

## Food Protection and Defense: Preparing for a Crisis

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### INTRODUCTION

On January 30, 2004, George W. Bush declared in a Presidential Directive that “We should provide the best protection possible against a successful attack on the United States agriculture and food system, which could have catastrophic health and economic effects.”<sup>1</sup> Following this statement, the President called for coordination between numerous federal agencies, lead by the Department of Homeland Security, with significant responsibilities shared by the Secretaries of Interior, Agriculture, and Health and Human Services and the Administrator of the Environmental Protection Agency. But when it comes to food safety, is coordination enough? This article will explore that question and will also provide an analysis of the governmental responses to other catastrophic events, i.e. September 11 or Hurricane Katrina, to improve emergency preparedness.

As the President’s declaration makes clear, preparing for a crisis is best done in advance. In times of crisis, streamlined federal agencies and effective response plans greatly increase the effectiveness and efficiencies of a response. They can also help minimize public fear by anticipating problems or by identifying and addressing them early on. Effective response

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1. Press release, Office of the White House, Homeland Security Presidential Directive, HSPD-9, Subject: Defense of United States Agriculture and Food (Jan. 30, 2004), available at <http://www.whitehouse.gov/news/releases/2004/02/20040203-2.html>.

also requires a clear division of responsibility to direct action and resources by relevant federal, state and local agencies.

Following the 2001 attacks on the World Trade Center, Congress created the Department of Homeland Security, a centralized agency that brought together various government agencies in order to ensure the safety of our nation from terrorist threats. In the aftermath of Hurricane Katrina, however, we quickly learned that although our nation might have a plan to deal with terrorism, it did not provide guidance for addressing other emergencies like extreme weather conditions.

In the late summer of 2005, Hurricane Katrina slammed against the Gulf Coast, destroying much of New Orleans and many other coastal communities. This challenged emergency response plans and revealed problems at every level of the government infrastructure. Critical gaps in emergency preparedness resulted in a cascade of failures. There were interruptions in the chain of delivery for food, water, medicine, and other supplies from nationwide sources; disruption of both federal and local emergency communications systems; inadequate federal response to infectious disease concerns; and unclear and inconsistent messages to the public from the government.<sup>2</sup> A U.S. General Accountability Office (GAO) report later underscored that “[r]esponders at all levels of government – many victims themselves – encountered significant breakdowns in vital areas such as emergency communications, as well as obtaining essential supplies and equipment.”<sup>3</sup>

These disasters amply demonstrate the strengths and weaknesses in public health response which is divided among many different agencies. Similarly, recent *Escherichia coli* outbreaks and food recalls have exposed the federal government’s limited ability to respond to food borne disease outbreaks. Many critical issues have fallen through the cracks of agency jurisdiction, compromising emergency response in the event of a major contamination event involving the U.S. food

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2. See SHELLEY A. HEARNE ET AL., READY OR NOT? PROTECTING THE PUBLIC’S HEALTH FROM DISEASES, DISASTERS, AND BIOTERRORISM 53 (2005), <http://healthyamericans.org/reports/bioterror05/bioterror05Report.pdf>.

3. U.S. GOV’T ACCOUNTABILITY OFFICE, STATEMENT BY COMPTROLLER GENERAL DAVID M. WALKER ON GAO’S PRELIMINARY OBSERVATIONS REGARDING PREPAREDNESS AND RESPONSE TO HURRICANES KATRINA AND RITA 3 (GAO-06-365R 2006), available at <http://www.gao.gov/new.items/d06365r.pdf>.

supply, whether intentional or naturally occurring.

In a 1998 report entitled *Ensuring Safe Food from Production to Consumption*, the National Academy of Sciences (NAS) recommended that Congress establish a “unified and central framework for managing federal food safety programs, one that is headed by a single official and which has the responsibility and control of resources for all federal food safety activities . . . .”<sup>4</sup> The NAS report further described the federal programs: “[a]t least a dozen federal agencies implementing more than 35 statutes make up the federal part of the food safety system. Twenty-eight House and Senate committees provide oversight of these statutes.”<sup>5</sup>

#### ROLE OF FEDERAL, STATE, AND LOCAL AGENCIES

Following September 11, 2001, Congress created a single homeland security agency to centralize efforts to protect the American people. While security at airports around the nation was taken over by this new agency, the most frequent traveler into our homeland, imported food, remained under the supervision of a bifurcated federal system of food regulation. At the federal level, numerous agencies have a hand in directing food safety, though no agency has overarching authority. Though this fragmented network may play to the different needs of disparate jurisdictions and industries, as Hurricane Katrina demonstrated, such loosely connected departments weave a safety net full of holes.

The U.S. Department of Agriculture (USDA) inspects all meat and poultry products and certain processed egg products. The inspection system is based on a law drafted in 1906 requiring carcass-by-carcass inspection at slaughter plants and “continuous” daily inspection at other meat plants.<sup>6</sup> The USDA is also responsible for promoting meat overseas, ensuring the protection of plants and animals from disease (like avian influenza) and acting as an advocate for agricultural interests in the U.S. Congress. Thus, USDA has two missions when it comes to food: safety and promotion.

The U.S. Food and Drug Administration (FDA) is a public health agency charged with protecting the safety of all foods not regulated by USDA. The agency regulates about 80% of the

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4. INST. OF MED., NAT'L RES. COUNS., *ENSURING SAFE FOOD FROM PRODUCTION TO CONSUMPTION* 12 (1998).

5. *Id.* at 26.

6. Federal Meat Inspection Act, 21 U.S.C. §§ 601-695 (2000).

nation's food supply, including such high-risk products as seafood, fruits, vegetables and dairy products. Although the foods that FDA regulates are responsible for two-thirds of all food poisoning outbreaks, the agency receives only about half as much funding as the USDA.<sup>7</sup> Thus, FDA-regulated foods – both domestic and imported – receive much less oversight and inspection than USDA-regulated foods, despite the fact that outbreak data show that FDA-regulated foods were the largest contributors to outbreaks of food borne illness, far outpacing outbreaks and associated illnesses linked to meat and poultry products.<sup>8</sup>

The Centers for Disease Control and Prevention (CDC) is another public health agency under the Department of Health and Human Services. The CDC works with state and local health departments to track and manage outbreaks of food borne illnesses. In addition, it coordinates FoodNet, a system for tracking food borne diseases, and PulseNet, a system for genetically fingerprinting isolates of disease agents that has revolutionized CDC's ability to identify multi-state outbreaks.

With the multitude of federal food safety agencies, disparate policies, inadequate resources, and ongoing issues with both domestic and imported foods, the problems with coordination during an emergency could become quite critical. Meanwhile, President Bush's federal budget for the 2006 fiscal year cut funding for public health programs managed by the Department for Health and Human Services by over \$1 billion.<sup>9</sup> The 2007 proposed budget included an additional \$600 million cut.<sup>10</sup>

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7. USDA, FY 2005 BUDGET SUMMARY, 65 (n.d.), *available at* <http://www.usda.gov/agency/obpa/Budget-Summary/2005/FY05budsum.pdf> (last visited Jan. 20, 2007); U.S. FOOD AND DRUG ADMINISTRATION, OFFICE OF FINANCIAL MANAGEMENT, FY 2006 BUDGET SUMMARY AND BUDGET IN BRIEF: COMPARABLE ALL PURPOSE TABLE, PROGRAM LEVEL (n.d.), *available at* <http://www.fda.gov/oc/oms/ofm/budget/2006/HTML/Tables/compAPTPL.htm> (last visited Jan. 29, 2007).

8. Sixty-six percent of all outbreaks in the CSPI Outbreak Alert database were caused by foods regulated by the FDA; the remaining 27% were caused by foods regulated by the USDA (meat and poultry products); and 7% were caused by foods regulated in part by both agencies. CAROLINE SMITH DEWAAL ET AL., OUTBREAK ALERT!: CLOSING THE GAPS IN OUR FEDERAL FOOD-SAFETY NET (8th ed. 2006), *available at* [http://www.cspinet.org/foodsafety/outbreak\\_alert.pdf](http://www.cspinet.org/foodsafety/outbreak_alert.pdf).

9. TRUST FOR AMERICA'S HEALTH, PUBLIC HEALTH CRITICAL CARE PROGRAMS: FISCAL YEAR 2007, <http://healthyamericans.org/policy/criticalcare> (last visited Jan. 20, 2007).

10. *Id.*

### CRITICAL ISSUES IN FOOD PROTECTION

In a 2002 publication entitled *Terrorist Threats to Food, Guidance for Establishing and Strengthening Prevention and Response Systems*, the World Health Organization (WHO) defined food terrorism as “[a]n act or threat of deliberate contamination of food for human consumption with chemical, biological or radio-nuclear agents for the purpose of causing injury or death to civilian populations and/or disrupting social, economic or political stability.”<sup>11</sup> In 2004, as Department of Health and Human Service (DHHS) Secretary Tommy Thompson was preparing to resign, he was asked what worried him most as he left office. He responded “I, for the life of me, cannot understand why the terrorists have not attacked our food supply because it is so easy to do.”<sup>12</sup>

Although terrorists have not attacked our food supply, other cases of intentional contamination of food meant for human consumption have been reported. For example, in 2003, a supermarket employee in Michigan poisoned 200 pounds of ground beef with a nicotine-based insecticide, causing over 100 people to become ill.<sup>13</sup> In Oregon, a cult infected a local salad bar with *Salmonella* in an attempt to influence a local election.<sup>14</sup> While these cases were limited to a local area, the national and international nature of the food trade industry makes it very likely that a future attack will not be so confined. In addition to developing adequate response plans, federal, state and local governments should focus on what the typical American can do to prepare, what Americans should do in the case of an attack, and what information the government should communicate to Americans in this type of emergency.

The WHO has said that an effective food protection system should have standards for identifying risks, reducing risks, and

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11. FOOD SAFETY DEP'T, WORLD HEALTH ORG., TERRORIST THREATS TO FOOD: GUIDANCE FOR ESTABLISHING AND STRENGTHENING PREVENTION AND RESPONSE SYSTEMS, FOOD SAFETY ISSUES 4 (2002), available at <http://www.who.int/foodsafety/publications/general/en/terrorist.pdf>.

12. William Branigin, Mike Allen, & John Mintz, *Tommy Thompson Resigns from HHS, Bush Asks Defense Secretary Rumsfeld to Stay*, WASH. POST, Dec. 3, 2004, <http://www.washingtonpost.com/wp-dyn/articles/A31377-2004Dec3.html>.

13. M. Boulton et al., *Nicotine Poisoning After Ingestion of Contaminated Ground Beef – Michigan, 2003*, 52 CDC MORBIDITY AND MORTALITY WKLY. REP. 413 (2003).

14. T.J. Torok et al., *A Large Community Outbreak of Salmonellosis Caused by Intentional Contamination of Restaurant Salad Bars*, 278 JAMA 389 (1997).

for responding rapidly to control outbreak situations.<sup>15</sup> Within the United States, it is vital that the entire food safety infrastructure be reviewed, including federal, state, and local governments, to ensure that effective systems are in place. Critical issues identified by the WHO include food contamination monitoring, food control laboratories, food import inspection, recall and tracing systems, food technology expertise, food safety risk assessment, industry alert systems, and agriculture alert systems.<sup>16</sup>

Identifying risks for food contamination is the first step in food protection. This can be done in several ways. First, monitoring outbreaks of food borne illnesses provides information on both the source and agent of disease and allows resources to be better targeted to prevention. This information also provides the baseline that may be needed to distinguish an intentional from an unintentional outbreak. Ongoing food contaminant monitoring will track trends, identify problems before they affect consumers, and might provide an early warning system if an attack on the food supply were to occur.

Both food and public health laboratories are essential at each level – local, state, and national – to provide real-time food monitoring, public health, and outbreak data. Laboratories are essential for identifying possible infectious agents and infected food in an emergency. Similarly, ensuring surge capacity, the ability to mobilize additional resources when needed in an emergency, at the state level is an important element of emergency response. According to a Trust for America's Health (Trust) report, these essential criteria are not being met. The Trust report found that thirteen states and the District of Columbia are not meeting the preparedness needs outlined in their bioterrorism preparedness plan because they do not have the types of laboratories capable of assessing dangerous agents (i.e., bio-safety level three laboratories).<sup>17</sup>

The Trust report further found that over 25% of states do not have adequate laboratory capacity to meet anticipated preparedness and response needs in the face of bio-threats.<sup>18</sup> Similarly, hospitals in nearly one-third of states lack sufficient capabilities to consistently and rapidly consult with infection

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15. FOOD SAFETY DEP'T, *supra* note 11.

16. *Id.*

17. HEARNE ET AL., *supra* note 2, at 16.

18. *Id.* at 17.

control experts about possible or suspected disease outbreaks.<sup>19</sup> States should hire or train infection control experts and identify second-tier and third-tier laboratories that could be made available if primary labs were overwhelmed or disabled during an emergency.

Quickly identifying risk management options in emergencies is aided by both timely risk assessments and new food technologies. Both functions are spread between multiple agencies and the private sector. For example, developing food technology is shared by federal research organizations and private companies. Approval for use of food technology on or in food production often takes years, and the responsibility is shared between several agencies. Food safety risk assessment is also handled by numerous federal agencies. Risk assessment provides an overview of the relevant scientific information necessary to determine the source of a risk, as well as technological and risk communication options.

Food tracking and mandatory recall systems are also essential tools in a food emergency. According to the WHO, “[t]racing systems and market recalls are thus critical in responding to food contamination, whether deliberate or inadvertent.”<sup>20</sup> However, the two primary U.S. food regulatory agencies, the USDA and the FDA, rely on voluntary company tracking and recall systems.<sup>21</sup> The USDA does not give information on the distribution of contaminated meat products to state public health officials unless the state officials sign a nondisclosure agreement. This policy means that the states are barred from giving consumers information about where and when recalled meat was sold. If the food supply was the focus of a terrorist attack, the USDA’s policy would likely contribute to a higher rate of death and illness because it would interfere with the ability of consumers to obtain the knowledge necessary to protect them. While the USDA recently proposed a rule to allow for greater disclosure, this rule has not yet been approved.<sup>22</sup> The proposed rule would allow USDA to make publicly available lists of retail consignees of meat and poultry products that have been voluntarily recalled by a federally

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19. *Id.*

20. FOOD SAFETY DEP’T, *supra* note 11, at 16.

21. UNITED STATES DEPARTMENT OF AGRICULTURE, FOOD INSPECTION AND SAFETY SERVICE, FSIS DIRECTIVE 8080.1, REVISION 4 (2004), *available at* <http://www.fsis.usda.gov/OPPDE/rdad/FSISDirectives/8080.1Rev4.pdf>.

22. Availability of Lists of Retail Consignees during Meat or Poultry Product Recalls, 9 C.F.R. § 390.1 (2004).

inspected meat or poultry products establishment.

Consumer education and response are also challenging during a food emergency. During smaller scale food safety recalls, the government has encountered unpredictable consumer reactions. Sometimes the mere mention of a risk will trigger avoidance of a product, while at other times consumers completely ignore known safety hazards. Anticipating responses and crafting effective communication methods to reach consumers are essential. Experts say that the best methods for communicating with consumers during a food emergency include using responsible speculation, acknowledging uncertainty, sharing dilemmas about what to do, and *not* aiming for zero fear.<sup>23</sup>

Industry and agriculture alert systems are considered essential during a food emergency, and are also important components of risk communication. When properly coordinated, the industry and agricultural sector can provide early warning. Getting information from the food industry and producers to government decision-makers and delivering good advice from the government to both these sectors and to consumers is not only vital for minimizing economic losses from a food emergency, but also for maximizing the public health response.

Our nation's food supply is becoming increasingly global and includes foods grown and processed in many different countries. In addition to monitoring the safety of food produced in the United States, federal agencies must ensure the safety of food imported into our country, which can be subject to intentional tampering. This is a growing area of concern, as improvements in transportation and trade have facilitated the import of foods from around the world into the U.S. food supply. The typical supermarket now carries produce from Guatemala and South Africa, shrimp from Ecuador, and soups from Asia. Food imports have increased at least three-fold since 1985. The FDA lacks new inspection resources to keep up with this astronomical growth.<sup>24</sup> The FDA reportedly inspects only about

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23. Peter M. Sandman & Jody Lanard. *Bird Flu: Communicating the Risk*, 10 PERSP. IN HEALTH 2, 3 (2005), available at [www.paho.org/English/DD/PIN/perspectives22.pdf](http://www.paho.org/English/DD/PIN/perspectives22.pdf).

24. *Safety of Food Imports Before the Permanent Subcommittee on Investigations*, S. Committee on Government Affairs (1998) (statement William B. Schultz, Deputy Commissioner for Policy, Food and Drug Administration, Department of Health and Human Services), available at <http://www.fda.gov/ola/1998/imported.htm> (last visited Feb. 2, 2007).

1% of food products entering the country; a surveillance rate that is much too low to ensure that hazardous food does not enter the country.<sup>25</sup>

The safety of imported foods is dependant on many factors beyond the control of our government. While a comprehensive system of inspections both in the country of origin and at the border is effective in controlling hazards in imported meat and poultry products regulated by USDA, FDA lacks sufficient resources to inspect imported fruits, vegetables, seafood and dairy products.

The failure of the FDA's import inspection program became clear in 2003 when an outbreak was tied to imported Mexican scallions used in salsa prepared at a Pennsylvania Chi-Chi's restaurant. The scallions were contaminated with Hepatitis A and they infected at least 555 people and caused three deaths.<sup>26</sup> This outbreak was the last of four that were linked to the same imported green onions that occurred between August and November.<sup>27</sup> After the Pennsylvania outbreak, the FDA inspected farms in Mexico and found abhorrent conditions for farm workers. The FDA reported that workers "[l]ived in windowless metal shacks with no showers. Shallow trenches ran from an area littered with soiled diapers and other human waste, downhill to onion fields and a packaging house. . . ."<sup>28</sup> While the FDA never conclusively linked the conditions on one farm to the outbreak of Hepatitis A, it still demonstrates how closely connected our world has become—so close that the safety of salsa at a local restaurant relies on production practices (or security measures) 2,000 miles away.

#### IMPROVING EMERGENCY RESPONSE

In its 2002 publication *Terrorist Threats to Food*, the WHO stated that "[a]n effective emergency response . . . should

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25. *Food Safety Overview of Food Safety and Inspection Service and Food and Drug Administration Expenditures Before the S. Comm. On Agriculture, Nutrition, and Forestry*, 106th Cong. (2000) (statement of Lawrence J. Dyckman, Director, Food and Agriculture Issues Resources, Community, and Economic Development Division), available at <http://www.gao.gov/archive/2000/rc00300t.pdf>.

26. V. Dato et al., *Hepatitis A Outbreak Associated with Green Onions at Restaurant- Monaco, Pennsylvania, 2003*, 52 CDC MORBIDITY AND MORTALITY WKLY. REP. 1155, 1155 (2003).

27. S. Boodman, *Raw Menace: Major Hepatitis A Outbreak Tied to Green Onions*, WASH POST, Nov. 25, 2003, at F.01.

28. Joe Mandak, *FDA finds squalor at Mexican farm in hepatitis probe*, ASSOCIATED PRESS STATE AND LOCAL WIRE, May 7, 2005.

include links [to] law enforcement . . . agencies, food recall systems, risk assessment specialists and the food industry as well as the more traditional sectors of health care providers, laboratories and emergency services.”<sup>29</sup> Such a closely coordinated system would likely produce both practical and effective results during an emergency, but only if the outbreak is identified early on, the contaminated food can be located, and the channels of communication are open. To ensure prompt identification of intentional contamination, outbreak tracking needs to be standardized, fully reported, and prioritized. Once identified, officials must develop a clear and effective response plan for removing contaminated foods from grocery store aisles and home refrigerators. But all of this requires a public health network at the local, county, and state levels that work together with fully-funded and staffed federal agencies.

Another option for improving emergency response is for Congress to enact a modern food law administered by a single food safety agency. In 2006 the USDA received \$837 million to inspect meat and poultry. This is more than twice the amount that the FDA received for food-related inspections.<sup>30</sup> These resources can not be reallocated in an emergency, due to legal restriction and the problem that the foods safety programs exist in two distinct agencies. A 1998 NAS report called for the consolidation of food-safety responsibility under a single statute, a single budget, and a single leader.<sup>31</sup> This report concluded that the “current fragmented regulatory structure is not well equipped to meet the current challenges.”<sup>32</sup> This approach has been recommended also by the GAO and many others.<sup>33</sup>

Addressing these issues is not a problem that the United States faces alone. With the globalization of the world’s food supply comes the realization that risks for food contamination are more challenging. To empower consumers in the

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29. See FOOD SAFETY DEP’T, *supra* note 11, at 25-26.

30. Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2006, Pub. L. No. 109-97, 119 Stat. 2120 (2005).

31. Institute of Medicine, *supra* note 4.

32. *Id.* at 12.

33. *Federal Food Safety and Security System: Fundamental Restructuring is Needed to Address Fragmentation and Overlap Before the Subcomm. On Civil Serv. and Agency Organization, H. Comm. On Government Reform*, 108th Cong. 4 (statement of Lawrence J. Dyckman, Director, Natural Resources and Environment, available at <http://www.gao.gov/new.items/d04588t.pdf>).

international market, in 2003 the Center for Science in the Public Interest (CSPI) formed Safe Food International (SFI) in conjunction with the WHO and the United Nations' Food and Agriculture Organization (FAO).<sup>34</sup> SFI is a coalition of consumer organizations from around the world, which aims to unify and focus the efforts of consumer organizations to ensure a safer food supply. In June 2005, SFI held a conference in Geneva, Switzerland with consumer groups from twenty-two developing nations in order to create *The Guidelines for Consumer Organizations to Promote National Food Safety Systems*.<sup>35</sup> These guidelines provide consumer non-governmental organizations with a framework for promoting the elements of an effective food safety program.<sup>36</sup> These elements include:

- Food law and regulations,
- Food-borne disease surveillance and investigation systems,
- Food control management,
- Inspections services,
- Recall and tracking systems,
- Food monitoring laboratories,
- Information, education, communication and training,
- Funding and affordability of the national food safety program.<sup>37</sup>

Promoting these elements in both wealthy and developing nations will provide an important oversight for assuring that each national food safety program addresses key problems, helps minimize food-related deaths and illnesses, and deters the use of food as a target of intentional contamination.

## CONCLUSION

The gaps and inefficiencies documented above demonstrate

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34. Safe Food International is a nongovernmental organization (NGO) project by CSPI. It was started under the direction of Caroline Smith DeWaal in 2003. CSPI also founded the International Association of Consumer Food Organizations.

35. See SAFE FOOD INT'L, GUIDELINES FOR CONSUMER ORGANIZATIONS TO PROMOTE NATIONAL FOOD SAFETY SYSTEMS 2 (2005), available at [http://www.safefoodinternational.org/guidelines\\_for\\_consumer\\_organizations.pdf](http://www.safefoodinternational.org/guidelines_for_consumer_organizations.pdf).

36. *Id.*

37. Caroline Smith DeWaal & Gonzalo R. Guerrero Brito, *Safe Food International: A Blueprint for Better Global Food Safety*, 60 FOOD & DRUG L.J. 393 (2005).

that until we address the problems inherent in the food-safety regulatory structure, we will not be able to achieve a risk-based food-safety system capable of responding effectively to food emergencies. The steps for preventing bioterrorism do not require grand schemes and great minds. Instead, they require strong national programs, outbreak surveillance, and effective and honest public communication. Security measures in the food industry are our first line of defense against bioterrorism and have the primary role of preventing intentional and unintentional contamination. However, to be effective, industry programs require government monitoring and auditing.

The fractured federal food safety infrastructure makes coordination very difficult, and makes very real the possibility that a Katrina-like response could follow a food emergency. Therefore, many external organizations have made calls for restructuring the federal government's food safety system. Over the last twenty years, expert panels from the White House and Congress to the National Academy of Sciences and the General Accounting Office have all reached similar conclusions.

It is clearly not news to anyone that statutes written before the Ford Model T was driven are not suited to address modern issues like bioterrorism, mad cow disease, or even common food borne bacteria. If a terrorist was to strike the U.S. food supply, consumer confidence in the government's fractured food safety programs would plummet as fast as confidence in airport security did following September 11, 2001. Dr. John Bailar, the chairman of the NAS committee called for a more unified food safety structure, and remarked that "[w]hen bioterrorism is added to the mix, the case for prompt and sweeping change becomes compelling. While additional tinkering with the details of our food safety system might be helpful, the consolidation of responsibilities, authorities, and resources for food safety into a single high-level agency is critical."<sup>38</sup> Today, a unified agency operating under a modern food safety statute is truly an issue of national security.

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38. See John C. Bailar, III. *Ensuring Safe Food: An Organizational Perspective*, in FIREPOWER IN THE LAB: AUTOMATION IN THE FIGHT AGAINST INFECTIOUS DISEASES AND BIOTERRORISM 140 (Scott P. Layne et al. eds., 2001).