



Food Defense

Survey & Report

Food Defense

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ACKNOWLEDGEMENTS

Food, like water and air, is essential to sustain life. For the past three years, DomPrep has focused on protecting the food supply in one manner or another. Each time we achieved better results. Early this year, in a conversation with Scott Becker, executive director at the Association of Public Health Laboratories, he remarked, “If you really want to learn about food preparedness, you must go to the University of Minnesota.” He was right. This report is the result of an Insiders Roundtable held at that prestigious venue. Thank you Scott, for your important suggestion.

Additionally, DomPrep’s staff Susan Collins and Catherine Feinman did a terrific job in producing this report. Catherine researched, compiled, drafted, analyzed, and edited a huge amount of content into the final product. Susan coordinated and organized the design, layout, and production. A special thank you goes to them.

Select advisors from the DomPrep40 provided thought leadership, insight, and professional contacts to increase the report’s importance, credibility, and relevance to planners and policy professionals alike. A warm thank you goes to Amy Kircher, DrPH, director of the National Center for Food Protection and Defense at the University of Minnesota, Maureen Sullivan, emergency preparedness and response laboratory coordinator of the Minnesota Department of Health, and Craig W. Hedberg, Ph.D., University of Minnesota, who played key roles in the process.

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Last, but certainly not least, thank you to more than 600 people – roundtable attendees and DomPrep readers – who each provided valuable feedback that led to the discovery of important insights.

A changing global threat environment, coupled with increasingly interdependent societies and aging infrastructures, is a dangerous combination that preparedness leaders must address. Once again, it is gratifying that DomPrep and the newly created Preparedness Leadership Council, International serve as a catalyst for this type of interaction as the community searches for solutions.

Martin D. Masiuk
Publisher of DomPrep

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FOREWORD

Throughout history, food has been used as a delivery mechanism to incapacitate enemies. Today this threat remains, as intentional food contamination plots are uncovered with surprising frequency. Due to the nature of the globally distributed and highly integrated food systems, rapid identification of an assault to the system is an ongoing challenge. Threats come in many forms from Mother Nature and system failures to intentional contamination from economic motivations, criminals, or terrorists. Recent examples of intentional contamination are of grave concern to the U.S. and global populations as food is one infrastructure that nobody can opt out of. People can take themselves out of other threat equations by not flying or choosing not to live by a nuclear power plant; however, food is necessary for survival.

The United States has made monumental improvements in preparing for a disaster in the homeland since the terror attacks of 9/11 and Amerithrax. This includes significant efforts in education, training, and exercising the first responder community to respond to multiple hazards that threaten the nation. This report takes another crucial step in preparing the responder community for threats from intentional contamination of the food supply. The food defense roundtable discussion and survey responses from DomPrep's multi-discipline readership highlight the critical work that must continue to prepare the nation's communities for an intentional attack on the food system.

Amy Kircher, DrPH

Director

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SUMMARY

Food contamination has led to various food recalls within the past month: dog treats for salmonella, hot dog relish for botulism, salad for listeria, kids' food products for spoilage, and sandwich wraps for E. coli. Even Hepatitis A. and norovirus outbreaks have been associated with food contamination incidents.

Defined as the protection of the nation's food supply from deliberate or intentional acts of contamination, food defense is a topic of great importance to the preparedness community, but it is not widely understood, especially outside the food and agriculture sector. To share their experience and knowledge on this topic, key stakeholders met for a roundtable discussion on 23 July 2013 at the University of Minnesota to address the following: the definition of food defense, systems that are currently in place, existing gaps, funding concerns, and protection of the food supply chain.

The room included representatives from: the government at local (City of Bloomington, Minneapolis Health Department), state (Minnesota Department of Agriculture, Minnesota Department of Health, Minnesota Department of Health and Public Health Laboratory), and federal levels (U.S. Food and Drug Administration, U.S. Air Force Food Defense Program, Federal Bureau of Investigation); academia (University of Minnesota, National Center for Food Protection and Defense); and the private sector (BioFire Diagnostics, Daybreaker Foods, Tyco Integrated Security, Northrop Grumman Health IT, Monsanto Company).

I. *Food Defense Awareness* – “Food defense” is a term that requires a definition that a broad audience can understand and agree upon. Regardless of the industry or type of role a person plays in his or her daily routine, everyone can play an important part in protecting the nation's food supply from intentional contamination.

II. *Systems Currently in Place* – The Incident Command System and key legislation are just two ways in which sectors are joining forces to protect the nation's food supply chain. However, if the operational level does not use the existing systems, then they are essentially useless.

III. *Existing Gaps* – Many gaps exist because of unclear rules and regulations for food defense. It is important to first recognize that those gaps do exist throughout the food chain – from farmer to consumer. One of the most significant gaps is that people who have no daily food-related tasks would play a role in the response if there were an intentional contamination of the food system.

IV. *Food Defense Costs* – Government and industry stakeholders must move beyond their differences and allocate resources that can effectively protect the nation’s food supply chain. Collaborative partnerships are the best way to address decreasing funds as funding needs continue to increase.

V. *Protecting the Food Supply Chain* – Protecting the food supply requires a whole-community approach. Although industry should generally lead the effort to protect the food supply chain, government and law enforcement also play critical supporting roles.

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I. FOOD DEFENSE AWARENESS

Food defense, food regulations, and related terminology may not be widely understood by emergency planners, responders, and receivers. To address this concern, Amy Kircher, director of the National Center for Food Protection and Defense, began the roundtable discussion on 23 July 2013 by asking how different stakeholders define the term “food defense.” Before defining what food defense is, it was important to clarify what it is not. “Food security” and “food defense” are not interchangeable, but those outside the food and agriculture sector sometimes misuse these terms. “Food security” simply means having enough food, whereas the term “food defense” is more difficult to clearly define.

Even defining “food” is sometimes unclear. For example, water can be a consumable or nonconsumable agricultural element that is regulated differently depending on the “packaging.” If the water is in a tap, it falls under the jurisdiction of the U.S. Environmental Protection Agency; however, if it is in a bottle, then the U.S. Food and Drug Administration is the regulating body. Kircher pointed out that some beverage companies also do not see themselves in the food defense space.

The Umbrella of Food Protection

In order to develop an overall food protection plan, it is important to understand the difference between food safety (unintentional contamination) and food defense (intentional contamination). Where food safety relates to contamination from natural hazards, errors, or failures in the system, food defense works toward mitigating intentional threats to the food system motivated by terrorism, economically motivated adulteration, or disgruntled employees. In both incidents, the collective actions taken to prevent an event, identify a disruption in the food system, and respond fall under an umbrella term, “food protection,” that encompasses both food safety and food defense.

At the state and city level, there is a continuum of prevention, detection, and response. Maureen Sullivan, emergency preparedness and response laboratory coordinator at the Minnesota Department of Health, stated, “If we are not able to pick up outbreaks at the smaller

scale, I think we are ill prepared to do anything larger.” It is critical to protect the food and agriculture sector from harm.

At the public health laboratories, it does not matter at the outset whether an incident is accidental or intentional because, either way, the laboratorians’ job is to look for pathogens. It is the responsibility of the epidemiologists to find the source. However, if there is a hint that it is intentional, it could possibly change to some degree what and how the laboratory will test – for example, if a surveillance camera catches someone putting food on the shelf rather than taking it off, it raises a red flag. By co-locating the Minnesota’s Department of Agriculture and Department of Health, there is a huge benefit for ease of information sharing and collaboration.

From the point of view of the Federal Bureau of Investigation and other law enforcement agencies, intentional adulteration, underlying motive, and consequences are all critical components for determining the population’s potential response – for example, in certain international circumstances food adulteration may lead to riots or wars. One resource that identifies food incidents is the Food Emergency Response Network (FERN). This network of the nation’s food-testing laboratories integrates federal and state agencies into a network to respond to emergencies involving biological, chemical, and radiological contamination of food. The primary challenge for law enforcement agencies is the presentation of an intentional food contamination as each incident may present differently. There are numerous food safety outbreaks every day that agencies investigate without the involvement of law enforcement; finding the signal of an intentional act in the noise of typical outbreaks, while at the same time conserving resources, can be difficult.

An “All Hazards” Approach

A robust, all-hazards approach is certainly applicable when the milk or food supply is vulnerable. The first step is to anticipate an event. Next, assessment of the threat will help determine the preventative measures that each stakeholder should take and the education that they should acquire. Finally, if the threat does materialize, then stakeholders must have a response plan.

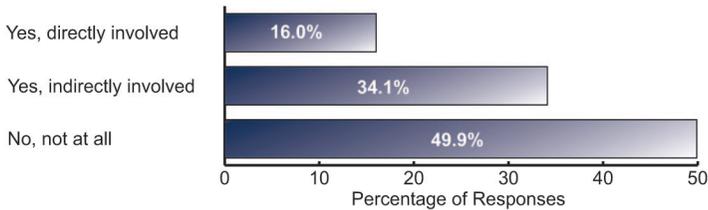
Food safety incidents occur on a regular basis. Professionals are familiar with those hazards and have, unfortunately, responded to plenty of food safety incidents (e.g., salmonella). Protecting the food supply from intentional contamination requires assessment of additional hazards that may generate significant disruption (e.g., ricin).

The challenge, therefore, is to pull food safety and food defense under the umbrella of food protection. There is significant overlap in activities for food safety and defense that have dual benefit. Intentional attacks from economically motivated adulterators, criminals, and terrorists will likely present initially as a food safety issue; therefore, the perspective of both safety and defense are important. One capability that has proven successful is the hazard analysis and critical control points (HACCP) preventative approach that traditionally focuses on food safety, but vulnerabilities can be safety or defense related. To ensure that a company is adequately prepared for a food defense incident, current HACCP plans require a food defense addendum.



Figure 1:

Do your current responsibilities include tasks related to food: food industry, food supply chain, food surveillance, food safety, food defense, etc.?



Survey Results – Awareness

Half of all the respondents reported that their current responsibilities include no involvement at all with tasks related to food (Figure 1). It is important to note that, although many of them do not work within or directly with the food industry or any related field, the topic of food defense still raises great interest among emergency planners, responders, and receivers. Raising awareness within, and gathering feedback from, those communities are two steps closer toward the whole-community approach to food defense.

When asked how the survey respondents would define “food defense,” more than half (386) of the respondents shared their thoughts. There were many different views from many different disciplines, whose practitioners have varying degrees of knowledge on the topic of food defense. The following definition is a compilation of the survey responses and the key words that the respondents used most often:

Food defense is the ability to monitor, prevent, and respond to an incident in order to protect the food production and distribution chains against intentional contamination and to provide a safe, unadulterated food supply to the nation – from the farm to the table.

The first key phrase in the above definition is “the ability to monitor, prevent, and respond.” There are many electronic systems available to assist practitioners in monitoring, investigating, and

preventing foodborne illnesses, but they are not all widely known. In addition to the systems listed in Table 1, respondents offered other resources that include:

- *State and local resources:* Hospital Health Alert Network (through Illinois Department of Public Health); King County Public Health; required county epidemiology daily assessment polls; Massachusetts Virtual Epidemiologic Network; state veterinarians
- *National resources:* Centers for Disease Control and Prevention; U.S. Environmental Protection Agency; U.S. Department of Health and Human Services; U.S. Food and Drug Administration; Northern Command; National Outbreak Reporting System (includes foodborne outbreaks); U.S. Department of Agriculture; U.S. Agency for International Development; Food Industry Environmental Network LLC; Hazard Analysis and Critical Control Points; Extension Disaster Education Network; CaliciNet; Homeland Security Information Network Communities of Interest
- *International resources:* Relevant Australian Bodies and Alerts (e.g., FSANZ); World Health Organization; International SOS Medical Alerts; Laboratory Response Network; International Food Information Council Foundation

TABLE 1:

Are you familiar with any of the following electronic systems related to surveillance and/or foodborne illness investigations? (Select all that apply)

	Percentage of Responses
eLaboratory Exchange Network (eLexNet)	9.2%
Epidemic Information Exchange (Epi-X)	37.3%
Food Emergency Response Network	30.8%
FoodNet	22.2%
FoodShield	13.1%
Health Alert Network	62.9%
Homeland Security Information Network - Food and Agriculture Portal	44.7%
InfraGard	29.4%
Lessons Learned Information Systems	43.3%
National Biosurveillance Integration System	23.1%
National Voluntary Environment Assessment Information System (NVEAIS)	3.1%
PetNet	4.7%
Pro-Med Mail (International Society for Infectious Diseases)	15.7%
PulseNet	24.3%
Other	5.5%

II. SYSTEMS CURRENTLY IN PLACE

The July Food Defense roundtable convened in Minnesota due to the number of stakeholders located in Minneapolis and St. Paul: Several global food companies are headquartered in the twin cities; the University of Minnesota has established subject matter experts and the National Center for Food Defense; and the state is known to have a highly regarded integrated food surveillance systems. The Minnesota Laboratory systems, for example, can rapidly send alerts to clinical laboratories to find additional samples.

Surveillance, Response & Quality Assurance

Surveillance of disruptions in the food system can be challenging during routine food safety events and would likely be challenging in a food defense event as well. Identification of events from the clinical community, communication among responders, and delays in shipping samples are just a few obstacles that occur.

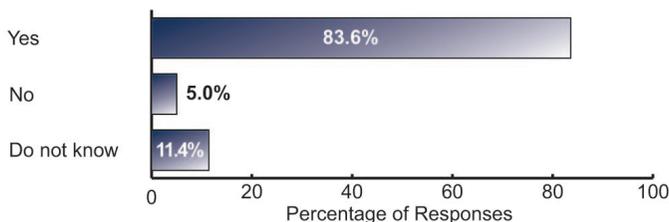
First responders – including fire, law enforcement, emergency medical services – are most often involved in response to an event and not as involved in the prevention or surveillance tasks. One response asset operational in 18 states is the FDA-funded rapid response team. These teams conduct integrated, multiagency responses to all-hazards food and feed emergencies. The integration of these teams with traditional first responders would likely provide additional capability to respond to a food defense incident.

Food facility operators also can make changes that would affect food defense as a whole, but information sharing is a concern when looking at the entire supply chain: Who regulates the water upstream? What systems are in place to work with hog farms? How will supply chain stakeholders share information? Who are all the stakeholders?

The Food Ingredient Distribution Association (FIDA) brings some of this information together. There are many conditions, though, that could disrupt how and where food is moving: risk layers and critical nodes, from local to global companies. Each step of the process – pre-event, event, response, recovery, and return to “normal” – is different.

Figure 2:

Do you believe that the Incident Command System (ICS) would be beneficial for responding to a food-related incident?



The systems in place must be able to complement each other in order to report, detect, and recover from an event. Unfortunately, as preventive controls change, so do the criminal tactics to bypass these controls.

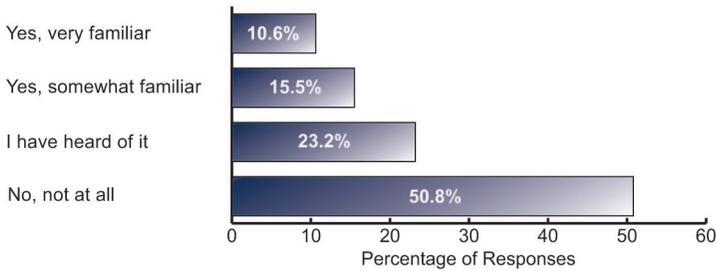
Communication, Coordination & Information Sharing

To reduce the probability of an attack, some roundtable attendees suggested better traceability, fusing together disparate data sources, and improved information sharing. Several tools exist or are in prototype to aid defense of the food system. The University of Minnesota's National Center for Food Protection and Defense this year has prototyped a supply chain documentation and risk analysis tool, which links together components of the supply chain owned by different companies and assesses the collective risk from multiple threats.

To discuss the nation's critical food and agriculture infrastructure, a national-level forum exists. The U.S. Department of Homeland Security leads the council as the convener and the U.S. Food and Drug Administration and the U.S. Department of Agriculture, along with an industry representative, chair the Food and Agriculture Government Coordinating Council/Sector Coordinating Council. The forum made up of stakeholders from the government, industry, and academia meets quarterly to identify issues, share new capabilities, and work on food defense initiatives.

In summary, all stakeholders should understand how their jurisdictions share information and the roles of the relevant regulatory

Figure 3:
Are you familiar with the Food Safety Modernization Act (FSMA)?



food agencies and emergency responders in a food defense incident. Although there has been much written about the challenges of sharing information, it is a key component for protecting the food supply.

Survey Results – Measuring Resilience

Since 9/11, the majority of personnel that would respond to a disaster has trained and exercised in the Incident Command System (ICS). To augment current ICS training, Michael Starkey, emergency planning director at the Minnesota Department of Agriculture, indicated that a new food-centric ICS course is being developed that will be available to all states as a Food and Drug Administration product. This will aid in training both food stakeholders and first responders to provide a unified response to a food incident. Additionally, there have been efforts in several locations to bring industry into the incident command structure to collaborate in the response. Most of the survey respondents (83.6 percent) agree that incorporating incident command into the food and agriculture sector is a great crossroads for multiple disciplines to speak the same language and have a unified approach to response (Figure 2).

About half (50.8 percent) of the survey respondents reported that they were not familiar with the Food and Drug Administration’s Food Safety Modernization Act (FSMA), which President Barack Obama originally signed into law on 4 January 2011 (Figure 3). FSMA rules, which are currently under review, shift the focus from responding to food contamination to preventing it. During the review period, the

Food and Drug Administration is accepting comments about topics such as: preventive controls for human food; produce safety; foreign supplier verification programs; accreditation of third-party auditors/certification bodies; and preventive controls for animal food.

III. EXISTING GAPS

Performing risk assessments and identifying vulnerabilities will help highlight existing gaps and pave the way for developing mitigation strategies. The 9/11 terrorist attacks changed the way in which many people think about hazards and vulnerabilities. Sometimes the best way to stop a “bad person” is to think like one; but, for some, this can be difficult. Bridging the gap, though, begins by first identifying that there is in fact a problem.

Some common gaps are funding, training, and understanding how the food supply process works. Detection methods and the length of time required to perform laboratory tests also can create gaps in mitigating and responding to potential threats. Of course, sharing information is a gap that may occur both within and between sectors.

There are information challenges presented by different groups. Industry does not want to share proprietary information and the public sector may be prohibited by classification rules. The clearance process from the federal government level may require long vetting timelines, which presents additional challenges. To remedy the problem, the information ecosystem should focus more on linking information available from different organizations, which would help bridge the gap.

The federal government has worked with food production systems for years to identify the risks. A challenge for identifying food defense risks is that the risk profile changes and there are many critical control points in the facility and along the food chain. High-value attacks – using the system as a weapon, cyber threats, process controls, and packaging – may not necessarily be considered high-risk threats under Hazard Analysis and Critical Control Points (HACCP). With HACCP conducting risk-based inspections, there are vulnerabilities when the inspectors are not on site. From a regulatory standpoint, the inspectors may be on site only one or two times a year (4 times maximum). As such, it is critical that the day-to-day operations have food safety/food defense plans in place to keep the issues at the forefront and have effective systems in place when needed.

Companies must comply with a variety of rules and regulations to produce and distribute food and to keep the food system safe. However,

there are things that can go wrong – from minor energy failures to major supply chain interruptions. Information on food safety often moves quickly because these regulations and standard operating procedures for response are clear. Food testing on the safety side has established protocols, whereas there are a lot more unknowns in threats from a food defense perspective. Lastly, there are delays in supply chain data and information sharing because of the proprietary nature of the data and internal rules and regulations. For example, the 2007 dog-food recall (as a result of melamine contamination) occurred much later in the United States than in other countries because the United States did not initially recognize the problem.

Since 9/11, information pipelines have opened; however, the flow of data is not always open or consistent. There needs to be a more proactive role in identifying which data can be shared among stakeholders to deal with threats and disruptions to the food supply chain. There have been some collaborative efforts between sectors – for instance, the radiological and food/agriculture sectors are currently talking about milk. Minnesota has found success in sharing information and collaborating by co-locating their state’s Department of Agriculture and Health laboratories. This allows for better communication and collaboration on food incidents. Both departments work closely with the University of Minnesota, which has schools in medicine, public health, and agriculture. These historical partnerships have built high levels of trust within the system. Cross-sector efforts such as this increase the collaboration among responders yet more work is required.

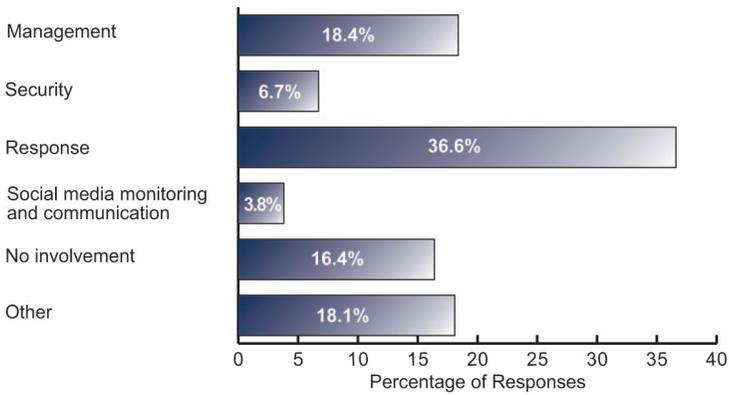
In the pre-event space, threats remain from groups that are seeking to undermine crop development. To identify criminal or terrorist activity, information sharing and relationship building among law enforcement officials and researchers would help prime the system for earlier detection. In today’s world, the threats from intentional contamination of the nation’s food system continue to evolve and response to an intentional adulteration may be different depending on the intent. As such, collaboration, professional development, and training are paramount.

Survey Results – Hazards & Capabilities

It is interesting to note that, although half of all the survey respondents reported that their current responsibilities include no

Figure 4:

In your current position, what role would you play if a foodborne outbreak were to occur?



involvement with tasks related to food (Figure 1), only 16.4 percent stated that they would have no involvement if a foodborne outbreak were to occur (Figure 4). Many of the 18 percent who selected “Other” as their response still reported that they would play a management, response, or social media monitoring and communications role if a foodborne outbreak were to occur. Some respondents would manage the responders, receivers, public health laboratories, and call centers. Others would manage the emergency healthcare system through triage, surge, logistics, and patient tracking, while ensuring compliance with the National Incident Management System.

Survey respondents reported that response to an intentional foodborne outbreak would include members of the National Guard, medical communities, fire departments, hazardous material teams, government agencies, Community Emergency Response Teams, Medical Reserve Corps, Red Cross, emergency medical services, and other volunteer agencies. In addition to performing emergency operations, the response efforts would include disposal of contaminated material. Respondents indicated that they would be involved in communication efforts such as traditional and social media, educating the public, briefing senior executives, and coordinating information between government and nongovernment stakeholders.

In addition to management, security, response, and communication roles, the respondents offered many other tasks that they would be called to perform during a foodborne outbreak. These include:

- Investigate and research – perform epidemiologic and other scientific research, conduct public health and law enforcement investigations, determine surge capacity, analyze the disease outbreak and gaps, detect and test specimens in laboratories;
- Advise – serve as public health advisors, local/state food industry experts, continuity of operations planners, emergency preparers, and even judicial and psychological advisors to enforce inspections, codes, policies, and responses to all stakeholders (including the disability community);
- Monitor – provide services to monitor the outbreak, the overall response, the agency employees who are affected, the agency operations that are impacted, the work performed by communicable disease staff, the health community response, and the surveillance efforts;
- Facilitate – implement the Incident Command Structure concepts for a large-scale response, the Strategic National Planning Guidance efforts within states, and the public health laboratory response;
- Treat – serve as healthcare providers, nurses, emergency room staff, and National Disaster Medical Teams to provide necessary medical treatment, perform kidney dialysis, transport patients, and dispense medical countermeasures from the Strategic National Stockpile;
- Command – serve as the incident commander or district health officer, assist at the incident command post, command the hospital response, activate the emergency operations center to provide assistance to laboratories and plants, and coordinate with the local response; and
- Support – work in the environmental health division, assist customers and clients, offer technical or administrative support, support the federal agencies and incident management, and provide animal care.

TABLE 2:

Different motivations lead to intentional food adulteration (i.e., degrading the quality of food by adding or removing key ingredients). In your opinion, rank the following on a four-point scale from the most likely threat (1) to the least likely threat (4).

	1	2	3	4
Criminals	6.1%	17.0%	29.6%	47.2%
Disgruntled Employees	46.6%	29.4%	16.3%	7.7%
Economically Motivated Adulteration	18.7%	31.5%	27.0%	22.8%
Terrorism - Domestic or Foreign	28.6%	22.1%	27.0%	22.3%

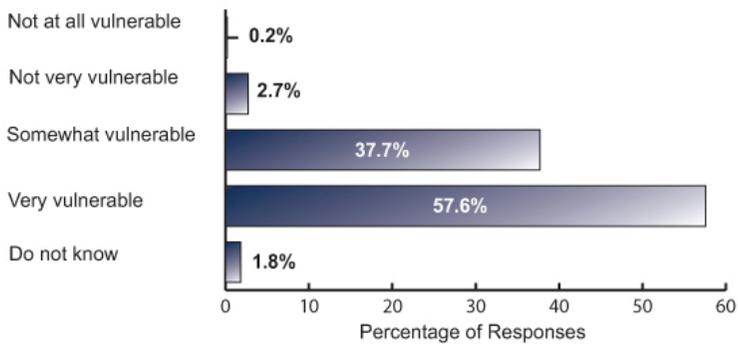
Although some of the respondents did not see themselves responsible for one of the above tasks, they stated that they still would be concerned and would take personal protective actions. Two respondents pointed out that their roles could possibly be as victims themselves or they may manage their families' health and safety.

To examine the motivations that might lead to intentional food adulteration, respondents ranked four primary motivations from most likely to least likely (Table 2). According to those results, adulteration of food by a disgruntled employee is the most probable to occur, whereas criminal involvement in an intentional event is least likely. Other responses included economically motivated adulteration and domestic or foreign terrorism.

The next question determined the respondents' perception about the level of vulnerability. More than 95 percent believe that the U.S. food supply is vulnerable to the threat of intentional contamination (Figure 5). By identifying that a problem exists, the nation moves closer to creating a solution. Conducting exercises that examine the specific vulnerabilities within the supply chain and holding companies accountable for their roles in mitigating the vulnerabilities would help close some of the existing gaps.

Figure 5:

How vulnerable do you believe the U.S. food supply is to the threat of intentional contamination?



IV. FOOD DEFENSE COSTS

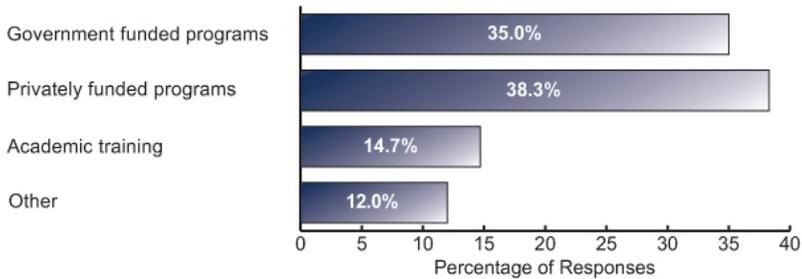
Funding protection efforts in today's economic environment is a concern regardless of the critical infrastructure. With a decrease in federal government funding, preparedness activities are not being accomplished or the costs are being borne by limited state and company budgets. The effects of sequestration are just beginning to materialize and will have a domino effect on the grants that jurisdictions have previously received – for example, the rapid response team grants. This decline in federal funding will place a greater burden on the states' preparedness and response efforts to an intentional food contamination.

To ensure that preparedness and response requirements remain present in funding discussions, elected officials and other government representatives must be constantly aware of threats to the food system. Under the Food Safety Modernization Act (FSMA), the food and agriculture sector will be required to communicate more within and between all the supply chain components. Navigating the rules can be a challenge, but when companies do not share information, many other companies including the end users will experience problems later in the food chain. What may begin as a food safety concern can quickly present itself as a food defense issue. There is a growing collaborative intent to share information as well as to detect and respond for culpability. It is now time to expand the engagement to get broader industry buy-in.

The more stakeholders do on the front end; the better prepared the nation will be as a whole. Although there are still layered costs throughout the process, the up-front costs would be less than the costs and time associated with responding to a foodborne intentional attack. By implementing more preventative measures, it may also reduce insurance costs because the risks to those companies will decrease. Whether food defense costs ultimately increase or decrease a company's budget, choosing not to work with others to address this issue will certainly affect the company's bottom line.

Figure 6:

What do you believe is the best method for expanding (and/or funding) a food defense awareness plan within companies?



Survey Results – Planning & Strategies

Survey responses were almost evenly split between government-funded versus privately funded programs (35.0 and 38.3 percent, respectively) as the best method for expanding (and/or funding) a food defense awareness plan within companies (Figure 6). Government-funded programs may include grants and improvement of the existing local, state, and federal environmental health services. Whereas, privately funded programs may include local grower associations and developing better business risk analysis processes.

Responses to questions about who should provide training ranged from rigid government-mandated training and funding to more flexible, professional organizations, conferences, trainings, and public awareness campaigns. The Food and Drug Administration offers training materials on food defense (Food Defense 101, including ALERT). ALERT is management awareness and training, whereas Employees FIRST focuses on the front line food worker’s awareness.

Tax incentives *with measurable outcomes* are another suggestion for funding food defense by motivating industry stakeholders. By making prevention, mitigation, and response plans part of the licensing process, it will help fulfill regulatory requirements for food testing and reporting by the industry. Regulatory requirements with clear, enforceable consequences for failure to protect their component of the food chain will bring all stakeholders to the table and require companies to include front-line staff in defense measures.

Public-private partnerships and collaboration between all parties also would enhance planning and response efforts. Suggestions from respondents for incorporating both the public and private sectors included: (a) industry-funded programs backed by government standards and oversight; (b) an integrated approach with several funding streams that create more ownership in the entire process; or (c) short-term, government-funded seed programs, then continued by industry-funded programs.

When asked what the best method would be for expanding (and/or funding) a food defense awareness plan within companies, a few anonymous survey responses indicated that additional measures are unnecessary. For example:

Funding and expanding food defense awareness within companies are unrelated. Industry responds to their customers' demands, which ultimately are driven by consumer demands. Let the free market system work it out without additional ineffective government programs.

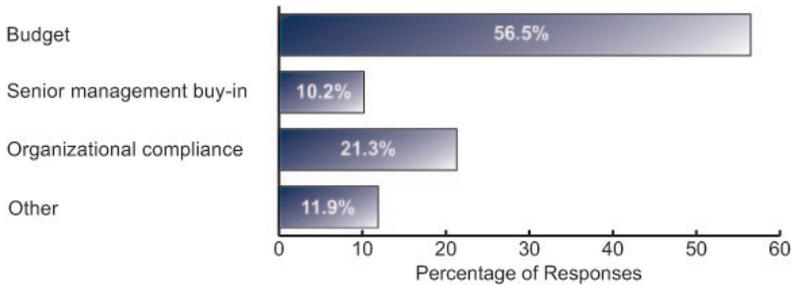
Another response stated: "This is a dumb question! The government already controls and oversees the manufacturing and growing of foods." And yet another: "We already have a plan – why is there a need to expand it?"

In response to those who stated that no further action should be necessary, Daniel J. Piepgrass, security specialist at Navy Installations Command (Code N3F) in Norfolk, Virginia, stated:

There is little understanding by all parties involved in the production, distribution, and consumption (manufacturers, distributors, politicians, and public) of foodstuffs and the vulnerabilities of the food supply chain to tampering and just how easy it is to intentionally contaminate our food supply. Even a localized contamination of food supplies can quickly cause nationwide loss of trust in the integrity of food sources and panic in the general population into boycotting entirely certain food types such as meats, fruits, etc. A thorough understanding of the threat and an appreciation for its severity is the first step in adequately protecting our food chain.

Figure 7:

What do you believe would be the biggest obstacle for implementing effective food defense?



Respondents indicated that the biggest obstacle for implementing effective food defense is budget concerns (56.5 percent) (Figure 7). Other obstacles that respondents shared include: apathy and risk perception (“it won’t happen here”); awareness of issues; buy-in from all levels of government (federal, state, local, and tribal) and industry (growers, manufacturers, transporters, and distributors); risk mitigation; bureaucratic red tape; complexity of distribution points; corporate “bottom line” and shareholder commitment; sheer size of the industry; lack of industry incentives and organization; insufficient financial and personnel resources; proprietary concerns; industry versus government standards; oversight and enforcement of current regulations; negative public reaction; and misunderstanding the complexity of food-source management.

The responses to this question highlight the tensions between government and industry leaders. Some survey respondents from the public sector stated that industry often “stonewall” their efforts and should put “safety over profits.” From the industry perspective, other respondents stated a desire for the government to “shoulder the cost burden for the protection of the nation’s food supply,” while at the same time respect private industry’s legal authorities and proprietary concerns. Effective collaboration for planning and response requires moving beyond these differences. The bottom line is that everybody, no matter how small the role they play in the food chain, must take ownership and institute effective measures.

V. PROTECTING THE FOOD SUPPLY CHAIN

In order to protect the food supply chain, the roles of all stakeholders must be clearly defined: (a) emergency planners, responders, and receivers; (b) food manufacturers, distributors, and other related fields; and (c) public health, laboratories, and government agencies at all levels. As food moves through the food supply chain, the governing authority also changes.

With the global nature of the food supply, the nation must build an international network of private and public professionals to protect the food system. An attack anywhere in the supply chain may enter production facilities in the United States. To protect the supply chain as a whole, workshops, training, and other education tools can help educate suppliers, manufacturers, and retailers on risk assessment and mitigation. Communication must be effective and go two ways, with feedback from both industry and government.

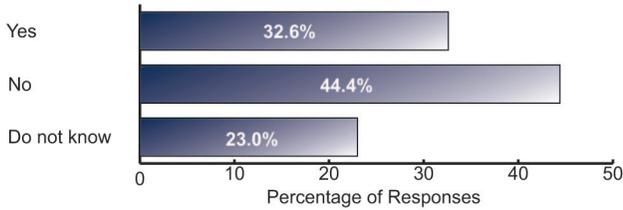
There are varying levels of preventive controls at the retail outlets, production hubs, and distribution hubs. Actions as simple as locking doors and challenging (credentialing) visitors who enter the facilities can significantly reduce the threat of intentional food adulteration. Of course, identifying that such vulnerabilities exist is a necessary step in protecting the food supply chain.

In some cases, members of the supply chain must find ways to comply with regulations while still providing adequate protection of food and food-related equipment and supplies. One example offered at the roundtable involves the milk industry. The current laws govern that inspectors and sanitarians must be able to access cattle and milk supplies at any time. As a result, processing plants and farms must take additional actions to ensure the protection of their assets, which may mean additional expense.

Each stakeholder should have a food protection plan, a rapid method of detection, and the right tools to ensure food safety and defense. Food distributors should be aware of and inspect the food chain at various stages to ensure safety. The focus for both food safety and food defense should be on the entire food chain system, how it moves, and its adaptability.

Figure 8:

Does your organization or agency have a Food Emergency Response Plan?



Survey Results – Collaboration

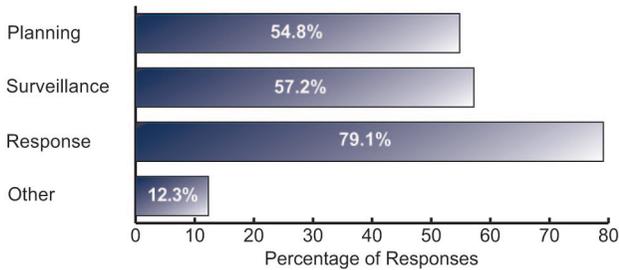
Only about one-third (32.6 percent) of survey respondents reported that their organizations or agencies have food emergency response plans (Figure 8). This raises the question: If most of the respondents would play a role in a foodborne outbreak (Figure 4), why do they not have an emergency response plan for such incidents? Some may rely on government intervention or possibly law enforcement.

In addition to the differing points of view from government versus industry, there are similar differences between law enforcement and industry. Although more than half of all respondents believe that law enforcement should have planning, surveillance, and response roles in protecting the food supply, others disagree (Figure 9). Some of the reasons respondents provided for not including law enforcement in the food defense space include: lack of training in food or public health; food defense should be an industry-led effort; “unclear where law enforcement would be best used to protect food supply besides transport”; “nothing they can do until an unlawful act is happening”; and “cops are not the answer to everything.” Dennis Marcell, vice president of Survival Specialist Association, summed up this view about law enforcement involvement: “The food supply is a private venture, unless a law is being broken, they have no need to be involved.”

Of course, physical security efforts and deterrence are usually the primary responsibilities of law enforcement officials. In the food defense space, such duties may include: protecting donations; maintaining public order; preventing thefts of noncontaminated food; identifying/securing contaminated food warehouses and points of entry; and

Figure 9:

What role(s) do you believe law enforcement should play in protecting the food supply? (Select all that apply)



securing points of distribution. Other duties that respondents suggested include: networking, training, investigation, and mitigation support.

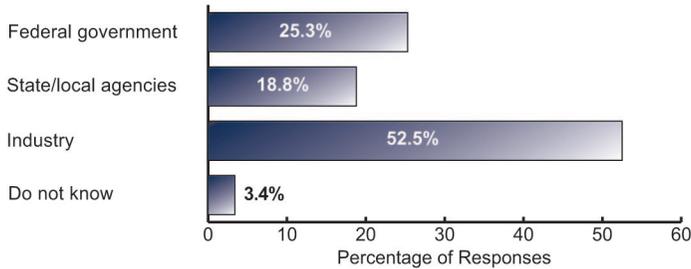
The food industry contains critical infrastructure facilities, many with their own security officers. As such, it is important that the Federal Bureau of Investigation's InfraGard, as well as the county police chiefs and sheriffs, are aware of the industry's concerns and understand what to do when needed. During these discussions, law enforcement could clarify guidelines as they relate to their own duties and perhaps the behavior of others. By sharing information and intelligence during the planning process, law enforcement can better assist the public health and agriculture departments, investigate criminal intent, and possibly thwart contamination or adulteration attempts through pre-incident interdiction, inter-agency operability, and public awareness.

Bill Kelly, senior public health planning specialist in Montgomery County, Maryland, agrees that law enforcement should play a supporting role for a multi-agency effort: "There are government environmental health specialists, Department of Agriculture agents working on food protection already. Law enforcement should be a backup to the people who know how food safety works."

Consistent with previous responses, the survey respondents believe that industry (52.5 percent) should play the primary role in protecting the food supply chain, with federal and state/local government (25.3 and 18.8 percent, respectively) playing a supporting role (Figure 10). Regardless

Figure 10:

Who do you believe should play the primary role in protecting the food supply chain?



of who plays the primary role, food defense should not be a competitive advantage. It is in everyone's best interest to work together, share critical information, and protect the food supply.

Don Hsieh, director of commercial and industrial marketing for Tyco Integrated Security, sums up the importance of protecting the food supply chain using preventative measures: "It is imperative that food and beverage manufacturers and distributors develop a proactive food defense program that delivers comprehensive control over the integrity of their supply chain to combat food adulteration. Implementing preventive and proactive controls built on actionable intelligence to protect the food supply chain is significantly more effective than reacting to an adulteration event after it happens. The benefits of a strong food defense strategy include increasing consumer safety, reducing operational risks, and protecting brand reputation."

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KEY FINDINGS & ACTION PLAN

This report is a compilation of the knowledge that key food defense representatives shared at the 23 July 2013 roundtable discussion in Minnesota and the responses from a survey of DomPrep's multi-discipline readership. Although industry plays a key role in protecting the various stages of the food chain, there is still a need for the whole community to share the responsibility of protecting food from intentional contamination. Planning and operating within information silos will slow the detection and response times, which means that a much greater number of people could potentially be affected. Whether directly, indirectly, or not involved with food, each person in the emergency preparedness, response, and recovery communities would likely play some role during a foodborne outbreak. Actions that should be taken now, before an outbreak occurs, include:

- Understand the differences between – and use the correct terminology when referring to – food security, food safety, food defense, and food protection;
- Include food defense when developing an all-hazards plan;
- Determine, plan, and train for the role that a stakeholder might play during a foodborne outbreak;
- Explore electronic systems that are available to assist practitioners in monitoring, investigating, and preventing foodborne illnesses;
- Develop relationships with key stakeholders, including public health laboratories, epidemiologists, and the state health department;
- Provide Incident Command Structure training for all employees to facilitate a smooth emergency response when working with other disciplines;
- Read and understand the Food and Drug Administration's Food Safety Modernization Act;
- Perform risk assessments and identify vulnerabilities to highlight existing gaps in current emergency response plans;
- Build a collaborative network for sharing information and resources as needed;

- Report and share information about any suspicious activity that may indicate intentional food adulteration; and
- Include the private sector into response activities.

This report provides recommended actions for the preparedness community in defending the nation's food supply against intentional contamination. By defining the term "food defense," discovering systems that are currently in place, determining existing gaps, addressing funding concerns, and protecting the food supply chain, each person can identify what his or her role would be in the event of a foodborne illness outbreak – whether intentional or unintentional – and begin planning to adequately fulfill that role.

APPENDIX A

Food Defense Resources

Following are food-related resources mentioned in this report as well as those provided by respondents. These are just some of the many resources available to help communities build awareness of food defense and develop plans to protect the food supply.

Barfblog (Safe Food From Farm to Fork), <http://barfblog.com>

CaliciNet, <http://www.cdc.gov/foodsafety/resources.html>

Centers for Disease Control and Prevention (CDC), <http://www.cdc.gov>

Criticality Spatial Analysis (CRISTAL), <http://www.ncfpd.umn.edu/default/assets/File/NCFPD%20Spotlight-CRISTAL.pdf>

Disposal and Decontamination Guidance, <http://www.fsis.usda.gov/wps/portal/fsis/topics/food-defense-defense-and-emergency-response/recovery>

Electronic Laboratory Exchange Network (eLEXNET), <https://www.elexnet.com/elex/>

Employees FIRST, <http://www.fda.gov/Food/FoodDefense/ToolsEducationalMaterials/ucm295997.htm>

Epidemic Information Exchange (Epi-X), <http://www.cdc.gov/epix>

Extension Disaster Education Network (EDEN), <http://eden.lsu.edu/Pages/default.aspx>

Food Defense 101 (including ALERT), <http://www.fda.gov/Food/FoodDefense/ToolsEducationalMaterials/ucm353774.htm>

Food Defense Guidance Documents and Regulatory Information, <http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/FoodDefense/default.htm>

Food Defense Plan Builder, <http://www.fda.gov/Food/FoodDefense/ToolsEducationalMaterials/ucm349888.htm>

Food Emergency Response Network (FERN), <http://www.fermlab.org>

Food Industry Environmental Network LLC (FIEN), <http://www.fien.com/index.php>

Food Ingredient Distributors Association (FIDA), <http://fdassoc.com>

Food Safety and Inspection Service (FSIS), <http://www.fsis.usda.gov>

Food Safety Modernization Act (FSMA), <http://www.fda.gov/Food/GuidanceRegulation/FSMA>

Food Standards Australia New Zealand (FSANZ), <http://www.foodstandards.gov.au>

Food-Related Emergency Exercise Bundle (FREE-B), <http://www.fda.gov/Food/FoodDefense/ToolsEducationalMaterials/ucm295902.htm>

Foodborne Diseases Active Surveillance Network (FoodNet), <http://www.cdc.gov/foodnet/>

FoodSafety, <http://www.foodsafety.gov>

Food Safety News, <http://www.foodsafetynews.com>

FoodSHIELD, <https://www.foodshield.org>

FSIS Food Defense Exercise Tool, <https://webtraining.rti.org/fsis>

General Food Defense Plan developed by the USDA Food Safety and Inspection Service, http://www.fsis.usda.gov/wps/wcm/connect/99f95182-0c9e-4214-9762-e98197f54ebf/General-Food-Defense-Plan-9-3-09+_2_.pdf?MOD=AJPERES

Hazard Analysis and Critical Control Points (HACCP), <http://www.fda.gov/Food/GuidanceRegulation/HACCP/>

Health Alert Network (HAN), <http://emergency.cdc.gov/han/>

Homeland Security Information Network (HSIN) – Food and Agriculture Portal, <http://www.dhs.gov/homeland-security-information-network>

Hospital Health Alert Network (through Illinois Department of Public Health), <http://www.idph.state.il.us>

InfraGard, <https://www.infragard.org>

International Association of Food Protection, <http://www.foodprotection.org>

International Food Information Council Foundation, <http://www.foodinsight.org>

International SOS Medical Alerts, <https://www.internationalsos.com/en/email-alerts.htm>

King County Food Protection Program, <http://www.kingcounty.gov/healthservices/health/ehs/foodsafety.aspx>

Laboratory Response Network (LRN), <http://www.bt.cdc.gov/lrn/>

Lessons Learned Information Sharing (LLIS), <https://www.llis.dhs.gov>

Massachusetts Virtual Epidemiologic Network (MAVEN), <http://www.mass.gov/eohhs/gov/departments/dph/programs/id/isis/massachusetts-virtual-epidemiologic-network.html>

Mitigation Strategies Database, <http://www.fda.gov/Food/FoodDefense/ToolsEducationalMaterials/ucm295898.htm>

National Biosurveillance Integration Center, <http://www.dhs.gov/national-biosurveillance-integration-center>

National Center for Food Protection and Defense, <http://www.ncfpd.umn.edu>

National Dairy Council, <http://www.nationaldairyCouncil.org>

National Institute of Food and Agriculture, Food Safety and Biosecurity, <http://www.nifa.usda.gov/foodsafetybiosecurity.cfm>

National Institutes of Health, <http://nih.gov>

National Outbreak Reporting System (NORS), <http://www.cdc.gov/nors/>

National Voluntary Environment Assessment Information System (NVEAIS), <http://www.cdc.gov/nceh/ehs/NVEAIS/>

ProMED-mail (International Society for Infectious Diseases), <http://www.promedmail.org>

PulseNet, <http://www.cdc.gov/pulsenet/>

State Veterinarians, <https://www.avma.org/KB/Resources/Reference/disaster/Pages/Disaster-Preparedness-State-veterinarians.aspx>

Transported Asset Protection Association (TAPA), <http://www.tapaonline.org>

U.S. Agency for International Development (USAID), <http://www.usaid.gov>

U.S. Department Health and Human Services (HHS), <http://www.hhs.gov>

U.S. Department of Agriculture (USDA), <http://www.usda.gov>

U.S. Department of Homeland Security (DHS), <http://www.dhs.gov>

U.S. Environmental Protection Agency (EPA), <http://www.epa.gov>

U.S. Food and Drug Administration (FDA), <http://www.fda.gov>

U.S. Northern Command, <http://www.northcom.mil>

Vulnerability Assessment Software, <http://www.fda.gov/Food/FoodDefense/ToolsEducationalMaterials/ucm295900.htm>

White House, <http://www.whitehouse.gov>

World Health Organization (WHO), <http://www.who.int>

APPENDIX B

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APPENDIX D

Demographics of Respondents

In what sector are you employed?	
	Percentage of Responses
Fire Service	5.6%
Law Enforcement	2.6%
EMS	2.1%
Emergency Management	10.3%
Public Health	20.8%
Hospital (including VA)	8.6%
Federal Government	10.0%
Military	1.8%
State/Local Government	11.2%
Non-Government Organizations (NGOs)	2.1%
Privately Owned Company	10.3%
Publicly Traded Company	6.1%
Self Employed	1.1%
Not Employed	0.2%
Academic Institution	5.1%
Student	0.4%
Other	1.8%

What type of position do you hold?

	Percentage of Responses
Upper Management	23.1%
Middle Management	32.6%
Operations	16.0%
Technical	8.6%
Training	6.1%
Administration	5.1%
Other	8.4%

Food defense is the ability to monitor, prevent, and respond to an incident in order to protect the food production and distribution chains against intentional contamination and to provide a safe, unadulterated food supply to the nation – from the farm to the table.

Consensus of DomPrep's Readership

Underwriters

