

PR/HACCP RULE EVALUATION REPORT

Changes in Consumer Knowledge, Behavior, and Confidence Since the 1996 PR/HACCP Final Rule

Final Report

9/3/02

Purpose

Research Triangle Institute (RTI) conducted a multiyear evaluation of the 1996 *Pathogen Reduction; Hazard Analysis and Critical Control Point (PR/HACCP) Systems; Final Rule* for the U.S. Department of Agriculture, Food Safety and Inspection Service (USDA, FSIS). As part of this evaluation, RTI conducted a study to measure any changes in consumer knowledge, safe food handling practices (i.e., behavior), and confidence in the safety of meat and poultry since the PR/HACCP farm-to-table initiatives were implemented.

These initiatives include the PR/HACCP rule itself plus national consumer education campaigns, such as the Partnership for Food Safety Education's Fight BAC![®] campaign¹ and the FSIS' Food Thermometer Education Campaign;² increased national, state, and local food safety efforts; promotion of farm-to-table strategies by trade associations, industry, and academia; and activities to strengthen education and training of food handlers. The public's knowledge of safe handling practices and their confidence in the safety of meat and poultry may have been influenced by these collective efforts.

This report builds on our December 2001 report, which presents the results of our analysis through the year 2000. This final

¹The Fight BAC![®] campaign was launched in 1997 by the Partnership for Food Safety Education. The focal point of the campaign is BAC (representing bacteria) and the four food safety messages of clean, separate, cook, and chill.

²FSIS rolled out its national Food Thermometer Education Campaign in spring 2000 to educate consumers about the importance of using a food thermometer. The focal point of the campaign is Thermo[™] (representing a food thermometer).

report describes the results of our analysis of existing surveys, observation data, and consumer focus groups to measure changes in consumer knowledge, behavior, and confidence since the PR/HACCP farm-to-table initiatives. We present our key findings and recommendations, describe our methodology, and present the results of our pre- and post-HACCP data analysis.

Key Findings

Key findings on changes in consumer knowledge, behavior, and confidence since the PR/HACCP farm-to-table initiatives are presented below. It is noteworthy that although consumers report that they are more knowledgeable about food safety and have improved their safe handling practices, in reality, some consumers are still unknowingly practicing some unsafe behaviors.

Consumer Knowledge and Behavior

- Most consumers report that they are more knowledgeable about food safety and have improved certain safe handling practices, such as keeping hands and surfaces clean and taking steps to prevent cross-contamination when cooking (see Table 1). However, when observed, consumers do not always follow these practices.
- Although the self-reported use of some safe handling practices has increased, many consumers report in surveys and focus groups not following some recommended safe handling practices, such as using a food thermometer, safely handling leftovers, safely defrosting meat and poultry, and immediately discarding food that may be unsafe.

PR/HACCP RULE EVALUATION REPORT
Changes in Consumer Knowledge, Behavior, and Confidence
Since the 1996 PR/HACCP Final Rule

Final Report

9/3/02

Table 1. Changes in Consumers' Reported Use of Specific Safe Handling Practices Since the 1996 PR/HACCP Final Rule

Practice	1993 (%)	1998 (%)	2001 (%)
<i>Clean: Wash hands and surfaces often</i>			
Usually wash hands with soap after handling raw meat/poultry (main meal raw meat/poultry cooks)	66	76	82
Always wash hands with soap before preparing food (main meal cooks)	NA	68	72
<i>Separate: Don't cross-contaminate</i>			
Properly clean cutting boards or other surfaces after cutting raw meat/poultry before using them to prepare other foods that will be eaten raw at the same meal ^a (main meal raw meat/poultry cooks)	68	79	85
<i>Cook: Cook to proper temperatures</i>			
Usually serve hamburgers medium ^b or well-done at home (main meal meat/poultry cooks)	74	83	82
Own a food thermometer (main meal cooks)	NA	46	60
Always or often use a food thermometer when cooking roasts or large pieces of meat (main meal raw meat/poultry cooks)	NA	22	32
Always or often use a food thermometer when cooking chicken parts such as breasts or thighs (main meal raw meat/poultry cooks)	NA	6	12
Always or often use a food thermometer when cooking hamburgers (main meal raw meat/poultry cooks)	NA	3	6
Safely reheat leftovers containing meat/poultry ^c (main meal meat/poultry cooks)	20	NA	NA
<i>Chill: Refrigerate promptly</i>			
Safely store large amounts of leftovers in the refrigerator ^d (main meal meat/poultry cooks)	NA	NA	26
Safely defrost meat/poultry ^e (main meal meat/poultry cooks)	46	NA	NA

^aWash cutting boards or other surfaces with soap and/or bleach or use a different cutting board.

^bCook hamburgers brown all the way through with no pink in the middle. Although color is not a reliable indicator of doneness, surveys often use color as a measure of doneness to collect information on how consumers cook hamburgers.

^cHeat leftovers until bubbling or use a thermometer to check for doneness.

^dRefrigerate leftovers within two hours after cooking and store them in several smaller containers.

^eDo not let raw meat/poultry defrost at room temperature for any time.

NA = not available.

Note: Main meal cooks: n = 1,457 (1993), n = 1,816 (1998), and n = 4,175 (2001).

Main meal meat/poultry cooks: n = 1,415 (1993), n = 1,766 (1998) and n = 4,040 (2001).

Main meal raw meat/poultry cooks: n = 1,701 (1998) and n = 3,893 (2001). For the 1993 survey, data are not available on the number of meat/poultry cooks who handle raw meat/poultry.

Source: FDA/FSIS Food Safety Survey, 1993, 1998, and 2001.

PR/HACCP RULE EVALUATION REPORT

Changes in Consumer Knowledge, Behavior, and Confidence

Since the 1996 PR/HACCP Final Rule

Final Report

9/3/02

- Although only a small percentage of consumers use a food thermometer, thermometer ownership and use has increased since 1998. This finding demonstrates an important first step in a difficult behavior change.
- Consumers have increased knowledge about foodborne pathogens, high-risk foods, and high-risk populations, but their knowledge is sometimes wrong or incomplete. Consumers also do not always follow practices to minimize pathogens.
- Compared to five years ago (since the PR/HACCP initiatives), consumers are more cautious when handling and preparing meat and poultry at home, a change that they attribute to media coverage of food safety.
- Even though consumers do not actively seek food safety information, they heed food safety recommendations that are readily available to them through the media. They also rely on food labels for food safety information, and regularly check expiration dates on food labels.

Consumer Confidence

- Compared to five years ago (since the PR/HACCP initiatives), consumer focus group participants' confidence in the safety of meat and poultry has increased or remained about the same.
- Focus group findings suggest that consumers think the government is doing an adequate job keeping meat and poultry safe, although most think the government has not improved its performance in the past five years.
- Most consumers willingly accept responsibility for ensuring that the food they eat is safe. They express confidence in their ability to handle and prepare meat and poultry safely,

worrying more about how meat and poultry are handled prior to purchase. However, some consumers unknowingly follow some unsafe practices when cooking at home.

Main Recommendations

Recommendations based on our analysis of existing surveys, observation data, and consumer focus groups are summarized below.

Target selected areas for promoting food safety behavior changes. This study identified the following areas where additional educational efforts designed to change behavior are needed:

- Food thermometer use: FSIS should continue to promote food thermometer use through its Food Thermometer Education Campaign.
- The "two-hour rule": refrigerate or freeze foods within two hours or less.
- Proper handling, storage, and reheating of leftovers.
- Refrigerator thermometer use.
- Practices to defrost meat and poultry safely.
- The "when in doubt, throw it out" rule: discard food that may be unsafe (instead of checking appearance, odor, or taste).

Educate consumers about specific pathogens, practices to destroy or minimize pathogens, and high-risk populations. Educating consumers about specific pathogens such as *Listeria* and *Campylobacter* and practices they can follow when cooking at home to destroy or minimize these pathogens may help to prevent foodborne illness. Also, educating

PR/HACCP RULE EVALUATION REPORT

Changes in Consumer Knowledge, Behavior, and Confidence Since the 1996 PR/HACCP Final Rule

Final Report

9/3/02

consumers about high-risk populations will help to ensure that food for high-risk consumers is prepared safely.

Continue to work with the media to educate consumers about safe handling practices. Consumers get most of their information on food safety and safe handling practices from the media, such as television news shows and the local news. Cooking programs are also a key source of food safety information for many consumers. We suggest that FSIS continue to work with the media to promote food safety and safe handling practices.

Use food labels as a mechanism for providing food safety information to consumers. Consumers report that they often rely on food labels for food safety information, including expiration dates. We suggest that FSIS consider the appropriateness of using labels to provide specific food safety information.

Educate consumers about government initiatives to improve the safety of meat and poultry. FSIS should consider educating consumers about initiatives such as HACCP to make meat and poultry safer at all stages of the farm-to-table continuum. Education efforts may lead to improved consumer confidence about how meat and poultry are handled prior to purchase.

Methodology

We used existing surveys, observation data, and consumer focus groups to measure changes in consumer knowledge, safe handling practices, and confidence since the PR/HACCP farm-to-table initiatives. Appendix A identifies the sponsor, the data collection approach, the population, and the year(s) of data collection for each study. Many of the surveys are longitudinal so we can track changes since the 1996

PR/HACCP rule. However, only the Food and Drug Administration (FDA)/FSIS Food Safety Survey was conducted prior to 1996.

In spring 2002, we conducted consumer focus groups to collect information on changes in consumer knowledge, safe handling practices, and confidence compared to five years ago. The focus groups covered areas not always addressed in the surveys and helped to provide a greater understanding of why consumer practices and confidence have changed.

Results

We summarize the results of the data analysis below. We discuss changes in consumer knowledge, safe handling practices, and confidence in the safety of meat and poultry since the PR/HACCP farm-to-table initiatives.

Consumer Knowledge and Behavior

Consumers' stated knowledge of food safety has increased since the PR/HACCP farm-to-table initiatives, but when observed, they do not always follow safe handling practices. Table 1 summarizes results from the FDA/FSIS Food Safety Survey on changes in consumers' reported use of specific safe handling practices since the PR/HACCP farm-to-table initiatives. The practices are grouped according to the four food safety messages addressed by the Fight BAC!® campaign: clean, separate, cook, and chill. As shown in Table 1 and discussed below, consumers' reported use of certain safe handling practices, such as keeping hands and surfaces clean and taking steps to prevent cross-contamination when cooking has increased since the PR/HACCP farm-to-table initiatives.

PR/HACCP RULE EVALUATION REPORT

Changes in Consumer Knowledge, Behavior, and Confidence Since the 1996 PR/HACCP Final Rule

Final Report

9/3/02

However, in studies where consumers are observed during food preparation—the Audits International Home Food Safety Study and a study conducted by Utah State University; actual practices often differ from reported practices. These studies find that consumers do not always follow safe handling practices, such as handwashing and measures to prevent cross-contamination, despite reporting knowledge and use of these practices. For example, 87 percent of participants in the Utah State University Study reported that they wash their hands all or most of the time before food preparation, but only 45 percent actually washed their hands when observed (Anderson et al., 2000).

Many consumers follow the recommended practices for keeping hands and surfaces clean. FSIS recommends that consumers use soap and water to wash hands, utensils, and surfaces and follow practices to keep raw meat/poultry separate from foods that will not be cooked to prevent cross-contamination. The FDA/FSIS Food Safety Survey collected information on cleaning practices and practices to prevent cross-contamination. In 2001, 82 percent of consumers reported that they usually wash their hands with soap after handling raw meat/poultry, compared to 66 percent in 1993. Eighty-five percent of consumers reported in 2001 that they properly clean cutting boards and other surfaces after cutting raw meat/poultry, compared to 68 percent in 1993.

In focus groups with household food preparers (RTI, 2002a), participants admitted that they do not *always* wash their hands, for example, before preparing a sandwich or snack. Also, focus group findings suggest that while consumers habitually follow practices to prevent cross-contamination when cooking, they are not as conscientious about keeping raw

meat/poultry separate from other foods when grocery shopping, and keeping raw meat/poultry separate from other foods in their refrigerators.

Food thermometer use has increased since 1998, but additional improvements are needed. Many consumers do not use a food thermometer. FSIS recommends that consumers use a food thermometer to ensure that the internal temperature of meat/poultry has reached a high enough temperature to kill foodborne bacteria. FSIS also recommends that leftovers be reheated to 165° F or until steaming hot.

The 1998 and 2001 FDA/FSIS Food Safety Surveys collected information on food thermometer ownership and use. As shown in Table 1, the percentage of consumers who own a food thermometer increased from 46 percent in 1998 to 60 percent in 2001. Food thermometer use has also increased since 1998. The percentage of consumers who use a food thermometer when cooking roasts increased from 22 percent in 1998 to 32 percent in 2001. Although only a small percentage of consumers use a food thermometer when cooking chicken parts (12 percent) and hamburgers (6 percent), usage has doubled since 1998. In 1993, only 20 percent of consumers reported safely reheating leftovers. Focus groups conducted in 2002 (RTI, 2002a) echo the 1993 FDA/FSIS Food Safety Survey finding that many consumers do not safely reheat leftovers.

In the Utah State University study (Anderson et al., 2000), only 5 percent of participants used a food thermometer to check for doneness, and most of them did not know how to interpret the reading. As a result, 82 percent of participants undercooked the chicken entrée (breaded chicken breasts), and 46 percent of participants undercooked the meat loaf.

PR/HACCP RULE EVALUATION REPORT

Changes in Consumer Knowledge, Behavior, and Confidence Since the 1996 PR/HACCP Final Rule

Final Report

9/3/02

In focus groups with parents of young children (RTI, 2002b), most participants reported that they were not aware of the health or food quality benefits of using a thermometer. Instead, many relied on experience, time, the internal color of the meat and/or juices, and recipes or cooking instructions to check for doneness. Some participants reported overcooking meat and poultry to ensure doneness.

More consumers are eating their hamburgers more thoroughly cooked, but most do not use a food thermometer to check for a safe internal temperature.

Undercooked hamburgers pose a foodborne illness risk if contaminated with *E. coli* O157:H7 or other pathogens, such as *Salmonella*. In 1998, FSIS began recommending that consumers use a food thermometer to check for doneness of hamburgers based on research that color is not a reliable indicator of doneness.³

Although color is not a reliable indicator of doneness, surveys often use color as a measure of doneness to collect information on how consumers cook hamburgers. The percentage of consumers who cook their hamburgers until brown all the way through with no pink in the middle increased from 74 percent in 1993 to 82 percent in 2001 (FDA/FSIS, 1993 and 2001). The percentage of consumers who order their hamburgers at restaurants medium or well done with no pink in the middle increased from 69 percent in 1997 to 75 percent in 2001 (CDC FoodNet, 1997 and 2001). Focus group findings suggest that consumers are eating their hamburgers more thoroughly cooked because of safety concerns (RTI, 2002a and 2002b). However, few consumers (6 percent) use a

food thermometer to check for doneness when cooking hamburgers at home (FDA/FSIS, 2001).

Many consumers do not follow the recommended practices for keeping foods at proper temperatures. FSIS recommends that consumers refrigerate or freeze perishables, prepared foods, and leftovers within two hours; never defrost meat/poultry at room temperature; separate large amounts of leftovers into several shallow containers for quicker cooling in the refrigerator; and keep their refrigerators at 40° F.

Recent focus group findings suggest that many consumers are not familiar with the two-hour rule—that is, to refrigerate or freeze foods within two hours or less (RTI, 2000 and 2002a). Some consumers believe it is safe to eat certain foods (e.g., fried chicken) that have been stored at room temperature for long periods.

In 1993, less than half of consumers reported that they defrost meat and poultry safely (FDA/FSIS, 1993). Recent focus group findings suggest that many consumers continue to follow the unsafe practice of defrosting meat and poultry at room temperature (RTI, 2002a).

In 2001, only 26 percent of consumers reported that they refrigerate large amounts of leftovers within two hours and in several smaller (shallow) containers (FDA/FSIS, 2001). Most consumers refrigerate leftovers within two hours; however, many do not divide large amounts of leftovers into several smaller (shallow) containers for quicker cooling.

In 2001, 67 percent of consumers did not own a refrigerator thermometer and 60 percent did not know the proper refrigerator temperature (ADA and ConAgra, 2001). The Utah State University study (Anderson et

³Research conducted by USDA's Agricultural Research Service (ARS) in 1998 found that one in four hamburgers turns brown before it has been cooked to a safe internal temperature.

PR/HACCP RULE EVALUATION REPORT

Changes in Consumer Knowledge, Behavior, and Confidence

Since the 1996 PR/HACCP Final Rule

Final Report

9/3/02

al., 2000) found that 29 percent of participants have their refrigerator air temperature higher than 40°F, with 7 percent higher than 45°F. Keeping the refrigerator at a safe temperature is important for minimizing the growth of harmful bacteria.

Nearly half of consumers do not follow the recommended rule “when in doubt, throw it out.” In 1999, 53 percent of consumers reported that they discard food that they believe may be unsafe, 42 percent check the appearance and smell of the food and then decide, and 3 percent taste the food and then decide (Penn State, 1999). The correct practice is to discard food that may be unsafe.

Consumers have some knowledge about foodborne pathogens, high-risk foods, and high-risk populations, but some knowledge gaps exist. The FDA/FSIS Food Safety Survey and focus group data suggest that consumers are more knowledgeable, but their knowledge is sometimes wrong or incomplete.

- The percentage of consumers who correctly think that microbes are a very serious or serious food safety problem increased from 36 percent in 1993 to 53 percent in 2001.
- As shown in Figure 1, most consumers are aware of the foodborne pathogens, *Salmonella* (93 percent) and *E. coli* (88 percent). Awareness of *Salmonella* increased between 1993 and 2001, since the PR/HACCP initiatives.
- Although awareness of *Listeria* is low, consumer awareness of this pathogen also increased since the PR/HACCP initiatives. The percentage of consumers aware of *Listeria* increased from 9 percent in 1993 to 31 percent in 2001 (doubling between 1998 and 2001).

Awareness of *Campylobacter* remains low.

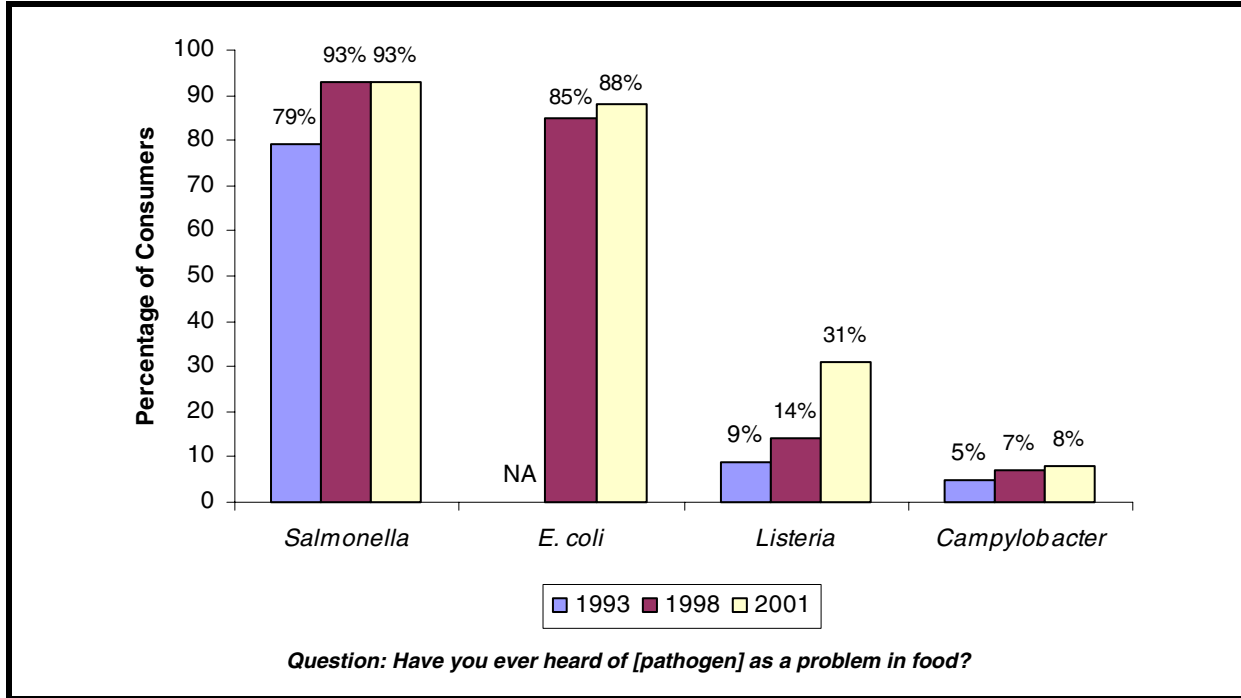
- Differences in awareness of pathogens exist among certain subpopulations.⁴ Seniors have greater awareness of *Salmonella* and *E. coli*. Individuals without a high-school education have lower awareness of specific foodborne pathogens.
- More consumers correctly identified meat and poultry as high-risk foods for foodborne illness in 1998 than in 1993. Perception of chicken as a high-risk food increased from 31 percent in 1993 to 45 percent in 1998. Similarly, perception of meat as a high-risk food increased from 24 percent in 1993 to 49 percent in 1998.
- The percentage of consumers who correctly responded that they could make a food safe if it has *Salmonella* in it by cooking the food increased from 39 percent in 1993 to 66 percent in 2001.
- In focus groups with household food preparers (RTI, 2002a), participants, as a group, correctly identified the elderly, young children, and people with compromised immune systems as being at high risk for foodborne illness, but were unaware that pregnant women are at high risk. Despite reporting knowledge of high-risk populations, participants do not consider themselves to be at risk. For example, senior participants incorrectly believe that only individuals 80 years old and older are at high risk.

⁴We used a t-test to test for differences in awareness of specific pathogens for the subpopulations of interest.

PR/HACCP RULE EVALUATION REPORT

Changes in Consumer Knowledge, Behavior, and Confidence Since the 1996 PR/HACCP Final Rule

Figure 1. Changes in Consumers' Awareness of Specific Pathogens Since the 1996 PR/HACCP Final Rule



NA = not available.

Source: FDA/FSIS Food Safety Survey, 1993, 1998, and 2001.

Compared to five years ago (since the PR/HACCP initiatives), consumers are more cautious when handling and preparing meat and poultry at home. They attribute their increased knowledge and behavior changes to media coverage of food safety. In focus groups with household food preparers (RTI, 2002a), many participants reported improving how they handle and prepare meat and poultry because of food safety concerns. Participants attributed many of their behavioral changes to media coverage of food safety. Some parents say they have improved their handling practices since having children (RTI, 2001 and 2002b).

Focus group participants report making the following changes in the past five years (since the PR/HACCP initiatives):

- using plastic cutting boards (instead of wood)
- defrosting meat and poultry in the refrigerator (instead of in the sink or on the countertop)
- being more conscientious about hand-washing
- overcooking meat (especially hamburgers) and poultry
- using a food thermometer

Findings from the Audits International Home Food Safety Study (2000)⁵ also suggest that consumers have improved their safe

⁵Audits International uses a critical control-point evaluation approach to evaluate in-home meal preparation that is similar to the U.S. Food Code for retail establishments.

PR/HACCP RULE EVALUATION REPORT

Changes in Consumer Knowledge, Behavior, and Confidence

Since the 1996 PR/HACCP Final Rule

Final Report

9/3/02

handling practices in response to media coverage of food safety. Audits International found that consumers improved their safe handling practices between 1997 and 1999, but additional improvements were not observed in 2000. The study authors attribute the improvements to heightened awareness about food safety from increased media attention for certain foods (e.g., hamburgers, eggs, and chicken).

Even though consumers do not actively seek food safety information, they heed food safety recommendations that are readily available to them through the media. In focus groups with household food preparers (RTI, 2002a), participants attributed their increased knowledge of food safety and safe handling practices primarily to

- television news shows (e.g., *Dateline*, *48 Hours*);
- the local television news; and
- cooking programs (e.g., *Emeril*, *Good Eats*).

In 2001, over 60 percent of consumers reported that they pay a lot of attention to news stories on safe handling practices, food safety scares, or product recalls, and about another 30 percent pay some attention to such stories (Penn State, 2001).

Many consumers rely on food labels for food safety information. In focus groups with household food preparers (RTI, 2002a), participants identified food labels as an important source of food safety information. In 1999, about 85 percent of consumers reported that they regularly check expiration dates and regularly check food packages to be sure seals are not broken (Penn State, 1999). Checking expiration dates for perishable foods is a safe handling practice that is particularly important to help prevent

listeriosis, since *Listeria monocytogenes* grows at refrigerator temperatures. Checking for unbroken seals helps ensure the product was not contaminated during shipping and handling.

Other sources of food safety information include the following: magazines, newspapers, family members and friends, and grocery stores (RTI, 2002a).

Consumer Confidence

Focus group findings suggest that consumers' confidence in the safety of meat and poultry has increased or remained about the same since the PR/HACCP farm-to-table initiatives. In focus groups with household food preparers (RTI, 2002a), many participants reported that their confidence in the safety of meat and poultry has increased or remained about the same in the past five years (since the PR/HACCP initiatives). Participants whose confidence levels have increased attribute their rising confidence to media coverage of food safety, although the media coverage may be negative (e.g., recalls, rewrapping and redating meat products). Some participants say media coverage has made them more knowledgeable about how to handle and prepare food safely when cooking at home. Others say media coverage of food safety problems encourages manufacturers to "clean up their act," thus, they are more confident.

In focus groups with household food preparers (RTI, 2002a), most participants identified the federal government as being the entity responsible for ensuring the safety of meat and poultry. Many participants think the government is doing an adequate job keeping meat and poultry safe, although most think the government has not improved its performance in the past five years. Participants were not aware of

PR/HACCP RULE EVALUATION REPORT

Changes in Consumer Knowledge, Behavior, and Confidence Since the 1996 PR/HACCP Final Rule

Final Report

9/3/02

HACCP or other government initiatives to improve the safety of meat and poultry.

Most consumers willingly accept responsibility for ensuring that the food they eat is safe. They express confidence in their ability to handle and prepare meat and poultry safely. Most consumers agree that “food safety is up to each of us as individuals,” and say that they exert a great deal or some effort to choose safe foods and handle them safely (Penn State, 1998). In 2001, 93 percent of consumers reported that they are completely or mostly confident that the meat and poultry they prepare at home is safe to eat (CDC FoodNet, 2001). However, despite expressing confidence in their knowledge and ability to handle and prepare meat and poultry safely, consumers’ discussions in focus groups about their actual practices revealed that some participants unknowingly follow some unsafe practices when cooking at home (RTI, 2000 and 2002a).

Consumers worry more about how meat and poultry are handled prior to purchase than about how they handle it at home. They feel they have control over the safety of the food they prepare at home. The FDA/FSIS Food Safety Survey and focus group data highlight areas of concerns for consumers.

- As shown in Figure 2, consumers think foodborne illness most likely stems from food handling procedures at food processing plants and restaurants rather than in their homes. Consumers’ believing that foodborne illness originates outside the home might reduce their concern for food safety.
- The percentage of consumers who have heard about antibiotic residues as a problem in food increased from 26 percent in 1993 to 35 percent in 2001.

- In focus groups with household food preparers (RTI, 2002a), participants expressed concerns about food transportation. They worry about storage temperature, delivery time, and the possibility of cross-contamination from other cargo.

PR/HACCP RULE EVALUATION REPORT

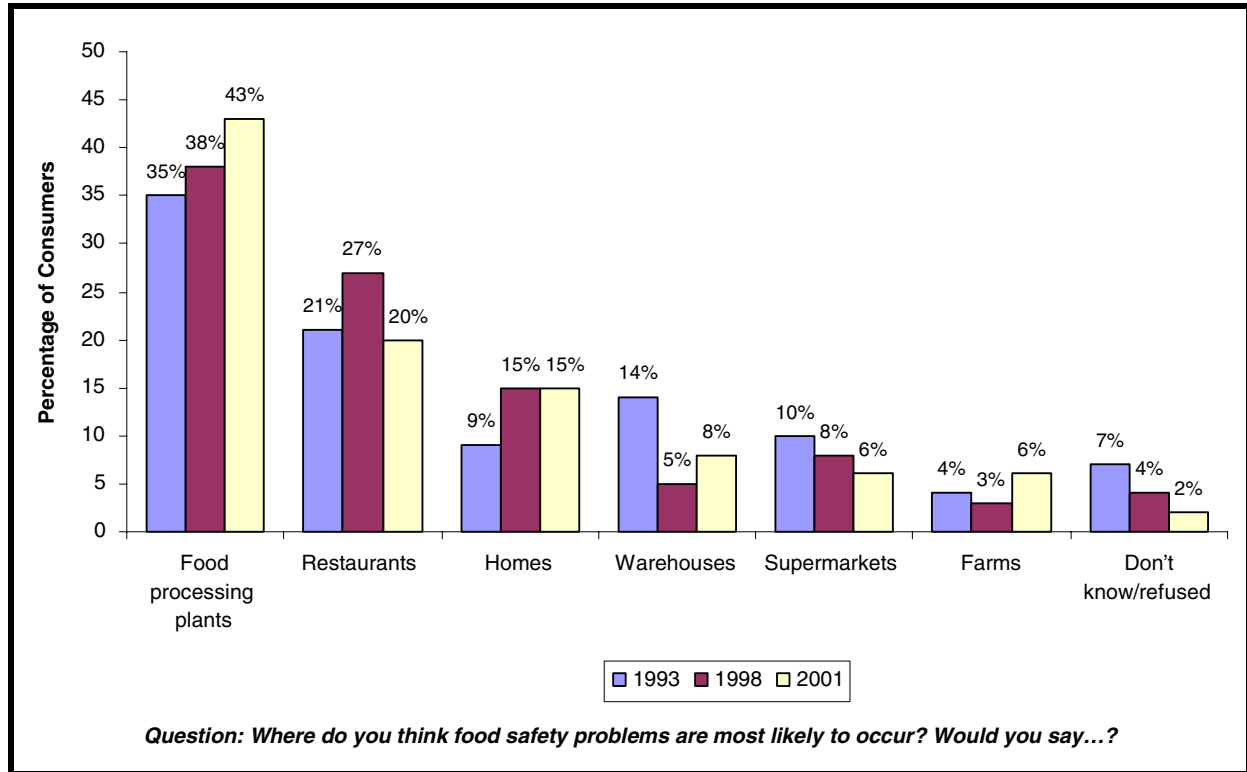
Changes in Consumer Knowledge, Behavior, and Confidence

Since the 1996 PR/HACCP Final Rule

Final Report

9/3/02

Figure 2. Changes in Consumers' Opinions on Sources of Foodborne Illness Since the 1996 PR/HACCP Final Rule



Source: FDA/FSIS Food Safety Survey, 1993, 1998, and 2001.

PR/HACCP RULE EVALUATION REPORT
Changes in Consumer Knowledge, Behavior, and Confidence
Since the 1996 PR/HACCP Final Rule

Final Report

9/3/02

References

American Dietetic Association (ADA) and ConAgra Foods Foundation (ConAgra). 2001. Home Food Safety Refrigeration Survey. <http://www.homefoodsafety.org/>.

Anderson, J.B., E. Gee, V.T. Mendenhall, T.A. Shuster, K. Hansen, and A. Volk. 2000. "A Camera's View of Consumer Food Handling and Preparation Practices." Final report prepared for the U.S. Food and Drug Administration. North Logan, Utah: Spectrum Consulting.

Audits International. 2000. Home Food Safety Study. Northbrook, IL. <http://www.audits.com/>.

Centers for Disease Control and Prevention (CDC). 1997. Foodborne Diseases Active Surveillance Network (FoodNet): Population Survey: 1996-1997. Atlanta, GA: Centers for Disease Control and Prevention.

Centers for Disease Control and Prevention (CDC). 2001. Foodborne Diseases Active Surveillance Network (FoodNet): Population Survey: 2000-2001. Atlanta, GA: Centers for Disease Control and Prevention.

Food and Drug Administration/Food Safety and Inspection Service (FDA/FSIS). 1993. Food Safety Survey. Washington, DC.

Food and Drug Administration/Food Safety and Inspection Service (FDA/FSIS). 1998. Food Safety Survey. Washington, DC.

Food and Drug Administration/Food Safety and Inspection Service (FDA/FSIS). 2001. Food Safety Survey. Washington, DC.

Pennsylvania State University (Penn State). 1998. Tabulations from the Food Safety Survey provided by Rex Warland, Penn State University. University Park, PA.

Pennsylvania State University (Penn State). 1999. Tabulations from the Food Safety Survey provided by Rex Warland, Penn State University. University Park, PA.

Pennsylvania State University (Penn State). 2001. Tabulations from the Food Safety Survey provided by Rex Warland, Penn State University. University Park, PA.

Research Triangle Institute (RTI). December 2000. "PR/HACCP Rule Evaluation Report—Focus Group Study on Food Safety Messages and Delivery Mechanisms." Final report prepared for the U.S. Department of Agriculture, Food Safety and Inspection Service.

Research Triangle Institute (RTI). February 2001. "PR/HACCP Rule Evaluation Report—Listeriosis Food Safety Messages and Delivery Mechanisms for Pregnant Women." Final report prepared for the U.S. Department of Agriculture, Food Safety and Inspection Service.

Research Triangle Institute (RTI). August 2002a. "PR/HACCP Rule Evaluation Report—Focus Group Findings on Changes in Consumer Knowledge, Behavior, and Confidence Since the 1996 PR/HACCP Final Rule." Final report prepared for the U.S. Department of Agriculture, Food Safety and Inspection Service.

Research Triangle Institute (RTI). March 2002b. "PR/HACCP Rule Evaluation Report—Thermometer Usage Messages and Delivery Mechanisms for Parents of Young Children." Final report prepared for the U.S. Department of Agriculture, Food Safety and Inspection Service.

PR/HACCP RULE EVALUATION REPORT

Changes in Consumer Knowledge, Behavior, and Confidence Since the 1996 PR/HACCP Final Rule

Final Report

9/3/02

Appendix A. Description of Data Sources on Changes in Consumer Knowledge, Behavior, and Confidence Since the 1996 PR/HACCP Final Rule

Sponsor	Study	Data Collection Approach	Population	Year(s) of Data Collection (Number of Observations)
ADA & ConAgra Foods	Home Food Safety Refrigeration Survey	Internet survey	Adult household food preparers living in private households in the continental U.S.	2001 (1,594)
Audits International ^a	Home Food Safety Study	Direct observation—auditors scored individuals preparing a meal	Targeted sample of households in 70 to 80 metropolitan areas	1997 (106) 1999 (121) 2000 (115)
CDC, FoodNet ^b	Population Survey	Telephone survey	U.S. individuals in FoodNet sites; limited to adults for RTI analysis	1996/1997 (9,003) 1998/1999 (12,755) 2000/2001 (2,409) ^c
FDA & FSIS	Food Safety Survey	Telephone survey	U.S. adults; nationally representative sample weighted to U.S. Census proportions on race, gender, and education	1993 (1,620) 1998 (2,001) 2001 (4,482)
FDA	Utah State University Study	Direct observation—individuals videotaped preparing a meal	Targeted sample of Utah residents; primary meal preparer; participants reflected overall Utah demographics	1999 (99)
FSIS	Food Safety Messages and Delivery Mechanisms	Focus groups	Household food preparers in four locations with general population, parents of young children, young adults, and seniors	2000 (67)
FSIS	Listeriosis Food Safety Messages and Delivery Mechanisms for Pregnant Women	Focus groups	Pregnant household food preparers in four locations	2001 (63)
FSIS	Thermometer Usage Messages and Delivery Mechanisms for Parents of Young Children	Focus groups	Household food preparers who are parents of young children in three locations	2002 (49)
FSIS	Changes in Consumer Knowledge, Behavior, and Confidence Since the 1996 PR/HACCP Final Rule	Focus groups	Household food preparers in four locations with general population, parents of young children, young adults, and seniors	2002 (64)
Penn State University	Food Safety Survey	Telephone survey	U.S. adults	1998 (1,000) 1999 (1,400) 2001 (2,000)

^aAudits International was recently acquired by Ecolab. The results of the 2001 Home Food Safety Study were not available for inclusion in the data analysis.

^bFor the 2000/2001 CDC FoodNet Population Survey, we initiated “piggyback” data collection activities to add questions on consumer behavior and confidence.

^cThe number of observations is for the questions used in the RTI analysis; these questions were only included in the 4th quarter survey (conducted February–March 2001).