

Public Response to Large-Scale Produce Contamination

Cara L. Cuite and William K. Hallman

JEL Classifications: D12, D01, Q13.

A recent article in the *New York Times* states that “food scares have become as common as midwestern tornadoes” (Harris and Belluck, 2009). It can certainly seem that way, especially with the recent series of high profile problems with a wide range of foods. Shortly after the government warned people to avoid all fresh spinach in the fall of 2006 (FDA, 2007), there was an extensive recall of pet food contaminated by melamine in 2007 (FDA, 2008a). This was followed, in early 2008, by the largest meat recall in history; more than 143 million pounds of beef were recalled because the company was slaughtering and selling the meat from “downer” cows (Healy and Schmit, 2008). During spring and summer of 2008, the United States had its largest foodborne illness outbreak in over a decade. More than 1,400 people became ill from *Salmonella* Saintpaul, originally believed to be caused by consuming fresh tomatoes, but ultimately linked to fresh jalapeno peppers from Mexico (FDA, 2008b). This year, the U.S. experienced the largest food recall in its history, with more than 2,100 food products recalled as a result of *Salmonella* Typhimurium contamination linked to the Peanut Corporation of America (FDA, 2009a). A smaller but significant pistachio recall followed closely on the heels of the peanut butter recalls (FDA, 2009b).

Given this sequence of large, well-publicized, and closely timed food recalls, it may not be surprising that the American public’s confidence in our food supply is decreasing (Consumer Reports National Research Center, 2008).

Overview of Spinach and Tomato Warnings

The research presented here is derived from two national telephone surveys of Americans. The first survey was about the 2006 *E. coli* outbreak associated with fresh spinach, and it was fielded five weeks after the FDA advisory had been lifted. The second survey, regarding the 2008 warn-

ings to consumers to avoid eating tomatoes thought to have been contaminated with *Salmonella* Saintpaul, was fielded a week and a half after the FDA advisory was lifted. The results from these surveys provide valuable insights into the challenges and successes of communicating with the public about food safety. More details about the survey are presented after a brief description of each outbreak.

The two outbreaks studied were similar in that both were national in scope, involved fresh produce, and the advisories to consumers changed over time. At the beginning of each of these advisories, the warnings were about an entire class of fresh produce, and were not delimited by brand, lot number, or even geography, although in each case, as the investigation developed, the warnings changed and become increasingly specific.

Warning about *E. coli* O157:H7 in Spinach, 2006

On Sept. 14, 2006, the U.S. Food and Drug Administration (FDA) issued an advisory to consumers not to eat bagged fresh spinach because of suspected contamination by *E. coli* O157:H7. The advisory was ultimately lifted on Sept. 22, when the FDA advised the public that they could be confident in consuming spinach grown outside the three counties in California that had been implicated in the outbreak. Thus, the warning had been in effect for a total of one week and one day.

The information from the FDA changed slightly over the course of the advisory. In its second day, the advisory was expanded to include all fresh spinach because the FDA had been informed that bagged spinach was sometimes sold in an unbagged form at the retail level. As the investigation continued, the focus narrowed to products from Natural Selection Foods, LLC, of San Juan Bautista, California, with “Best if Used by Dates” of Aug. 17, 2006 through Oct. 1, 2006.

It was not until Sept. 20th that the FDA mentioned that it was safe to eat frozen spinach, canned spinach and spinach included in premade meals manufactured by food companies. The following day, the FDA issued a statement that they, working closely with the CDC and the State of California, had determined that the spinach implicated in the outbreak had been grown in three counties in California. The FDA was cautious in stating that produce other than spinach grown in these counties had not been implicated in the outbreak, however, the advisory against eating spinach was still in effect.

Ultimately, nearly 200 people in 26 states were reported to the CDC as having potentially been infected with the outbreak strain of *E. coli* O157:H7 (FDA, 2007). More than 100 of these cases were hospitalized, and 31 developed a form of kidney failure called hemolytic uremic syndrome (HUS). This resulted in the deaths of three people in confirmed cases of infection associated with the outbreak.

Warnings about Salmonella Saintpaul in Peppers and Tomatoes, 2008

The *Salmonella* Saintpaul outbreak lasted considerably longer than the spinach warning, and the FDA's advice to consumers was much more complex. Although initially limited to consumers in Texas and New Mexico who were warned not to eat raw red plum, red Roma, or round red tomatoes, FDA expanded its warning to consumers nationwide on June 7, 2008.

Because not all types of tomatoes were implicated in the outbreak, FDA's advice to consumers was complex. The public was told they could continue to eat cherry tomatoes, grape tomatoes, and tomatoes sold with the vine still attached, or tomatoes grown at home. In addition, the

FDA established, and subsequently updated, an online list of states, territories, and countries where tomatoes are grown but which had not been associated with the outbreak. Consumers were warned that they should not eat the implicated types of tomatoes unless they had been harvested in one of the areas on the FDA's list.

On June 30, the CDC announced that they had not found any contaminated tomatoes and they were broadening their investigation to encompass food items commonly consumed with tomatoes. On July 9, the CDC reported that accumulated data from its investigations indicated that jalapeño peppers caused some illnesses but did not explain all the cases associated with the outbreak, and it advised high-risk consumers—the immunocompromised, elderly and infants—to avoid consuming raw jalapeño and serrano peppers.

While the pepper warning remained in place, the FDA withdrew its tomato warning on July 17, stating that investigators had determined that fresh tomatoes now available in the domestic market were not associated with the current outbreak. Thus, the tomato warning had been in effect for six weeks and two days, and the tomato warning continued to be covered in the news coverage of the ongoing investigation and pepper warning. Finally, on Aug. 28th, FDA declared the outbreak over and lifted its final warning regarding the consumption of jalapeño peppers and serrano peppers.

Ultimately, 1,442 reported cases of illness in 43 states were linked to the outbreak. Of these, at least 286 resulted in hospitalization, and the infection may have contributed to the deaths of two individuals. By the time it was over, the *Salmonella* Saintpaul contamination had resulted in the largest foodborne illness outbreak in over a decade.

Risk Communication Lessons from These Outbreaks

We contacted two large, independent samples of American adults by telephone (1200 in 2006 and 1101 in 2008). All of the data presented here have been weighted, so that our sample is representative of all Americans (within a margin of error of approximately $\pm 4\%$). We posed many similar, but not identical, questions in each of the two surveys, and report a selection of our findings here (the full reports can be found at www.foodpolicyinstitute.org). We chose to focus on tomatoes, and not peppers, in the 2008 survey because the tomato warning received more media coverage and also because, unlike the pepper warning, it had ended by the time we began to field the survey. The spinach survey was fielded over the course of November, 2006, and all interviews were conducted five weeks or longer after the warning had been lifted. The tomato survey was fielded much sooner after the lifting of the warning, beginning one and a half weeks after the warning was lifted. However, it was in the field longer, for almost two months, during August and September, 2008.

The following sections provide an overview of the most important risk communication lessons that can be learned from these large national outbreaks.

The Vast Majority of Americans Heard about These Warnings

Communication about both the spinach and the tomato warnings was very successful. Eighty seven percent of Americans had heard about the spinach recall, and 93% about the tomato warning. Fewer had heard about the 2008 pepper warning, only 69%. This is likely because the warning was in place for a shorter period of time, fewer Americans consume peppers (Blisard and Stewart, 2007), and because the warning focused on

high-risk groups. However, the percentage aware of all three of these warnings is quite high when compared with awareness of other, local foodborne illness outbreaks (Patrick, Griffin, Voetsch and Mead, 2007).

We asked the 2006 respondents if they consumed spinach prior to the warning, and the 2008 respondents about their tomato consumption prior to the warning. For those respondents who had not heard of the warning, we simply asked “Do you consume [spinach/tomatoes]?” We found that among those who did not consume the affected food, there was a lower likelihood of being aware of the warning. It is not surprising that those who did not consume spinach or tomatoes were less aware of the respective warnings, and this indicates that some people may simply not pay attention to information about food recalls that they deem not relevant to them.

Americans Confused about Foods Included in Warnings

In 2006, The FDA warned against eating *any* fresh spinach, and their advisory expanded in the first few days to explicitly include both bagged and loose fresh spinach. Frozen and canned spinach were explicitly excluded from the warning. While 95% of those aware of the spinach outbreak knew that “bagged fresh spinach” was recalled, only 68% knew that “loose fresh spinach” had been recalled. When we asked about the types of spinach that were NOT recalled, we found that about 1 in 5 incorrectly thought that frozen and canned spinach had been recalled (22% and 16%, respectively). Of note is that similar percentages said that they did not know if frozen or canned spinach had been recalled (21% and 14%, respectively) which means that almost half of Americans were either wrong or unsure about whether these two types of spinach had been implicated in the outbreak.

The communications about the types of tomatoes that were considered unsafe to eat were even more confusing than those about spinach. When asked how much they agree with the statement, “You knew which types of tomatoes the public was warned not to eat,” only 31% said that they “strongly agreed.” A significant number of respondents “strongly disagreed” (23%) and the remainder fell in the middle.

While the details differed in each of these instances, what did not differ is that the specifics of the advice from the FDA were not clear to many Americans. The messages were necessarily complex, but the complexities left many confused. Unfortunately, there is no reason to think future recalls will be less complex.

Most Americans Avoid the Contaminated Food

In both surveys, we asked a series of questions about whether Americans ate the potentially contaminated food during the warnings. This is of particular concern given the potential public health consequences of ignoring these warnings. We found that approximately one-in-eight Americans (13%) who were aware of the recall and ate spinach prior to the recall *during* the recall. Moreover, nearly three-quarters of these (74%) said that they knew about the recall when they ate it.

Similarly, we found that a small but significant percentage of Americans ate the implicated types of fresh tomatoes during the tomato warning. Eleven percent of Americans disregarded the FDA’s advice, and knowingly ate the types of tomatoes they had been warned not to eat.

People May Try to “Decontaminate” the Product

In both recalls, some Americans reported performing behaviors that they believed would make the po-

tentially contaminated food safe to eat, often in direct contradiction of what the FDA has stated. In both surveys, many of those who reported that they had knowingly eaten the foods that they had been warned not to eat told interviewers that they had done something they thought would make the food safe, such as washing or cooking it. However, in both warnings, the FDA specifically stated that neither of those actions were sufficient to make the food safe to eat.

We asked additional questions about washing fresh produce in the 2006 survey. Regardless of whether they had heard of the spinach recall, 44% of Americans thought it true that properly washing contaminated food makes it safe to eat; it does not. Moreover, nearly half of those aware of the recall (48%) reported that the spinach recall caused them to wash foods, including those other than spinach, more thoroughly.

The issue of people trying to “decontaminate” rather than discarding potentially contaminated foods may become even more relevant as the economy worsens and more Americans struggle to feed their families. Just as some families in need adopt strategies of eating food that is no longer fresh enough to consume (Kempson et al., 2002), an increasing number of Americans may be loathe to discard food that they have paid for, and may devise their own strategies, sometimes ill-advised, to attempt render the food edible for their family.

Americans More Aware of Advisories Beginning than Ending

By the time these national surveys were fielded, the relevant warnings had been lifted. In the case of the spinach survey, the warning had been lifted six weeks prior to the one month data collection period, and the tomato warning had been lifted one and a half weeks prior to the month of data collection.

We asked all participants who were aware of the warnings a series of questions about whether the warnings had been lifted. Again, the survey was fielded more than six weeks after the FDA had lifted the advisory, saying that consumers could be confident in eating spinach grown outside the three counties in California that had been implicated in the *E. coli* contamination. Although a significant amount of time had passed, 13% of those aware of the warning reported incorrectly that “the spinach recall is still in effect” (a combination of 7% said this was definitely “true” and 6% said it was “likely true”) and nearly 18% said they were not sure. About half (55%) said that it was definitely “false” that the spinach recall was still in effect and 14% said that it was “likely false.” Thus, at the time the survey was conducted, almost half (45%) of people who were aware of the spinach recall were not confident that the recall had ended.

We found a very similar story with the tomato warning. When we presented the statement, “The tomato warning is currently in effect,” only 43% said that they “strongly disagreed.” Seven percent “strongly agreed,” and the remaining 50% either did not know or were not sure. One possible reason that fewer people were aware that the tomato warning was over may be that the interviews were conducted much closer to the date on which the warning was lifted.

Some Will Never Again Eat the Affected Food

We asked people whether they had eaten spinach and tomatoes since the warnings had been lifted. We told every respondent that the warnings had been lifted just prior to asking about postwarning consumption, so that even those who were not aware at the start of the interview were by the time we asked this question. Because of the complexity of the tomato warning, we simply asked if the respondents

had eaten any tomatoes since the warning, and not if they had eaten the kinds that were included in the warning. Of those who ate tomatoes prior to the warning, 74% reported that they had eaten tomatoes since the warning was lifted.

Fewer had gone back to eating spinach at the time of our interview. Just over four-in-ten respondents (44%) who had heard about the recall and ate spinach reported that they had eaten spinach since the recall ended. These respondents reported that it took approximately two weeks after the recall ended for them to resume eating spinach. Those who had not yet eaten spinach since the recall said it would take an average of about two months for them to start eating fresh spinach again, and their estimates ranged from one day to one year. However, 5% of those who ate spinach and heard about the recall say they will never eat fresh spinach again.

Not only was a small minority of Americans saying that they would never eat spinach again in the wake of the *E. coli* contamination, but some reported avoiding other similar foods. Nearly one-fifth of those aware of the spinach recall said they were avoiding other bagged produce as a result of the spinach recall.

Even those who did not eat spinach prior to the warning were affected by the spinach outbreak. Many reported that they also stopped buying bagged produce; in fact, with the same frequency as those who did eat spinach prior to the warning. There are a number of lessons to be learned here. Food recalls can have an impact on the sale of similar related items. In addition, even people who did not consume a recalled product prior to the recall are affected by it, and are likely to change their consumption habits.

Moving Forward

As our ability to identify these types of outbreaks improves, and as our food system becomes increasingly interconnected, we are likely to encounter large scale recalls and warnings more frequently. In addition, our foodborne illness surveillance system requires time to accurately identify the food that is causing an outbreak, and as a result of this we are likely to continue to receive dynamic, changing messages from the FDA.

Based on the data reported here, we know that the vast majority of Americans are hearing about the FDA’s warnings to avoid certain foods—the initial warning *is* getting through. However, the specifics of which products they are meant to avoid are often not well known. This is of particular importance in cases like the recent peanut butter recall, where over 1,800 products have currently been recalled, but the major retail brands on the market have not been implicated. These messages involve many details about the specific products affected, and what is considered “safe” to eat changes over time. Survey research conducted over the course of an outbreak, rather than once the warning has been lifted, may help to better understand the challenges of adequately communicating about FDA warnings.

While the initial message is getting through to the public, the all-clear message is not. The results presented here do not tell us why this is the case: whether it is because the media are less likely to cover the all-clear messages, the complexity of the messages, or some other factors. However, future research should focus on understanding why this crucial piece of the warning communication is not reaching such a large percentage of the public. Ideally, this research would happen during the recall and its immediate aftermath, unlike the two surveys discussed here which both were fielded after the advisories had ended.

One way of increasing awareness of the end of recalls and advisories is for retailers to send out the all-clear messages. Many retailers have begun the practice of letting their customers know about advisories and recalls of foods they've purchased in the past, through letters, phone calls, and printed on receipts, so it would be a logical for them to also tell consumers when they have ended.

In sum, simplifying messages wherever possible, seeking multiple channels through which to communicate with the public, and helping the public to understand why they should heed the advice of the FDA may help Americans better understand and better adhere to warnings about food safety.

For More Information

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Cara L. Cuite (cuite@aesop.rutgers.edu) is a research project manager at the Food Policy Institute, Rutgers, The State University of New Jersey, New Brunswick, NJ. William K. Hallman (hallman@aesop.rutgers.edu) is the Director of the Food Policy Institute, and Professor in the Department of Human Ecology, Rutgers, The State University of New Jersey, New Brunswick, NJ.

The research described here was supported by two grants provided to the Rutgers Food Policy Institute, one from the Grocery Manufacturers Association (GMA), the association of food, beverage, and consumer products companies, and another from the Cooperative State Research, Education, and Extension Service (CSREES) of the United States Department of Agriculture (USDA) under the National Integrated Food Safety Initiative (NIFSI) grant # 2005-51110-02335 Food Biosecurity: Modeling the Health, Economic Social, and Psychological Consequences of Intentional and Unintentional Food Contamination, Dr. William K. Hallman, Principal Investigator. The opinions expressed in the article are those of the authors and do not necessarily reflect official positions or policies of GMA, the USDA, or the Food Policy Institute, Rutgers, The State University of New Jersey