**Cyanide tainted grapes in Chile affects export of product to other countries.**

# Scenario for Terrorist Attacks

- Product tampering
- Attack on ethnic groups in opposition to terrorist goals
- Sabotage of specific food groups or industries
- Attacks directed at a country's institutions, agencies, or departments

# Domestic Use of Biological Weapons

**Oregon (1984) – Salmonella contaminated salad bars.**

- ▶ **10 restaurants implicated; 751 cases of gastroenteritis**
- ▶ **Infected employees amplify spread of illness**
- ▶ **Errors in food rotation & refrigeration facilitated growth of organism**

# Domestic Use of Biological Weapons

**Texas (Medical Center) – 12 laboratory workers become ill after eating tainted pastries.**

- ▶ E-mail message invited employees to eat pastries in break room.
- ▶ Shigella agent was later identified as coming from lab culture collection.
- ▶ Motive for and method of contamination unknown.

# What is the Food Threat?

- Public accessible foods
- Processed foods
- Water
- Uncooked foods
- Fresh fruits & vegetables
- Agent Vectors

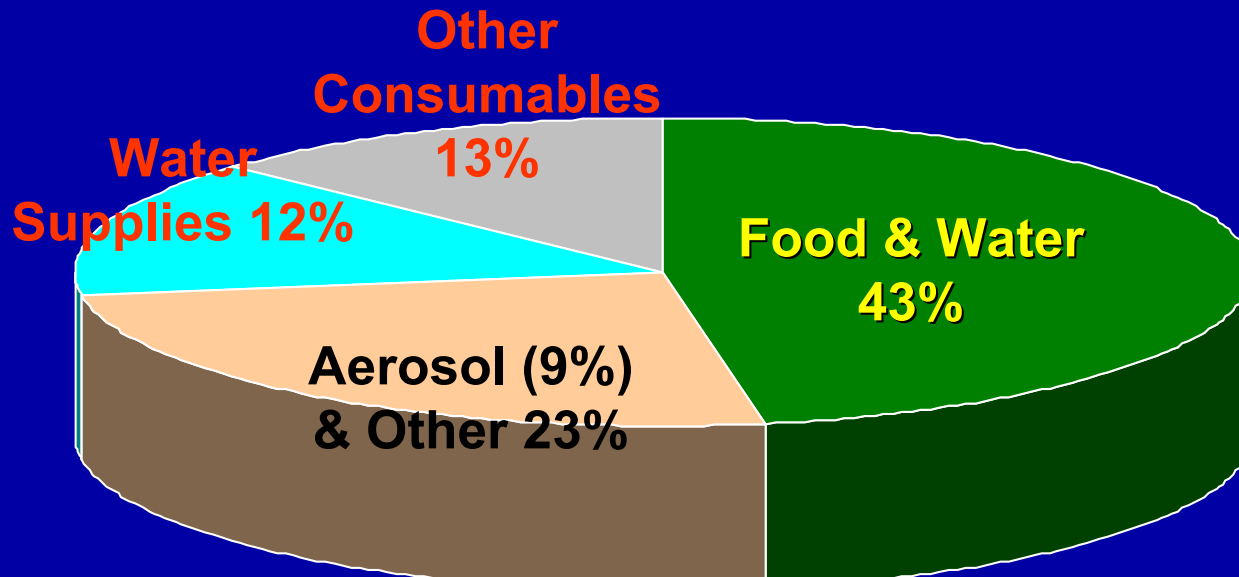
# EXAMPLE

## -- Processed Foods --

- ▶ 30 grams of ricin toxin
- ▶ Easily concealed in a pocket
- ▶ Could lethally poison 150 pounds of meat
- ▶ Enough to produce 1,500 hotdogs

**The Threat is REAL!**

# Top 4 Means of Terrorism Delivery



**68% of past incidents resulted from voluntary consumption**

# Food and Water Antiterrorism

## **Problem:**

- ◆ **No institutionalized process to address *intentional contamination* of food or water.**
- ◆ **Vulnerability surveys focus on conventional or aerosol attacks with collateral damage to food/water.**
- ◆ **Process & technology are inadequate to protect us.**

## **Solution:**

- ✓ **ID secure food & water handling procedures.**
- ✓ **Validate new equipment**
- ✓ **Institutionalized approach**

# Food Groups for Decontamination

- **Group I** – Canned or packaged items exposed only to chemical agent vapor.
- **Group II** – Canned or packaged items that are contaminated on the outside with a liquid chemical agent, a biological agent, or radioactive fallout.
- **Group III** – Unpacked or poorly packaged items that have been exposed to any NBC agent.
- **Group IV** – Food contaminated throughout the food chain.

# Nuclear Contamination

- *Direct contamination:*
  - Fallout that collects on the food surface.
- *Indirect contamination:*
  - Can be spread throughout the food chain
- *Induced radiation:*
  - Food exposed to sufficient neutron flux that does not destroy the food with blast and heat

# Nuclear Decontamination

- Aging
- Removing
  - Not canned or impermeable container
    - Wash or trim contamination from unpackaged food
  - Canned, bottled, or protected by impermeable container
    - Wash with soap and water, rinse
    - Brush, wipe contamination from surface of container

# Biological Contamination

- Normal packaging provides protection from most biological agents –
  - Exception is toxins and biologically derived substances
- Packaging will not support pathogenic agent
  - Exception is a spore-forming organism
- Food in sealed containers remain safe until outer surfaces decontaminated
- Most likely not affect appearance, taste, or smell of the food
- Most food in metal container or encased in heavy aluminum laminated plastic impervious to arthropod penetration.
- Unpackaged food contaminated

# Biological Decontamination

- Canned, bottled, or protected by impermeable container
  - Wash with soap and water, then immerse in disinfectant solution (Disinfectant, chlorine, food service or 1/ cup of household bleach in 10 gal of water)
  - Boil in water 15 minutes; not effective on toxins and some spores
  - Immerse in 5% sodium carbonate (4 lb washing soda in 10 gal water), rinse with potable water.
  - Immerse in household bleach solution (1/2 gal bleach in 25 gal water) for 10 minutes then rinse and aerate for 10 minutes.
  - Immerse in HTH (Calcium Hypochlorite) solution (1/2 lb in 25 gal water) 20 minutes, then rinse.
  - Immerse in STB solution (1 lb in 25 gal water) 30 minutes, then rinse.
  - Immerse in 2% peracetic acid for 10 minutes, rinse and aerate for 10 minutes.

# Biological Decontamination

- Not canned or in impermeable container
  - Boil in water 15 minutes. Cook
  - Immerse in or spray with 2% household bleach solution. (Packaged, peeled or pared food may be immersed or sprayed).

# Chemical Contamination

- Effect on the food depends upon nature of agent and type of food.
- Extent of penetration by chemical agent will depend on amount, form of dispersal (liquid or vapor) and duration of exposure.

# Three Categories of Foods

- Based on fat content, water content, & crystalline structure
  1. Foods with high water content, low fat content, and/or a crystalline structure (fresh vegetables, fruits, sugar, salt, and eggs)
    - Absorb mustard and nerve agents as a liquid or a vapor. Nerve agents will be hydrolyzed slowly.
  2. Foods with low fat content & irregular structure (flour, bread, grain, rice, cereals, dried fruits, dried vegetables, tea, coffee, peas, and beans)
    - Readily absorb mustard & nerve agents as a liquid. As a vapor, agents are absorbed to some extent but easily removed by airing.
  3. Foods with low water content, high fat content (butter, fat, fatty oils, ham, cheese, milk, bacon, fatty meat, and fish)
    - Absorb mustard & nerve agents removal is virtually impossible.

# Weather Elements Affect Chemical Decontamination

- Warm temperatures speed liquid agents' dispersion into the air
- High winds rapidly disperse chemical agent vapors
- Heavy rain or rain of a long period of time can aid in decontamination
- Direct sunrays can warm surfaces above air temperature

# Chemical Decontamination of Packaged Materials

- Airtight metal containers, glass, bottles, foil aluminated laminated materials
  - Vapor or Liquid
    - Air for 24 hours. Wash with hot soapy water, soda, or bleach solution. Rinse with water.
- Polyester, PVF, wooden boxes, crates, board, multilayer bags
  - Vapor
    - Remove contaminated package. Air contents for 24 hours.
- Cardboard, polyethylene
  - Liquid
    - Contaminated contents – treat as unpackaged food.

# Chemical Decontamination of Unpackaged Foods

FATTY FOODS (BUTTER, BACON, MILK, CHEESE, HAM)

- **NERVE AGENTS**

- Vapor, heavy
  - Destroy
- Vapor, light
  - Destroy
- Liquid
  - Destroy

- **MUSTARDS**

- Vapor
  - Remove 1 – 3 cm of outer layer and wash with 2% sodium bicarbonate solution. Boil for at least 30 minutes. Destroy milk
- Liquid
  - Destroy

# Chemical Decontamination of Unpackaged Foods

FATTY FOODS (BUTTER, BACON, MILK, CHEESE, HAM) cont'd

- **ARSENICALS**

- Destroy

- **CHOKING AGENTS**

- Wash food with water where possible and expose to the air for 24 hours. Food may be unpalatable due to the acid product of hydrolysis

- **CYANIDE TYPE AGENTS**

- Unlikely to produce dangerous contamination of foodstuffs/

- **RIOT CONTROL AGENTS**

- Food may be unpalatable to the extent of being inedible

# Chemical Decontamination of Unpackaged Foods

NON-FATTY FOODS, HIGH WATER CONTENT, CRYSTALLINE FRUITS,  
VEGETABLES, SALT, SUGAR)

## ■ NERVE AGENTS

- Vapor, heavy
  - Destroy, unless possible to boil after airing 48 hours
- Vapor, light
  - Air for 48 hours, then boil
- Liquid
  - Destroy

## ■ MUSTARDS

- Vapor
  - Wash with water, air for 48 hours
- Liquid
  - Destroy

## ■ ARSENICALS

- Destroy

# Chemical Decontamination of Unpackaged Foods

NON-FATTY FOODS, HIGH WATER CONTENT, CRYSTALLINE FRUITS, VEGETABLES, SALT, SUGAR) cont'd

## ■ **CHOKING AGENTS**

- Wash food with water where possible and expose to the air for 24 hours. Food may be unpalatable due to the acid product of hydrolysis

## ■ **CYANIDE TYPE AGENTS**

- Unlikely to produce dangerous contamination of foodstuffs

## ■ **RIOT CONTROL AGENTS**

- Food may be unpalatable to the extent of being inedible

# Chemical Decontamination of Unpackaged Foods

**NON-FATTY FOODS, LOW WATER CONTENT, AMORPHOUS  
(FLOUR, CEREALS, BREAD, PEAS)**

- **NERVE AGENTS**

- Vapor, heavy
  - Air for 48 hours, then boil
- Vapor, light
  - Air for 48 hours, then boil
- Liquid
  - Destroy

- **MUSTARDS**

- Vapor
  - Wash with water, air for 48 hours
- Liquid
  - Destroy

- **ARSENICALS**

- Destroy

# Chemical Decontamination of Unpackaged Foods

**NON-FATTY FOODS, LOW WATER CONTENT, AMORPHOUS  
(FLOUR, CEREALS, BREAD, PEAS) cont'd**

- **CHOKING AGENTS**

- Wash food with water where possible and expose to air for 24 hours. Food may be unpalatable due to acid product of hydrolysis

- **CYANIDE TYPE AGENTS**

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- **RIOT CONTROL AGENTS**

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# Food and Supply Security Checklist

- ✓ Use only known, appropriately licensed, inspected, or permitted sources for all items.
- ✓ Require all suppliers and transporters practice appropriate food security measures.
- ✓ Substantiate all labeling and packaging configuration prior to receiving the shipment.
- ✓ Evaluate the value of testing incoming items for detecting tampering or criminal or terrorist activities.
- ✓ Request locked sealed vehicles, containers. Obtain the seal number from the supplier and validate upon receipt. Maintain the chain of custody when the seal is broken or for inspection by a government agency.

# Food and Supply Security Checklist

cont'd

- ✓ Establish quarantine or release procedure for your facility.
- ✓ Supervise the unloading of all food, water and supplies.
- ✓ Keep track of all food, water and supply items.
- ✓ Investigate any missing or extra products or other irregularities outside a predetermined normal range of variability.
- ✓ Report any unresolved problems to the appropriate security personnel.

# Additional Precautions

- ✘ Maintain a list of companies who deliver food, water and supplies, the type and tag number(s) of the vehicles used and if possible a photo ID of the delivery person.
- ✘ Keep a list of all approved vendors, their delivery route, and expected time of arrival.
- ✘ If the vendor replenishes stock items to a par level, post the name of the company, delivery days, delivery times, and the name and photo of the delivery person.
- ✘ Check all deliveries very carefully. Do not accept any item not ordered. Request the driver return the unauthorized item(s) to the warehouse.

# Additional Precautions cont'd

- ✘ If any suspicious product is delivered or discovered, leave it alone, and notify the supervisor and appropriate security personnel.
- ✘ Always inspect all deliveries for any opened boxes or containers that show evidence of tampering or suspicious materials. Notify the appropriate security personnel.
- ✘ Regularly inspect all receiving areas and storage areas for any unusual items, packages or anything that may be out of place.
- ✘ Always be alert when receiving orders.
- ✘ Implement a system to control all vehicles authorized to park on the premises. If possible do not allow any vehicles to park near the distribution area.

# Storage of Food and Supplies

- Monitor the stocking procedures. Use the LIFO method of stocking.
- Spot-check stock locations. Maintain a record or file of the location of all items.
- Mark all aisles clearly.
- Stack all items correctly.
- Follow safety procedures for all combustible or hazardous supplies.
- Check on the preservation and condition of unpackaged items.

# Risk Assessment / HACCP

- ❑ Critical
- ❑ Need to identify potential points of human intervention based on ease & accessibility
- ❑ Terrorist initiatives and motives will be difficult to correlate

# Detection / Confirmation

- Defense against aerosol agents has developed into an integrated process of rapid detection followed by more sophisticated technological confirmation
- Rapid detection and screening of foods for natural foodborne pathogens has proven to be difficult
  - **Beware of quick fix rapid screening technologies**

# Long Term Plans for Food Safety and Security Attacks

- Renovation/Facility Replacement
- Staffing
- Regulatory Agencies
- Resources/Support
  - Peers
  - Consultants
  - Support Agencies
- Policies & Procedures

# Conclusions

- Food as a vehicle for bioterrorism has been used
- The potential for bioterrorism in the future is credible
- Detection technology is lacking
  - **Has limited reliability**
- Confirmatory capabilities exist
- Health care providers may be first to know

# Questions



# Thank You

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