TERRORISM AND THE FOOD SUPPLY

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GOAL OF THIS SECTION

To provide information about the challenges involved in protecting the nation's food supply from deliberate contamination.

WHAT THIS SECTION INCLUDES

- **Description of threats involving intentional contamination of food products**
- **Discussion of risks from foodborne illnesses**
- **Review of new systems for information sharing and reporting, and for inspections that will improve the safety of imported and domestic foods**

WHAT THIS SECTION DOES NOT INCLUDE AND WHY

- **Detailed descriptions of specific biological agents are not provided here. (Information on these agents can be found in the "Biological Agents" section [see p. 39].)**
- **Discussion of agroterrorism, or the use of biological agents against the agricultural industry, is not provided here because agencies other than the U.S. Department of Health and Human Services (HHS) have primary responsibility. Primary responsibility for these issues rests with the U.S. Department of Agriculture (USDA) (http://www.usda.gov) and the U.S. Environmental Protection Agency (EPA) (http://www.epa.gov).**

IMPACT OF FOODBORNE ILLNESSES

Most experts believe that terrorist acts involving the food supply are unlikely because they lack the dramatic impact of a bomb or chemical attack, but they are not impossible or implausible scenarios. Being able to detect the difference between an intentional and an unintentional outbreak of foodborne illness is made difficult because foodborne illness outbreaks occur every year in the United States. Alert consumers, health professionals, pharmacists, food retailers, and many others in the food industry play a vital role in the defense against both intentional and unintentional outbreaks of food-related illnesses.

U.S. consumers enjoy one of the safest food supplies in the world, yet a terrorist attack on the food supply is possible. Contaminating food does not require as much technical skill and organization as does weaponizing anthrax. Opportunities for access to the food supply stretch from farms and feedlots to restaurants and cafeterias. For example, terrorists could introduce an agent during the harvesting, packing, shipping, delivery, or preparation stage. Clearly, these acts are possible. Intentional criminal acts, such as the Rajneeshee Cult's *Salmonella* contamination of salad bars in Oregon in the 1980s, demonstrate that fact. Public health officials, the food industry, and health care providers already have a lot of experience with treating and preventing unintentional outbreaks.

However, some causes of foodborne illness, such as *Salmonella* and *E. coli* O157:H7, are also Category B bioterrorism agents. They are designated by HHS' Centers for Disease Control and Prevention (CDC) as Category B agents because they are relatively easy to spread and can make people sick or can even result in death. (Definitions of CDC Categories A, B, and C and details on foodborne organisms that terrorists could use in attacks can be found in the "Biological Agents" section [see p. 39].)

Intentional contamination of the food supply by terrorists is a new threat with unique challenges. Thus, it requires increased food inspection, disease surveillance, laboratory capacity, and awareness among health professionals and the general public.

WHAT ARE THE RISKS?

American consumers spend more than $617 billion a year on food, including $511 billion on food grown on American farms (Strongin 2002).

Overall, the $900 billion (Nestle 2002) U.S. food industry accounts for 20 percent of the gross national product and employs 14 million people directly and another 4 million people in related industries. The farm-to-table process, thus, involves millions of people who handle a variety of foods every day.

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Foodborne illnesses are more common than most people realize. They include infections caused by bacteria such as *Salmonella*, *Shigella*, *E. coli*, and *Listeria*; and by parasites such as ***Cryptosporidium*** and ***Cyclospora***. According to CDC, there are approximately 76 million illnesses; 325,000 hospitalizations; and 5,000 deaths every year due to naturally occurring foodborne illnesses in the United States (Mead et al. 1999). The exact numbers are unknown because many people just wait for their symptoms to go away and do not go to see a doctor. Even if someone seeks professional medical advice, the health professional may not attribute the case to a foodborne illness and will not report it to the local health department. The estimated annual costs for medical treatment and lost productivity due to naturally occurring foodborne illnesses range from $7 to $37 billion (Democratic Staff of the Commerce Committee 2004).

Deliberate contamination of the food supply could have a devastating public health and economic impact, with the possibility of global consequences. For example, fearful public reaction to bovine spongiform encephalopathy, known also as BSE or "mad cow disease," and the refusal of Europe and Japan to import United States beef demonstrated how quickly a domestic food-related health issue can become a global economic issue.

WHAT ARE THE SYMPTOMS?

Foodborne illnesses cause symptoms such as nausea, vomiting, diarrhea, or fever. Symptoms can occur between 1 hour and 3 weeks after eating contaminated food, depending on the agent ingested (bacterial, viral, or parasitic), so tracing the source of a foodborne outbreak can be very complicated and time consuming (USDA Food Safety and Inspection Service 2003).

Certain people can suffer more severe and serious reactions to naturally occurring illnesses. Very young children; pregnant women; older adults; and people with compromised immune systems due to chemotherapy, HIV/AIDS, or other conditions are particularly vulnerable. These groups would be at greatest risk in a terrorist attack and would need special attention from health professionals and public health officials.

To help health professionals be on the alert for foodborne illnesses, several associations and federal agencies collaborated in 2004 to produce a free educational primer on food safety called "Diagnosis and Management of Foodborne Illnesses: A Primer for Physicians and Other Health Care Professionals" (http://www.ama-assn.org/ama/pub/category/print/3629.html). The collaborators were the American Medical Association and American Nurses Association, along with CDC, HHS' Food and Drug Administration (FDA), and the USDA's Food Safety and Inspection Service (FSIS).

The primer has consumer-friendly charts and tables, and tips on how to prevent food-related diseases. It also helps health professionals recognize that any patient with foodborne illness could be the first case of a more widespread outbreak.

THE ROLES OF FDA AND USDA IN FOOD SAFETY AND SECURITY

Two federal agencies account for the majority of food safety spending and regulatory responsibilities: FDA, within HHS, and FSIS, within USDA. The U.S. Secretaries of HHS and USDA have publicly agreed to coordinate their responses to the various threats, risks, and vulnerabilities that the agrarian sector and the food supply are facing (Dyckman 2003).

FDA

FDA is responsible for overseeing all domestic and imported food sold in interstate commerce, including shell eggs, bottled water, and wine beverages with less than 7 percent alcohol. FDA inspections take a broad approach to food inspections to ensure that the overall food production process within a given establishment is functioning appropriately. To do this, FDA conducts a scientific evaluation and risk analysis to analyze potential hazards associated with the foods under its jurisdiction. Next, the agency identifies critical control points in a food's production at which the potential hazard could be controlled or eliminated; this includes processing, shipping, consumption, etc. Most importantly, FDA establishes preventative measures and procedures to monitor the correct use of these measures; for example, reprocessing or disposing of food if the minimum cooking temperature is not met. In addition, FDA also oversees animal drugs, feeds, and veterinary devices. FDA has about 770 inspectors for 57,000 food establishments and 132 ports. Once proper preventative measures and monitoring procedures are in place, FDA does a comprehensive evaluation of a specific food establishment about every 5 years.

FSIS

In contrast, FSIS is responsible for a more ongoing inspection of the foods under its jurisdiction. FSIS, a public health regulatory agency of USDA, protects consumers by ensuring that meat, poultry, and egg products (e.g., dried egg yolks, scrambled egg mix, liquid eggs), those foods not inspected by FDA, are safe, wholesome, and accurately labeled. Due to the fact that the production of these foods requires the slaughter of animals, much of USDA inspections focus on the ensuring of sanitary conditions for all slaughter and processing activities. This type of scrutiny requires frequent, even daily, onsite inspections. FSIS has more than 7,600 inspectors and veterinarians in meat, poultry, and egg product plants every day and at ports-of-entry to prevent, detect, and act in response to food safety emergencies.

FDA and USDA have both issued a number of industry security guidance documents, which can be found on their Web sites. Examples include:

- USDA, "FSIS Security Guidelines for Food Processors" (http://www.fsis.usda.gov/oa/topics/biosecurity2.htm)
- FDA, "Food Producers, Processors, and Transporters: Food Security Preventive Measures Guidance" (http://vm.cfsan.fda.gov/~dms/secguid6.html)
- FDA, "Retail Food Stores and Food Service Establishments: Food Security Preventive Measures Guidance" (http://vm.cfsan.fda.gov/~dms/secguid5.html)

CDC, EPA, and U.S. Customs and Border Protection (Customs) also have some limited responsibilities for food security. CDC reports and tracks foodborne disease, EPA evaluates environmental safety (e.g., levels of pesticides and herbicides), and Customs monitors food imports.

NEW REGULATIONS UNDER THE BIOTERRORISM ACT

The Public Health Security and Bioterrorism Preparedness and Response Act (Bioterrorism Act) of 2002 provides authorization for a series of federal actions that will help protect the American public against bioterrorism. In response to the food safety requirement of the act, FDA has issued the following four regulations:

- Food Facility Registration
- Prior Notice of Imported Food Shipments
- Administrative Detention
- Establishment and Maintenance of Records

More information on the provisions of the act that apply to FDA can be found at http://www.fda.gov/oc/bioterrorism/bioact.html.

Food Facility Registration

Under the Bioterrorism Act, companies that manufacture, process, pack, or hold food for consumption in the United States must register with FDA. In October 2003, FDA launched an electronic system that provides each registrant with a unique number. More than 200,000 foreign and domestic establishments are registered, and there are several hundred more new registrants each week. The ID numbers will help FDA quickly identify and notify food processors or other facilities involved in deliberate or accidental food contamination.

By registering companies that do business with the U.S. food market, federal officials will have the first-ever roster of trade partners, along with basic information that will make it easier to "trace back" foodborne illnesses.

Prior Notice of Imported Food Shipments

Companies must now provide advance notice to FDA about food shipments entering the United States. The law covers all human and animal food, drinks, and dietary supplements imported or offered for import to this country. The amount of advance notice needed depends on the mode of transportation being used but at a minimum ranges between 2 and 8 hours. FDA expects to receive roughly 25,000 notifications per day about incoming shipments. Under the new law, FDA will commission thousands of Customs officers to conduct investigations and examinations of foods imported through ports and other locations. FDA and Customs are working together to share information and computer systems and to keep food imports safe without creating unnecessary delays. Though Customs cannot perform physical inspections of every shipment, notification will allow federal inspectors to target their resources more effectively.

Administrative Detention

FDA is now authorized to administratively detain suspect food. This means that FDA can remove food from the food supply if it has credible evidence or information that it presents a threat of serious adverse health consequences or death to humans or animals. The final regulation clarifies the agency's administrative detention procedures and the process for appealing the detention order.

Establishment and Maintenance of Records

Another new regulation under the Bioterrorism Act creates a requirement regarding the establishment and maintenance, for no longer than 2 years, of records by persons (excluding farms and restaurants) who manufacture, process, pack, transport, distribute, receive, hold, or import food. The records that must be kept by this regulation are those that are needed to allow the Secretary to identify the immediate previous sources and immediate subsequent recipients of food, including its packaging, in order to address credible threats of serious adverse health consequences or death to humans or animals.

FOODNET

Detecting a terrorist attack on the food supply requires some kind of real-time alarm to indicate that more people are experiencing symptoms than would normally be the case with natural causes. Flu and normal outbreaks of foodborne diseases affect many people every year. Statistics on this number would serve as a baseline of the "typical" number of occurrences of certain illnesses. Without accurate baseline levels of these common illnesses, it would be difficult to detect, diagnose, and treat illnesses due to a terrorist attack. Most existing reporting systems rely on "passive surveillance," meaning generally that:

- A sick person visits a doctor
- The doctor takes a sample and sends it to the laboratory for evaluation
- The clinical laboratory tests a sample, finds bacteria or parasites, and reports the finding to the state health department
- The state health department makes a report to CDC

No overall national disease-tracking system exists yet. However, in the mid-1990s, CDC began to develop the Foodborne Diseases Active Surveillance Network (FoodNet) (http://www.cdc.gov/foodnet), to help public health experts track and detect existing patterns of foodborne diseases. FoodNet has expanded from five states in 1995 to include 10 states and more than 450 clinical laboratories, with collaboration among CDC, USDA, and FDA.

As of 2004, information is being collected on every laboratory-diagnosed case of bacterial pathogens, including *Salmonella*, *Shigella*, *Campylobacter*, *E. coli* O157:H7, *Listeria monocytogenes*, *Yersinia enterocolitica*, and *Vibrio*; and parasitic organisms, including *Cryptosporidium* and *Cyclospora* infections among residents in the areas within the 10 states where FoodNet collects information.

PULSENET

Another promising use of technology in food safety is "DNA fingerprinting." This molecular system uses networked computers to identify distinctive patterns and genetic makeup of *E. coli* and other bacteria and match strains of bacteria from

PULSENET ENABLES CDC TO DETERMINE

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different locations. PulseNet enables CDC to determine when people in different locations are becoming sick from a single source of contamination based on the bacteria's specific DNA. If scientists can determine the source of contamination, it may be possible to track down other people who are ill or may become ill.

SPECIAL CONCERNS: TAMPERING AND RECALL

Safety inspections and surveillance systems are part of a comprehensive program to improve food safety. But consumers must also play an active role by noticing anything unusual about their food. Consumer education and vigilance may be the best protection against food-tampering. The FDA Center for Food Safety and Applied Nutrition distributes consumer guides and tips to prevent illness by increasing awareness of the risk of food tampering (http://www.cfsan.fda.gov/~dms/fstamper.html). The Center for Food Safety and Applied Nutrition recommends the following to detect tampering at the grocery store:

- **Carefully examine all food product packaging.** Be aware of the normal appearance of food containers. That way you'll be more likely to notice if an outer seal or wrapper is missing. Compare a suspect container with others on the shelf.
- **Check any anti-tampering devices on packaging.** Make sure the plastic seal around the outside of a container is intact or that the safety button on the lid of a jar is down.
- **Don't purchase products if the packaging is open, torn, or damaged.** This includes products on the shelf or in the refrigerator or freezer sections of the grocery store.
- **Don't buy products that are damaged or that look unusual.** For example, never purchase canned goods that are leaking or that bulge at the ends. Likewise for products that appear to have been thawed and then refrozen.
- **Check the "sell-by" dates** printed on some products and only buy items within that time frame.

Once consumers get home, they should check purchases for the following:

- **When opening a container, carefully inspect the product.** Don't use products that are discolored, moldy, have an off odor, or that spurt liquid or foam when the container is opened.
- **Never eat food from products that are damaged or that look unusual.** For example, cans that are leaking or that bulge at the ends.

If consumers suspect product tampering at the grocery store, report it to the store manager. Once consumers get a commercial food product home, a suspected tampering incident should be reported to the local police department. If the food contains meat or poultry, consumers should also call USDA's Meat and Poultry Hotline at 1-800-535-4555. If the food contains seafood, produce, or eggs, consumers should call FDA's 24-hour emergency number (1-301-443-1240) or its nonemergency number (1-888-SAFEFOOD).

A food recall is a voluntary action by a manufacturer or distributor to protect the public from products that may cause health problems or possible death. Neither USDA nor FDA has mandatory recall authority. One exception for FDA is that infant formula recalls are mandatory. USDA will issue a recall announcement for recalls of foods under its jurisdiction. For FDA regulated foods, FDA will issue a recall announcement if a company does not do so within 24 hours. These announcements are meant to alert consumers about dangerous foods that they may have in their homes.

REFERENCES

American Medical Association, American Nurses Association, Centers for Disease Control and Prevention, Center for Food Safety and Applied Nutrition of the U.S. Food and Drug Administration, & Food Safety and Inspection Service of the U.S. Department of Agriculture. (2004). *Diagnosis and management of foodborne illnesses: A primer for physicians and other health care professionals.* Chicago, IL: American Medical Association.

Democratic Staff of the Commerce Committee. (2004). H.R. 3075, "Imported food safety act of 2001:" Fact sheet.

Dyckman, L.J. (2003). Bioterrorism: A threat to agriculture and the food supply. http://www.gao.gov/new.items/d04259t.pdf.

Harvard Medical School Office of Public Affairs. (2002). Consortium awarded CDC grant to coordinate national health system "radar" to catch bioterror events. http://www.hms.harvard.edu/news/releases/1002platt.html.

Mead, P.S., Slutsker, L., Dietz, V., McCaig, L.F., Bresee, J.S., Shapiro, C., et al. (1999). Food-related illness and death in the United States. *Emerging Infectious Diseases, 5(5)*. http://www.cdc.gov/ncidod/eid/vol5no5/mead.htm.

Nestle, M. (2002). *Food politics: How the food industry influences nutrition and health.* Berkeley, CA: University of California Press.

Platt, R. AcademyHealth National Health Policy Conference 2004, January 28, 2004, Washington, DC: Presentation during breakout session on bioterrorism preparedness: Linking the medical care and public health systems.

RAND Center for Domestic and International Health Security. (2004). Syndromic surveillance: An effective tool for detecting bioterrorism? http://www.rand.org/publications/RB/RB9042/RB9042.pdf.

Strongin, R.J. (2002). How vulnerable is the nation's food supply? Linking food safety and food security. http://www.nhpf.org/pdfs_ib/IB773_FoodSafety_5-17-02.pdf.

U.S. Department of Agriculture Food Safety and Inspection Service. (2003). Food safety and security: What consumers need to know. http://www.fsis.usda.gov/OA/topics/foodsec_cons.pdf.

U.S. Food and Drug Administration. (2003a). FDA and CBP announce their transitional compliance policy on food imports under the Bioterrorism Act. http://www.fda.gov/bbs/topics/news/2003/new00995.html.

U.S. Food and Drug Administration. (2003b). FDA and CBP bolster safeguards on imported food. Unprecedented agreement between the agencies advances FDA's implementation of the Bioterrorism Act. http://www.fda.gov/bbs/topics/NEWS/2003/NEW00988.html.

U.S. Food and Drug Administration. (2003c). FDA introduces new technology to improve food security: Electronic food facility registration goes "live," allowing more than 400,000 facilities to register in minutes; FDA reports on progress in developing rapid tests of food contamination. http://www.fda.gov/bbs/topics/NEWS/2003/NEW00960.html.

U.S. Food and Drug Administration. (2003d). HHS issues new rules to enhance security of the U.S. food supply. http://www.hhs.gov/news/press/2003pres/20031009.html.

U.S. Food and Drug Administration. (2004). FDA's budget proposal for FY 2005 requests increase for food safety. http://www.fda.gov/bbs/topics/NEWS/2004/NEW01015.html.

U.S. Food and Drug Administration, Center for Food Safety and Applied Nutrition, & Industry Affairs Staff Brochure. (2002). FDA recall policies. http://vm.cfsan.fda.gov/~lrd/recall2.html.

Zadjura, E.M., Schuster, L.J., Oleson, KW., Swearingen, S.E., & Tomco, R.R. (1992). Food safety and quality: Uniform, risk-based inspection system needed to ensure safe food supply. http://161.203.16.4/d33t10/147179.pdf.