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LEARNING

Food Safety and Food Security: A Matter of Public Health

Marion Nestle, PhD, MPH

We know how to produce safe food. In the United States, for example, standard food safety procedures are known as Hazard Analysis and Critical Control Point with Pathogen Reduction (HACCP). They were designed for the space agency to make sure that astronauts did not become ill under conditions of zero gravity. HACCP is difficult to pronounce and remember but its principles are simple: identify places in the chain of food production where hazards can occur, take steps to prevent the hazards, monitor to make sure the steps were taken, and test for pathogens to make sure the system is working properly. That HACCP rules are not required or followed by everyone involved in food production and service, from farm to table, is a result of politics and resistance to intervention by food producers. When they are not followed, foods cause more illness and death than is necessary.

In the United States, food safety regulation is largely divided between two agencies: the U.S. Department of Agriculture (USDA) and the Food and Drug Administration (FDA). The USDA is in charge of meat and poultry safety, and shares regulation of egg safety with the FDA. The primary responsibility of the USDA is to promote American agricultural production and its ties to agribusiness are historically strong and deep; this agency receives 80% of government funding for food safety oversight even though it regulates only about 20% of the food supply. In contrast, the FDA is in charge of 80% of the food supply but receives 20% of the funding. Since the mid-1990s, the USDA has required HACCP for meat and poultry, beginning at the slaugh-

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terhouse; no rules apply to farm production. The FDA requires HACCP only for fruit juices, sprouts, and shell eggs. Indeed, eggs are the only American food produced under HACCP rules, from farm to table. Everything else is voluntary. The result is a food safety system with many gaps that leave the food system vulnerable to accidental and deliberate contamination.

The terrorist attacks of September 2001 (what the United States calls 9/11) had profound effects on issues related to food safety and food security. They shifted the common use of the term food security—protection against hunger and food insufficiency—to mean protection of the food supply against bioterrorism. They raised alarms about the ways food and biotechnology could be used as biological weapons. They encouraged more forceful calls for reorganizing the current system of food safety regulation—widely agreed to be fragmented and inadequate—into a single oversight agency that combines the functions of USDA and FDA. Finally, they focused attention on the need for a national public health system capable of responding to emerging problems in food safety and security.

FOOD SECURITY AS SAFETY FROM BIOTERRORISM

Prior to 9/11, food security in the United States had a relatively narrow meaning—reliable access to adequate food—that derived from criteria for deciding whether people were eligible to receive welfare and food assistance. The international definition is broader, however. Based on the United Nations' 1948 Universal Declaration on Human Rights, it encompasses the right to a standard of living adequate for health and well-being, including food security. This right implies reliable access to food that is not only adequate in quantity and quality, but also readily available, culturally appropriate, and safe. With respect to safety, the Geneva Convention of August 1949, an international agreement on the protection of civilians during armed conflict, expressly prohibited deliberate destruction or pollution of agriculture or of supplies of food and water. These broader meanings derived from work in international development, where it was necessary to distinguish the physical sensation of hunger (which can be temporary or voluntary), from the chronic, involuntary lack of food that results from economic inequities, resource constraints, or political disruption.

After 9/11, the meaning of food security changed to indicate protection of the food supply against bioterrorists. Officials soon identified safe food and water as key components of a new Department of Homeland Security, which oversees the work of numerous federal bureaucracies established to

protect the nation's borders, nuclear power plants, and public facilities; fight bioterrorism; obtain intelligence; and protect food and water supplies.

FOOD AS A BIOLOGICAL WEAPON

After 9/11, Americans became aware of the possibility that terrorists might try to poison food and water supplies. Prevention of such actions is exceptionally difficult because so many agents can be used as biological weapons and can be delivered in so many ways and in so many places. The increasing consolidation and centralization of the American food supply only increases vulnerability to inadvertent or deliberate contamination. This was amply demonstrated in 2006 by spinach accidentally contaminated with a deadly form of *E. coli* and in 2007 by adulteration of Chinese wheat gluten used in pet foods. The low rate of inspection of imported foods is an especially weak link in the chain of protection. Prior to 9/11, the FDA inspected roughly 2% of imported food shipments. As a result of political pressures on the FDA to regulate foods less forcefully, the agency now inspects 1% or less of such shipments.

One particular concern is the role of biotechnology in developing weapons of bioterrorism. The research methods used to transmit desired genes into plants could easily be adapted for nefarious purposes: creating pathogenic bacteria resistant to multiple antibiotics or able to synthesize lethal toxins, or superweeds resistant to herbicides. As more than half of the soybeans grown in the United States are bioengineered to resist the herbicide Roundup, genetic mischief could do a great deal of damage.

Public health experts concerned about such possibilities cite precedents, ancient and modern, for the use of poisoned food and drink to achieve political ends. These date back to the time when the Athenians forced Socrates to drink hemlock. There are plenty of modern examples as well, mainly concerning deliberate sabotage by dissatisfied factory workers. A 2001 review of these and international episodes described the deliberate poisoning of water at German prisoner-of-war camps with arsenic, of Israeli citrus fruit with mercury, and of Chilean grapes with cyanide, suggesting that no food or drink is invulnerable to such contamination.

In the United States, the single known case of food poisoning designed to achieve political goals occurred in 1984. It involved the deliberate sprinkling of *Salmonella* onto restaurant salads and cream pitchers by followers of the Indian guru Bhagwan Shree Rajneesh. The Rajneesh group had established communal headquarters in a small rural town in Oregon but came into

conflict with neighbors over issues related to land use and building permits. To keep local residents from electing county officials who might enforce zoning laws, members of the group tried to make people ill with *Salmonella*. They succeeded in sickening at least 750 people. This incident demonstrated that biological agents were easy to use and to obtain: the commune clinic had simply ordered them from a biological supply house. It also revealed the difficulties of investigating such incidents. Investigators, unable to discern a rationale for deliberate poisoning, were only able to identify the perpetrators when one confessed.

Experts disagree about the degree of danger posed by food bioterrorism and the extent to which countries should devote resources to guard against it. Some believe that food supplies are too diffuse to permit terrorists to do much harm and that water supplies are relatively invulnerable for reasons of dilution, chlorination, sunlight, and filtration. They greatly prefer a public health approach, which means identifying the most important risks and determining how they can best be addressed. They emphasize the greater degree of harm caused by foodborne microbes, tobacco, and inappropriate use of antibiotics in animal agriculture than by bioterrorism, and suggest that it makes more sense to apply limited resources to existing problems rather than to a much smaller—although perhaps more frightening—risk. For those who share this view, national preparedness against food bioterrorism inappropriately diverts resources from dealing with more compelling food safety problems.

UNIFYING THE FOOD SAFETY SYSTEM

One repeated suggestion to improve food safety oversight has been to combine the safety functions of the USDA and FDA into a single unit dealing with all foods, from farm to table. Soon after 9/11, officials throughout government agencies called on Congress to fund improvements in food safety and public health systems, especially those involving disease surveillance, food production quality control, food security (in the anti-bioterrorism sense), and inspection of imported foods. Many thought that one positive result would be increased funding for food safety surveillance and, indeed, Congress doubled the FDA's inspection capacity over imported food—from 1% to 2% of the total entering the country—but these improvements did not last. Although the FDA asked for authority to issue recalls, to require food companies to take steps to prevent sabotage, and to demonstrate the traceability of ingredients and products, it was granted only limited authority to do so.

Food companies strongly opposed such measures. Instead, the FDA and USDA issued voluntary guidelines. The many food safety problems surfacing in 2006 and 2007 indicate the unreliability of voluntary efforts.

FOOD SECURITY AS A PUBLIC HEALTH ISSUE

One additional reason why the United States is especially vulnerable to bioterrorism is its neglect of public health "infrastructure"—the systems and personnel needed to track and prevent disease. The focus on homeland security may be politically necessary, but it diverts attention and resources away from basic public health needs. Neither domestic or international actions are aimed at addressing "root causes"—the underlying social, cultural, economic, or environmental influences that might encourage people to become engaged in terrorist activities. From the perspective of public health, bioterrorism may never entirely disappear, but it seems less likely to be used as a political weapon by people who have ready access to education, health care, and food, and who trust their governments to help improve their lot in life. If, as many believe, terrorism reflects frustration resulting from political and social inequities, it is most likely to thrive in countries that fail to provide access to basic needs, or that give lesser rights to ethnic, religious, or other minority groups. In such situations, public health can be a useful means to strengthen society as well as to avert terrorism.

Because a healthy population is an essential factor in economic development, the health effects of globalization—positive and negative—become important concerns in considerations of food safety and security. Globalization has improved the social, dietary, and material resources of many populations, but it has also heightened economic and health inequities. Globalization brings safe drinking water and antibiotics, but it also brings pressures to reduce food safety standards, protect the intellectual property rights of corporate patent owners, and accept the marketing of high-profit "junk" foods. With these ideas in mind, it makes sense to engage in short- and long-term strategies to prevent terrorism and its adverse health consequences: address poverty, social injustice, and disparities; provide humanitarian assistance; strengthen the ability of public health systems to respond to terrorism; protect the environment and food and water supplies; and advocate for control and eventual elimination of biological, chemical, and nuclear weapons. It makes sense for societies to ensure safe and secure food for all citizens for humanitarian as well as political reasons.

ENSURING SAFE FOOD

Because food safety is a political problem inextricably linked to matters of commerce, trade, and international relations, ensuring food safety requires political action. Everyone involved in food production, distribution, preparation, and service—individuals, producers, food companies, governments—needs to take responsibility for food safety and food security. Individuals must learn to handle and cook foods properly. Food companies should institute and follow HACCP rules, disclose production practices, take responsibility for lapses in safety, and tell the truth about matters of public interest. The government should require food companies to follow food safety procedures and could invest more in public health. On the international level, governments should support treaties that promote food safety, environmental protection, and the right to food, as well as agreements to stop producing biological weapons, genetically modified or otherwise. Overall, they should be actively involved in international policies to promote health and food security as human rights for everyone, everywhere. Food safety and food security are nothing less than indicators of the integrity of democratic institutions. They are well worth the political commitment of individuals, societies, and governments.