

CHAPTER 9

Food Safety



Food Safety and Inspection Service

The Office of Food Safety oversees the Food Safety and Inspection Service, the agency within USDA responsible for ensuring the safety, wholesomeness, and correct labeling and packaging of meat, poultry, and egg products. FSIS operates under the authority of the Federal Meat Inspection Act, the Poultry Products Inspection Act, and the Egg Products Inspection Act. FSIS sets standards for food safety and inspects and regulates all raw and processed meat and poultry products, and egg products sold in interstate commerce, including imported products. FSIS has implemented a strategy for change to reduce the incidence of foodborne illness attributable to meat, poultry, and egg products. The Office of Food Safety, headed by USDA's Under Secretary for Food Safety, provides oversight of the agency.

In FY 2001, FSIS inspected over 8.2 billion poultry, 140 million head of livestock, and 4.5 billion pounds of egg products.

The activities of FSIS include:

- Inspection of poultry and livestock, as well as processed products made from them;
- Inspection of all liquid, frozen, and dried egg products;
- Setting food safety standards for plant facilities, product contents, processing procedures, packaging and labeling, and microbial and chemical adulterants;

- Analyzing products for microbial and chemical adulterants;
- Conducting risk assessments, as well as epidemiological and other scientific studies, to estimate human health outcomes associated with the consumption of meat, poultry, and egg products. These risk assessments and studies provide science-based information for risk management and communication; and
- Educating consumers about foodborne illness by way of publications, educational campaigns, and a toll-free, nationwide USDA Meat and Poultry Hotline (1-800-535-4555).

FSIS inspectors examine animals before and after slaughter, preventing diseased animals from entering the food supply and examining carcasses for visible defects that can affect safety and quality. Inspectors also test for the presence of harmful pathogens and drug and chemical residues.

More than 7,600 FSIS inspectors carry out the inspection laws in over 6,500 privately owned meat, poultry, egg product, and other slaughtering or processing plants in the United States and U.S. Territories.

In addition, about 250,000 different processed meat and poultry products fall under FSIS inspection. These include hams, sausages, soups, stews, pizzas, frozen dinners, and products containing 2 percent or more cooked poultry or at least 3 percent raw meat. In addition to inspecting these products during processing, FSIS evaluates and sets standards for food ingredients, additives, and compounds used to prepare and package meat and poultry products.

As part of the inspection process, FSIS tests for the presence of pathogens and toxins such as *Salmonella*, *Listeria monocytogenes*, and *Staphylococcal enterotoxin* in ready-to-eat and other processed products. FSIS continues to have a zero tolerance for these pathogens in ready-to-eat and other processed products.

America's familiarity with health risks from foodborne microbial hazards has increased in recent years. Widely publicized outbreaks of foodborne illness...have raised the public's concern.

Table 9-1
Livestock, poultry, and egg products federally inspected in 2000 and 2001

	2000	2001
Cattle	36,239,548	38,974,227
Swine	93,385,041	96,599,904
Other livestock	3,915,417	4,138,779
Poultry	8,547,271,635	8,220,504,495
Egg products	5,100,000,000	4,500,000,000

Note: Fiscal years are October-September (i.e., fiscal 2001 ran Oct. 1, 2000–Sept. 30, 2001). All numbers are rounded from original data.

FSIS also tests for pathogens in some raw products. In 1994, USDA declared *E. coli* O157:H7 an adulterant in raw ground beef and established a monitoring program for the pathogen. As part of the Pathogen Reduction/Hazard Analysis and Critical Control Point (HACCP) Systems final rule, issued in July 1996, FSIS for the first time set pathogen reduction performance standards for *Salmonella* that slaughter plants and plants producing raw ground products must meet. The final rule also requires meat and poultry slaughter plants to conduct microbial testing for generic *E. coli* to verify the adequacy of their process controls for the prevention of fecal contamination.

Imported meat and poultry are also subject to FSIS scrutiny. The agency reviews and monitors foreign inspection systems to ensure that they are equivalent to the U.S. system before those countries are allowed to export. When the products reach the United States, products are reinspected at 155 active import locations by inspection personnel.

Nearly 4 billion pounds of meat and poultry passed inspection for entry into the United States from 33 countries during 2001.

Pathogen Reduction/Hazard Analysis and Critical Control Point (HACCP) Systems—Implementation

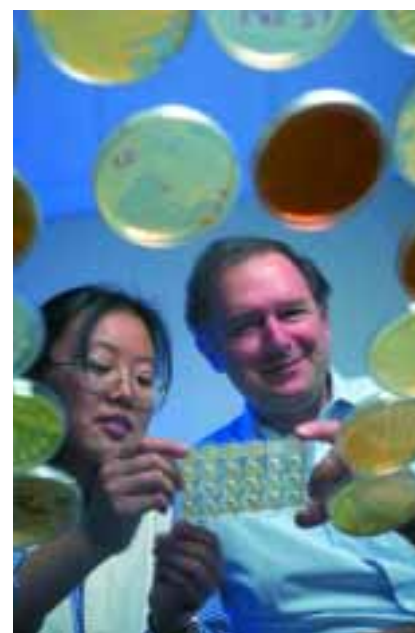
In 2000, FSIS completed implementation of its landmark rule, Pathogen Reduction/Hazard Analysis and Critical Control Point (HACCP) Systems. The rule addresses the serious problem of foodborne illness in the United States associated with meat and poultry products by focusing more attention on the prevention and reduction of microbial pathogens on raw products that can cause illness. It also clarifies the respective roles of government and industry in food safety. Industry is accountable for producing safe food. Government is responsible for setting appropriate food safety standards, maintaining vigorous oversight to ensure that these standards are met, and for operating a strong enforcement program to, among other things, deal with plants that do not meet regulatory standards.

The Pathogen Reduction/HACCP rule: (1) requires all meat and poultry plants to develop and implement written standard operating procedures for sanitation (SSOPs); (2) requires meat and poultry slaughter plants to conduct microbial testing for generic *E. coli* to verify the adequacy of their process controls for the prevention of fecal contamination; (3) requires all meat and poultry plants to develop and implement a system of preventive controls, known as HACCP, to improve the safety of their products; and (4) sets pathogen reduction performance standards for *Salmonella* that slaughter plants and plants producing raw ground products must meet.

The Pathogen Reduction/HACCP rule applies to over 6,500 federally inspected and 2,300 State-inspected slaughter and processing plants in the United States. Countries that export meat and poultry products to the United States must also meet the requirements of the final rule. Egg products are not covered by the final rule, but FSIS has developed a strategy that will include HACCP to improve the safety of eggs and egg products.

Implementation of HACCP in all plants has been smooth, and the new prevention-oriented meat and poultry inspection system continues to show improvement. With only minor fluctuations, *Salmonella* prevalences in all classes of products have decreased to levels below the baseline prevalence estimates determined prior to HACCP. The decrease in the prevalence of *Salmonella* in raw meat and poultry from 1998 to 2001 is consistent with reports from the Centers for Disease Control and Prevention indicating a decline in human illnesses linked to *Salmonella* during the same time period. As industry has complied with the new pathogen reduction and HACCP requirements, FSIS is strengthening HACCP systems to more effectively protect consumers from unsafe meat and poultry.

For more information on HACCP and compliance, visit the FSIS Web site at: <http://www.fsis.usda.gov> and access “HACCP Implementation.”



Proper design and implementation of new food safety policies must be based on the best available science. This is especially important in an international context.

Table 9-2
Prevalence of Salmonella in the PR/HACCP Verification Testing Program
All Years 1998–2001

Product	Base-line Prevalence (%)	Large Establishments		Small Establishments		Very Small Establishments		All Sizes Establishments	
		# Samp	% Pos	# Samp	% Pos	# Samp	% Pos	# Samp	% Pos
Broilers	20.0	23,229	9.2	7,757	13.7	453	34.7	31,439	10.7
Market Hogs	8.7	5,701	3.5	4,479	8.6	6,393	4.9	16,573	5.4
Cows/Bulls	2.7	419	0.5	4,164	2.0	1,288	3.6	5,871	2.2
Steers/Heifers	1.0	766	0.1	1,614	0.4	1,403	0.7	3,783	0.4
Ground Beef	7.5	3,954	5.2	48,595	3.8	22,209	2.4	74,758	3.4
Ground Chicken	44.6	408	15.9	536	16.0	53	11.3	997	15.7
Ground Turkey	49.9	2,836	30.2	812	25.6	64	28.1	3,712	29.2

Table 9-3
Percent of Sample Sets Meeting the Salmonella Performance Standards
All Years 1998–2001

Product	# Sets		% Pass		# Sets		% Pass		# Sets		% Pass	
Broilers	442	93.4	142	84.5	4	25.0	588	90.8				
Market Hogs	99	91.9	69	73.9	49	77.6	217	82.9				
Cows/Bulls	7	100.0	62	83.9	17	76.5	86	83.7				
Steers/Heifers	8	100.0	19	94.7	4	100.0	31	96.8				
Ground Beef	70	85.7	796	91.0	288	95.5	1,154	91.8				
Ground Chicken	6	100.0	9	100.0	1	100.0	16	100.0				
Ground Turkey	49	91.8	13	84.6	1	100.0	63	90.5				

HACCP-Based Inspection Models Project (HIMP)

In 2002, the CDC published a report that credits the implementation of HACCP as a major factor in the continued decline in the incidence of foodborne illness. However, the HACCP system does not currently apply to all activities associated with the slaughter process, so FSIS has developed and is testing new inspection models that employ the scientific principles associated with Pathogen Reduction/HACCP.

HIMP is a pilot program that began in 1997 and is designed to test whether new government slaughter inspection procedures can be employed that improve food safety and increase consumer protection, and that leads to the more efficient and effective use of inspection resources and personnel. Only meat and poultry plants that slaughter exclusively young, healthy, uniform animals—market hogs, fed cattle, or young poultry

(including turkeys)—are eligible for the project. These animals comprise nearly 90 percent of animals slaughtered in inspected establishments. Eligible plants may volunteer to participate in the pilot program.

Under HIMP, changes are being made in the role of the slaughter inspector. Except for one inspector at the end of the line, inspectors are no longer tied to one point on the inspection line. Instead, inspectors are free to move around the plant and up and down the processing line to perform verification checks and observe operations wherever necessary. Currently, approximately 24 establishments that slaughter young chickens, hogs, and turkeys are participating in the pilot project.

Under the project, FSIS has established performance standards for food safety and non-food safety defects, such as bruises, (also known as “other consumer

protections”) that volunteer plants must meet. In order to meet these standards, plants are extending their HACCP systems to address the food safety conditions, and they are developing process control plans to address other consumer practices. Plants are responsible for identifying and removing meat and poultry carcasses that do not meet these standards.

The accomplishments of the new system must meet or exceed the accomplishments of the current system in order for FSIS to consider the new system to be successful. The project is being carried out through an open public process that allows all interested constituents the opportunity to provide input. Data collected in the project to date, by both an independent contractor and FSIS’ in-plant inspectors, show improvements in both food safety and other consumer protections. FSIS will continue to evaluate and make improvements to HIMP. Plants that are permitted to operate under HIMP will be held accountable for meeting the performance standards and all other regulatory requirements.

Activities Related to Homeland Security

For nearly a century, FSIS has protected consumers by ensuring that meat, poultry, and egg products are safe, wholesome, and accurately labeled. Although we are now facing new threats related to intentional contamination of the food supply, this history of dealing with food emergencies has allowed FSIS to develop the expertise to protect our Nation’s supply of meat, poultry, and egg products.

With a strong food safety infrastructure already in place, USDA has been able to focus on fortifying existing programs and improving lines of communication both internally and externally through cooperation with industry, consumers, and other government agencies.

FSIS coordinates its efforts with several other agencies committed to preventing biosecurity threats. FSIS works closely with the Centers for Disease Control and Prevention, the Food and Drug Administration, and the Environmental Protection

Agency, as well as with State and local health agencies to share information about illnesses.

Emerging Issues

Over the past several years, FSIS has enhanced the public health focus of its food safety program helping the agency address emerging and re-emerging issues, such as *E. coli* O157:H7 and *Listeria monocytogenes*.

***E. coli* O157:H7**

The CDC estimates that 73,000 cases of infection and 60 deaths occur in the United States each year as a result of *E. coli* O157:H7.

A risk assessment for *E. coli* O157:H7 in ground beef was completed in September 2001 and submitted to the National Academy of Sciences for peer review. The risk assessment estimates the risks of foodborne illness from the pathogen under current baseline manufacturing conditions and will be revised in response to comments from the peer review. When the review is completed, the agency will use the risk assessment to determine whether changes in its policies on *E. coli* O157:H7 are needed.

Listeria monocytogenes

According to the CDC, an estimated 2,500 people in the United States become ill from *Listeria monocytogenes* each year, and approximately 20 percent die as a result of the illness.

FSIS consumer education programs specifically target pregnant women and newborns, older adults, and people with weakened immune systems caused by cancer treatments, AIDS, diabetes, kidney disease, etc., who are all at risk for becoming seriously ill from eating foods that contain *Listeria monocytogenes*.

On January 18, 2001, FDA and FSIS released a draft risk assessment of the potential relative risk of listeriosis from eating certain ready-to-eat foods, as well as an action plan designed to reduce the risk of foodborne illness caused by *Listeria monocytogenes*.

Continued basic research is needed to evaluate the incidence of current and emerging hazards, identify and quantify the chronic complications that these acute foodborne illnesses can cause, and identify which foods are causing the illnesses.



FSIS also has the following four longer term initiatives:

- The agency drafted a protocol to study the post-production growth of *Listeria monocytogenes* in a wide variety of ready-to-eat products. USDA's Agricultural Research Service is conducting the study;

- FSIS has developed an indepth verification protocol that can be used to determine the adequacy of plants' HACCP plans for ready-to-eat products, particularly regarding *Listeria monocytogenes*;

- A risk ranking for *Listeria monocytogenes*, in conjunction with the Food and Drug Administration, focused on all foods, particularly refrigerated, ready-to-eat foods; and

- FSIS is developing food safety standards for ready-to-eat products that will address the need to control all pathogens, including *Listeria monocytogenes*.

Bovine Spongiform Encephalopathy

Bovine spongiform encephalopathy (BSE) has never been detected in U.S. cattle. Since 1989, USDA has banned the import of live ruminants, such as cattle, sheep, goats, and most ruminant products from the United Kingdom and other countries having BSE. Should a case of BSE ever be detected in this country, an emergency response plan has been developed to immediately control suspect animals and prevent them from entering the food supply.

In 1998, USDA asked the Harvard Center for Risk Analysis to evaluate the robustness of U.S. measures to prevent the spread of BSE or "mad cow disease" to animals and humans if it were to arise in this country.

Results of this landmark 3-year study showed that the risk of BSE occurring in the United States is extremely low. The report noted that early protection systems put into place by the USDA and the U.S. Department of Health and Human Services (HHS) have been largely responsible for keeping BSE out of the United States and would prevent it from spreading if it ever did enter the country.

Even so, in November 2001, the Under Secretary for Food Safety announced a series of actions the USDA would take, in cooperation with HHS, to strengthen its BSE prevention programs and maintain the Government's vigilance against the disease.

- USDA will have the risk assessment peer reviewed by a team of outside experts to ensure its scientific integrity;
- USDA will continue increasing its testing for BSE, with over 12,500 cattle samples targeted in fiscal year 2002—up from 5,000 during fiscal year 2001;
- USDA will announce in the *Federal Register* the availability of a policy options paper that will outline additional possible regulatory actions to limit the risk of BSE exposure;
- USDA will issue a proposed rule to prohibit the use of certain stunning devices used to immobilize cattle during slaughter; and

■ USDA will publish an Advance Notice of Proposed Rulemaking to consider disposal options for dead and downer animals. Such cattle are considered an important potential pathway for the spread of BSE in the animal chain.

A complete copy of the Harvard Report can be obtained from USDA's official Web site at <http://www.usda.gov>. For more information about BSE, also visit <http://www.usda.gov> or <http://www.hhs.gov>

Food Net and PulseNet

FSIS has partnered with the CDC and other State and Federal agencies to determine the extent of foodborne illness in the United States and to maintain a database of DNA fingerprinting of foodborne bacteria.

The Foodborne Diseases Active Surveillance Network (FoodNet) is a part of the CDC Emerging Infections Program. FSIS worked in conjunction with CDC, the Food and Drug Administration, and public health laboratories in several States to establish FoodNet in 1995.

FoodNet includes active surveillance for diseases caused by foodborne pathogens, case-control studies to identify risk factors for acquiring foodborne illness, and surveys to assess medical and laboratory practices related to the diagnosis of foodborne illness. The baseline and annual data collected are being used to



help determine the effectiveness of the Pathogen Reduction; Hazard Analysis and Critical Control Points rule and other regulatory actions as well as public education efforts in decreasing the number of cases of major bacterial foodborne disease in the United States each year.

In FY 2001, FSIS completed the sixth full year of an agreement with the CDC to conduct active population-based surveillance for foodborne diseases (*Campylobacter*, *E. coli* O157:H7, *Listeria*, *Salmonella*, *Shigella*, *Vibrio*, *Yersinia*, *Cryptosporidium* and *Cyclospora*) in Minnesota, Oregon, Connecticut, Georgia, and selected counties in California, Maryland, New York, Colorado, and Tennessee (total population: 30 million). This multi-year study is providing much-needed data regarding the burden of foodborne illness in the United States.

PulseNet is a national computer network of public health laboratories that helps to rapidly identify and control outbreaks of foodborne illness. The laboratories perform DNA fingerprinting on bacteria that may be foodborne and the network permits rapid comparison of the fingerprint patterns through an electronic database at the CDC. PulseNet is an early warning system that links seemingly sporadic human illnesses together and, as a result, more outbreaks can be recognized, especially those that involve many States.



FoodNet and PulseNet are two examples of Federal and State agencies working together to accomplish the agency's public health goals of protecting the public and the meat and poultry supply through improving the tracking of foodborne illnesses and outbreaks.

Consumer and Food Safety Education

For more than two decades, FSIS has provided consumer information and educational materials designed to foster safe food handling through behavior changes in order to reduce the risk of foodborne illness. Educational materials and campaigns are science based and drawn from epidemiological studies concerning food and behaviors that contribute to food safety risks. Projects and activities are also based on social marketing principles, research derived from educational theory, market and consumer research, and focus group testing. FSIS provides information and educational materials designed to foster safe handling of meat, poultry, and egg products.

Consumer education programs focus on key food safety messages to the general public and special high-risk groups that face increased risks from foodborne illness—the very young, the elderly, pregnant women, people who have chronic diseases, and people with compromised immune systems. The agency reaches

diverse audiences through the media, information multipliers such as teachers, Extension and health educators, the FSIS Web site, printed materials, videos, USDA's Meat and Poultry Hotline, the internationally distributed newsletter, *The Food Safety Educator*, and other presentations and exhibits. FSIS produces public service announcements, news features, and partners with other government agencies, industry, and consumer associations on food safety projects.

USDA Meat and Poultry Hotline

In addition to basic food handling, storage and preparation questions, USDA's toll-free Meat and Poultry Hotline addresses the latest issues: outbreaks of foodborne illness; pathogens such as *Listeria monocytogenes*, *Salmonella*, *Campylobacter jejuni*, and *E. coli* O157:H7; recalls of meat and poultry products; egg safety; red meat irradiation; and food safety during a power outage or natural disaster. Over 172,000 calls were taken during FY 2000 and FY 2001 combined with over 400 media or information multiplier calls addressing safe food handling practices in the home. The analysis of call data helps to identify gaps in consumer knowledge to plan future food safety education campaigns. The Hotline's staff is comprised of home economists, registered dietitians, food technologists, and a physician.

In September 2001, the USDA Meat and Poultry Hotline initiated a 3-month Spanish language outreach pilot for the Latino community to provide consumers with bilingual service. The pilot outreach efforts were focused in Miami, FL, San Diego, CA, and Newark, NJ.

Callers may speak with a food safety specialist—in English or Spanish—from 10:00 a.m. to 4:00 p.m., Eastern time on weekdays year round by dialing the nationwide toll-free number 1-800-535-4555 or in the Washington, DC area, (202) 720-3333. The toll-free number for the hearing impaired (TTY) is 1-800-256-7072. An extensive menu of recorded food safety messages in English and Spanish may be heard 24 hours a day. The Hotline can also now be reached by e-mail at: mpholine.fsis@usda.gov

Food Thermometer Education Campaign—Thermy™

Based on USDA and other scientific research, FSIS launched a national consumer education campaign to increase consumer use of food thermometers at a May 25, 2000, press conference. Input from nationwide focus groups helped to develop Thermy™, a cartoon character, and his message: “It’s Safe to Bite When the Temperature is Right!” Thermy™ educational materials, developed in English and Spanish, were distributed nationally to schools, cooperative extension, and other educators. Thermometer companies, grocery chains, and other partners began using Thermy™ on product packaging, in-store floor displays, and consumer information publications. Thousands of information kits, magnets, and posters were distributed to food safety educators nationwide and a variety of Thermy™ information is available (also in Spanish) on the FSIS Web site: www.fsis.usda.gov/thermy. Thermy™ continues to appear at public functions across the country.

Partnership for Food Safety Education and Fight BAC!® Campaign

The Partnership for Food Safety Education’s Fight BAC!® campaign, which began in 1997, is a far-reaching, ambitious, and consumer-friendly public education campaign focused on safe food handling. The Fight BAC!® campaign’s goal is to educate consumers on the four simple steps they can take to fight foodborne bacteria and reduce their risk of foodborne illness. These steps are:

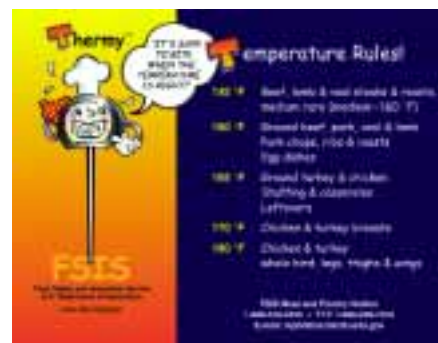
- Clean—wash hands and surfaces often,
- Separate—don’t cross-contaminate,
- Cook—cook to proper temperatures, and
- Chill—refrigerate promptly.

The campaign is represented by the character BAC! (bacteria), the invisible enemy who tries his best to spread contamination wherever he goes. By giving foodborne bacteria a personality, BAC! makes the learning process more meaningful and memorable for consumers of all ages.

For more information about the Partnership for Food Safety Education and Fight BAC!®, visit <http://www.fightbac.org/>

Listeria monocytogenes Consumer Outreach

Focus groups have shown that consumers are not aware that pregnant women are at high risk for foodborne illness and are unfamiliar with the bacterium *Listeria monocytogenes* (*Lm*). In FY 2001, FSIS developed a new brochure for pregnant women—*Listeriosis and Pregnancy: What Is Your Risk? Safe Food Handling for a Healthy Pregnancy*. The *Listeriosis and Food Safety Tips* (June 1999) brochure in English and Spanish remains available for purchase in single or bulk copies through the Government Printing Office and through the Federal Consumer Information Center (FCIC) in Pueblo, CO.



TM



The National Food Safety Information Network

FSIS and other agencies of the U.S. Department of Agriculture participated in the National Food Safety Information Network, which fosters communication among the Federal Government's primary providers of food safety information. The network includes: <http://www.FoodSafety.gov> the "Government Gateway to Food Safety Information;" the USDA Meat and Poultry Hotline; FDA's Center for Food Safety and Applied Nutrition (CFSAN); the USDA/FDA Foodborne Illness Education Information Center at the National Agricultural Library; National Food Safety Educators Network (EdNet); and FoodSafe, an online discussion group with 2,000 subscribers from more than 50 countries.

National Food Safety Education MonthSM (NFSEM)

Created by the International Food Safety Council, a coalition of restaurant and foodservice professionals certified in food safety, National Food Safety Education MonthSM (NFSEM) is an activity within the National Food Safety Initiative. It is held in September each year and its major focus is on food safety education for government and consumer organizations, as well as industry. The goals are: (1) to reinforce food safety education and training among restaurant and foodservice workers; and (2) to educate the public on how to handle and prepare food properly at home—whether cooking from scratch or serving take-out meals or leftovers. The theme for the September 2001 observance, *Be Cool, Chill Out, Refrigerate Promptly*, was one of the Fight BAC![®] messages.

FSIS Web Site

The Web site www.fsis.usda.gov remains a valuable resource for consumers, food safety educators, the regulated industry, FSIS employees, government officials, and other professionals. The site contains thousands of documents concerning FSIS news, meat and poultry product recalls, HACCP, speeches, regulations and directives, agency reports, food safety for consumers, and career employment information. Because documents may be downloaded in a variety of electronic formats, the Web site serves as an integral part of the agency's publication distribution process. Visitors to the site may also view video clips of news releases and public service announcements and can access numerous links to other food safety-related sites. Also, the Web site's electronic mailbox address received thousands of questions and comments by visitors from around the world.

Food Service Education

In FY 2001, FSIS participated in meetings and conference calls with the Food Safety Training and Education Alliance (FSTEA) to identify food safety activities and initiatives. In collaboration with FSTEA, FSIS organized and coordinated two symposia—(1) A Social Marketing Approach to Educating Food Service Workers and (2) Educating Food Service Workers. FSIS was instrumental in developing a Web site for FSTEA, www.fstea.org, at the National Agricultural Library managed by the USDA/FDA Foodborne Illness Education Information Center. FSIS also led the effort to develop, design, and distribute the brochure, *Food Safety: Taking Care of Business*. This brochure provides resources for food safety information and training materials specifically designed for retail and food service. A decal for mirrors depicting the importance of hand washing in relation to food safety, one of the four Fight BAC!® messages, was designed and produced for distribution to restaurants and foodservice establishments. Also, FSIS currently provides liaisons to USDA's Food and Nutrition Service (FNS), the National Food Service Management Institute (NFSMI), and the National Coalition for Food Safe Schools (NCFSS) and a staff member serves as a consultant to the Conference for Food Protection's Manager Training, Testing, and Certification Committee.

