

Pre-HACCP Food Safety Regulation

USDA, through its food safety agency, FSIS, has played a significant role in regulating meat and poultry quality and safety since 1890. During the 1880s, European countries began restricting American pork and livestock imports out of fear of trichinosis in pork and animal diseases in livestock. American meatpackers, fearing that they would lose export sales, petitioned the U.S. Congress for a way to guarantee the safety of American exports. After several years of effort, meatpacker lobbying efforts resulted in the Meat Inspection Act (MIA) of 1890. The MIA granted USDA the authority to inspect livestock, salted pork, and bacon intended for export and to quarantine animal imports to ensure that diseased animals were not imported. However, this legislation had many loopholes, so Congress strengthened it with more stringent legislation in 1891 that required the inspection of cattle for export and cattle, hogs, and sheep in interstate commerce for animal diseases, such as hog cholera and tuberculosis. The law also required all fresh beef for export to have a certificate verifying that the meat had come from inspected cattle and the inspection of pork products for trichinosis and some other animal diseases. To comply with this legislation, FSIS* inspectors made direct visual inspections of the animals and meat products and used microscopes to check for unwanted bacteria.¹ The MIA was further amended in 1895 to prevent the diversion into commerce of condemned carcasses and parts.

During the 1890s and early 1900s, inspectors examined an ever-increasing number of animals and volume of pork but did not monitor the cleanliness of packing plants. By some accounts, sanitation in plants became very inadequate, setting the stage for Upton Sinclair's novel, *The Jungle*. This book raised anxiety in the

¹ The USDA agency responsible for the inspection of meat and poultry products became an independent agency of USDA known as the Food Safety and Inspection Service in 1981. This agency had previously been called the Food Safety and Quality Service and, under various names, has been part of USDA operations since the FMIA of 1906. We use FSIS* to refer to the USDA food safety agencies that preceded FSIS.

United States, but, according to Wiser et al. (1986), it was the international reaction that caused the most concern among meatpackers. Fearing lost export sales, meatpackers lobbied for legislation that would assuage European food safety concerns. In response, Congress enacted the Federal Meat Inspection Act (FMIA) of 1906. This legislation did reduce concerns in export markets but was mainly directed at the domestic market, covering all meat plants that shipped products across State lines and to export markets. It greatly increased expenditures for Federal meat inspection activities and mandated that FSIS* inspect live cattle, hogs, sheep, and goats just prior to slaughter and their carcasses after slaughter. Legislation also required FSIS* to inspect meat further-processing lines to ensure proper sanitation and required producers to affix a label indicating that the meat was FSIS* inspected on all domestically shipped products.² If an inspector condemned a meat product, then that meat required a stamp of condemnation and had to be disposed of in the presence of an inspector. Since legislation mandated that meat products sold across State lines must pass inspection, the FMIA served as a vehicle for ensuring product wholesomeness and the Federal Government became a guarantor of meat quality and safety. Inspection also took place in plants selling products within State boundaries, but State agencies monitored these plants.

Poultry products were not covered under FMIA, probably because chickens were often raised in backyards and home butchered. With the advent of more commercial poultry slaughter and processing plants, the Federal Government instituted a fee-for-service inspection system. Processors participated in this program in order to assure the public that their products were wholesome.

Rising demand and the possibility of the use and sale of meat from sickly animals by some unscrupulous producers prompted Congress to mandate compulsory

² The 1891 act required labels to be affixed to products for export.

inspection in the Poultry Products Inspection Act (PPIA) of 1957. As with meat products, Federal inspectors used clinical symptoms and conditions as an indicator of disease conditions and visual and olfactory inspection as an indicator of animal and poultry meat microbiological safety.

Guaranteeing truthful labeling regarding product formulation became markedly more complex after World War II. FSIS* had long been concerned about the use of water, vegetable protein, and other nonmeat fillers that could be used by processors as cheap replacements for meat without being readily detected by consumers. However, concern about the use of these fillers increased after the war because frozen pizzas, prepackaged hamburgers, ham products, and other processed meat products made their way into grocery store meatcases. Later, poultry followed this path.

FSIS*'s meat and poultry food safety and labeling assurance inspection program became even more complicated with further changes in meat and poultry processing. *Silent Spring* by Rachel Carson and other books during the 1960s heightened consumer awareness of the presence of pesticides and other residues in food. In 1963, a congressionally mandated FSIS* study showed that: (1) few States had strong inspection programs, (2) there was a lack of uniformity among States concerning inspection requirements, and (3) sanitary conditions varied widely among State-inspected plants. In response, Congress amended the FMIA and PPIA with the WMA of 1967 and the WPPA of 1968.

Wholesome Meat Act of 1967 and Wholesome Poultry Products Act of 1968

The WMA and WPPA amendments greatly expanded FSIS*'s statutory authority over the number of establishments inspected, enhanced enforcement powers, and increased the detail with which FSIS* carried out inspections. These acts increased the number of establishments inspected in three ways. First, they increased the range of establishments over which FSIS* had authority by mandating that FSIS* has authority over renderers, food brokers, animal food manufacturers, freezer storage concerns, transporters, retail outlets, and wholesalers in addition to slaughter plants and processing plants. Today, FSIS* inspects more of the processing and slaughter operations of these types of establishments than plants defined by the Census

Bureau to be either an animal slaughter or meat processing plant.

The acts also granted FSIS* indirect oversight of State-inspected plants and direct monitoring of foreign exporters by requiring that State inspection systems and the systems of foreign country facilities of meat and poultry exporters to this country be at least equal to the Federal system. The "at least equal to" clause meant that FSIS* had to ensure that State-inspected systems and plants exporting products to the United States met FSIS* standards. This "at least equal to" clause had a huge effect on FSIS*'s inspection load. Shortly after enactment of the WMA and WPPA, 24 States discontinued State poultry inspections and 17 States decided not to pursue State meat inspection, so FSIS* had to take over their former responsibilities. Due to changes stemming from the WMA and WPPA, the number of State-inspected plants dropped by about 30 percent to 5,219, forcing plants without State inspection to seek FSIS* regulation or go bankrupt. Combined, the number of plants switching from State to Federal inspection and normal plant entries raised the number of federally inspected plants by about 50 percent to 7,093 over the 1972-76 period (Booz-Allen, 1977).

The WMA and WPPA also provided stronger enforcement tools. Regulations based on these mandates permitted product detentions, the withdrawal of inspection services from offending plants, and injunctions and investigations of allegations of food safety violations. However, Booz-Allen (1977) asserted that enforcement powers remained weak, in that violations depended on the presence of a meat or poultry inspector.

Booz-Allen maintained that many very small processing plants had inspectors present onsite only part of the time for a periodic plant inspection. Thus, although these plants were supposed to comply with the law all of the time, they could operate under potentially unsanitary conditions when the inspector was not present, enabling them to potentially ship products that did not meet FSIS* standards. Additionally, the penalties themselves were much weaker than they appeared. Plant inspectors commonly detained products that failed to meet FSIS* standards and withheld inspection services until sanitary conditions were met. However, since quality control managers in companies usually issued similar directives, these practices were really only usual control measures and, thus, just a normal cost of doing business.

Other enforcement measures had more coercive power but may have been less effective. The WMA and WPPA permitted the FSIS* to shut down a plant by canceling the meat or poultry grant (a license to sell meat or poultry) if the plant tried to bribe an inspector, failed to destroy condemned meat, or had unsanitary conditions that led to adulterated products. However, this enforcement tool may have been much weaker than it appeared. Booz-Allen (1977) indicated that FSIS* preferred to negotiate weaker agreements rather than seek permanent denial of inspection services because experience from court proceedings shortly after enactment of WMA and WPPA showed that judicial hearings were too protracted to be an effective deterrent. For example, FSIS* threatened 20 firms with closure after they tried to bribe FSIS* inspectors in the early 1970s. However, none of these firms ever did close. Rather, out-of-court settlements permitted them to terminate some of their employees but remain in operation. Booz-Allen (1977) also suggested that the threat of criminal penalties also proved to be ineffective, as FSIS* successfully prosecuted only 26 out of 90 cases in 1977.

Regulations based on the WMA and WPPA also described the terms under which meat or poultry products could be classified as adulterated, permitted the FSIS* to establish tolerance levels for adulterants, and addressed mislabeling issues. The acts defined adulterated products as those products processed under unsanitary conditions, lacking a valuable ingredient, or containing harmful substances, chemical pesticides, or diseased meat or poultry. Under this broad definition, FSIS* defined pesticides as adulterants in the 1960s and *E. coli* 0157: H7 as an adulterant in raw ground beef in the 1990s. For ready-to-eat products, such as luncheon meats, the detection of this pathogen or any other pathogen of public health concern, such as *Listeria monocytogenes* or *Salmonella*, could be the basis for declaring the product adulterated.

Having meat or poultry identified as adulterated is costly for meat and poultry plants because adulterated products must be condemned, appealed, or reconditioned to correct for the adulterating condition, for example, to kill *E. coli* 0157: H7. A condemned product requires disposal, while an appealed product can be retained and reconditioned for an alternative use, such as cooked products. Regardless of final use, precise records of all adulterated products must be maintained and the final dispositions of adulterated prod-

ucts generally yield much lower revenue than products that pass inspection.

Labeling requirements were instituted to ensure product consistency, meaning that labels had to correctly specify the contents of a given product and similar products had to meet uniform standards. For example, an item labeled “chili con carne” had to meet maximum fat and minimum meat content standards in order to pass inspection. Substitution of other products for ingredients on labels or in compensation of the amounts mandated by code was considered misbranding and a violation of the law, possibly resulting in punitive measures.

Regulations based on the WMA and WPPA also outlined 15 sanitary processes that formed the basis for a new direction in FSIS* meat and poultry inspection. Requirements differed from plant to plant but generally included good management practices and such commonly accepted food safety practices as the prevention of raw products from coming into contact with cooked products and processed products from coming into contact with walls, floors, ceilings, rails, etc. Other stipulations included requiring operations, procedures, clothing, and utensils to be clean and sanitary and handwashing by employees before touching an exposed meat product or after handling a dirty shipping container.

As a way to ensure hygienic facilities, the regulations also mandated that FSIS* approve blueprints in advance of construction and examine the facilities and equipment outlined in those drawings before granting inspection. To have an FSIS*-approved facility, plants had to have an ample water supply, efficient drainage, and other basic infrastructure. FSIS*-approved equipment had to have contact surfaces constructed of stainless steel or some other rust-resistant material and that could be cleaned of all microbial contamination.

By 1992, the sanitation and process controls practices (SPCP) requirements had evolved into a computer-generated scheduling process called the Performance Based Inspection System in which FSIS process-control inspectors examined plants for five types of sanitation and five types of process control activities. The sanitation activities included pre-operation sanitation of facilities, assembled and disassembled equipment, product-handling equipment, sanitation of operations, and proper handling of contaminated and adulterated products. Process control activities included water

supply/sewage disposal, facilities sanitation/personal hygiene, pest and rodent control, receipt and control of incoming material, and product handling and preparation. There were also specific requirements for particular products and product integrity concerns. Cooking time and temperature controls for roast beef and other cooked products and requirements for fermented, smoked, and other processed products became particularly important as the production of processed products became a larger share of the products inspected by FSIS*.³

Inspection enforcement took the following form. Process control inspectors periodically made rounds in the plant to verify compliance and examined all available records. Inspectors designated poorly performed operations as deficient tasks and held or condemned products for serious violations. If the deficiencies were particularly egregious or if the number of deficiencies relative to total operations was excessive, then the inspector asked the plant manager to make corrections. If operations remained deficient, inspectors had the authority to retain and condemn the product and temporarily prevent the use of rooms and equipment that could contaminate the product. No other actions could immediately be pursued. In the longer term, FSIS* had the authority to withdraw inspectors for serious, persistent violations but, due to the protracted nature of court hearings, was unable to use this tool successfully (Booz-Allen, 1977).

Voluntary Quality Control Programs

The WMA and WPPA greatly expanded FSIS*'s responsibilities in terms of the number of inspected facilities, types of inspection tasks, and administrative oversight, but according to Booz-Allen (1977), provided little additional funding for inspectors. Moreover, FSIS* was becoming increasingly aware that it needed to target more of its resources toward food safety rather than nonfood safety activities in processing, such as product formulations. Thus, since regulatory provisions yielded a framework for giving incentives to plants to administer their own process control programs, FSIS initiated several voluntary programs. FSIS envisioned that, under these programs, inspectors would verify the accuracy of records rather than directly monitor net weights, product formulations, etc.

³ The Inspection System Guide details each of the 10 sanitation and process control activities.

Starting in the late 1970s, FSIS* instituted five voluntary programs—Total Quality Control (TQC), Partial Quality Control (PQC), Streamlined Inspection System (SIS), New Line Speed Inspection System (NELS), and New Turkey Inspection System (NTIS)—that shifted some of the inspection workload to plants in exchange for either a relaxation of inspection frequency or increased line speeds. FSIS* could also require a plant to adopt a PQC program if a sanitation, process control, or product quality deficiency persisted.

Total Quality Control Programs

FSIS* instituted the TQC program in 1980. Under this program, the responsibility for documenting process control matters for food safety and nonhealth meat and poultry standards set by FSIS* fell to the plant. FSIS* continued to inspect products for compliance with the statutes, but focused more on the written documentation, with occasional, but scheduled, hands-on verification of compliance.

To qualify, plants had to design and implement a quality control program that encompassed all aspects of the plant's production processes from ante-mortem to post-mortem inspection. TQC plans typically dealt with the treatment of incoming raw materials, processing procedures, important food safety targets for processing operations, and action limits for plant quality control personnel. The FSIS regulations also required plants to specify sanitizing rinses and other inputs or devices used to control product wholesomeness or product quality.

Both FSIS and processing plants could gain from having a TQC program. FSIS benefited by easing the burden on inspection resources, while plants benefited from greater flexibility in establishing a quality control program most suitable to the plant's circumstances. For example, TQC processing plants could more quickly introduce new products due to expedited approval procedures, ship products without direct inspector presence, and did not have to pay for inspector overtime if the FSIS inspector's time exceeded the normal 8-hour workday.⁴ TQC plants could also use a special logo that advertised their quality control program.

⁴ U.S. law requires USDA inspectors to be present for some operations, such as slaughtering animals in order to make an ante-mortem or post-mortem inspection of every animal/carcass.

Plants had to meet several requirements before FSIS would recognize their plant-administered TQC programs. First, the plants had to demonstrate their ability to monitor the quality of their production by demonstrating the independence of quality control from production. So, plants had to have at least one full-time person whose primary responsibility was quality control, who reported to a manager whose responsibilities were not predominantly production-related, and who had authority to halt production or stop product shipments if production did not meet TQC standards. A plant without at least one full-time quality control person had to outline the responsibilities of the person in charge of the quality control program.

Plants also had to detail the manner in which their TQC programs would function and had to show how assorted components of the quality program could maintain compliance with health and nonhealth standards established by FSIS. The components of a TQC plan usually included raw material controls and process control points at assorted points in the production process. For process control points, plants specified tolerances and the nature of corrective actions in the event that tolerances were breached.

The FSIS inspector's role changed in TQC plants to one in which he or she used plant production records and in-plant observations to verify plant compliance with regulatory requirements and consulted with plant management.⁵ As a result, each TQC plan had a description of the plant's quality control actions, the nature and frequency of tests, the types of charts and other records, and the length of time for which TQC records would be maintained. A plant also had to agree to maintain all of the analyses and information generated by its quality control system such that the records could easily be monitored for compliance. FSIS, in turn, emphasized accurate recordkeeping and expected appropriate action when a product exceeded or reached a tolerance limit.

Partial Quality Control Programs

Partial Quality Control programs emerged during the 1970s as a way for establishments to better control plant sanitation and processes or parts of processes and accurately adhere to net weight, labeling, and other

⁵ Inspectors selected for TQC programs received specialized training, particularly in statistical process control, and received a premium salary for their work.

economic and public health safety requirements of individual products.⁶ Many PQC programs, particularly the economic programs, were voluntary, but FSIS mandated many public health programs, such as those for the production of cooked roast beef. FSIS inspectors monitor all PQC programs.

Plants with PQC programs had to fully document how they dealt with a particularly troublesome node of production that periodically got out of control and threatened the wholesomeness, quality, or economic value of the product. For example, if an inspector noticed condensation coming from the ceiling adjacent to an exposed product, then the plant could have been required to continuously address the problem or chosen voluntarily to develop a PQC program to demonstrate process control. With a PQC program, a plant could determine the expected variability of the problem and then address it on a statistical basis.

Plants voluntarily choosing PQC programs faced new regulatory requirements but also realized some benefits. FSIS required that plants have a written PQC program that outlined the nature and frequency of tests and detailed raw material controls, critical checks, and control limits. In exchange, plants benefited from the expertise of the specially trained, more highly skilled FSIS inspectors specializing in quality control.

All PQC programs for slaughter plants were voluntary. As with processors, PQC programs could be used to address economic and public health quality. Programs included finished product, preoperational sanitation, and carcass presentation standards. Three special quality control programs for poultry—the SIS, NELs, and NTIS—required PQC programs for poultry eviscerating lines.

Streamlined Inspection, New Line Speed Inspection, and New Turkey Inspection Systems

The SIS shifted routine tasks that affected nonfood safety from inspectors to plant employees. FSIS felt that plants producing branded products had a strong incentive to ensure their products would have no visible, unpalatable defects. So, plant employees, working

⁶ Economic qualities—including product weight, fat, and other measurable attributes that consumers can observe or otherwise believe to be present in similar products—often lead to different prices.

under FSIS supervision, detected and then trimmed meat defects that affect product economic quality but did not affect or harm public health safety.

FSIS established preventive systems of nonfood safety process control for broilers and cornish hens with the NELS and for turkeys with the NTIS. Under these slaughter process control systems, the establishment had to: (1) demonstrate compliance with regulatory requirements by identifying process control points that were important to regulatory compliance, (2) set realistic standards for these points and observe them frequently enough to ensure compliance and identify the action that would be taken if a standard was not met, (3) maintain records of observations that FSIS could monitor to verify compliance, (4) have quality control personnel that reported to supervisors who were independent of production and had the authority to halt production or shipment of products if necessary, and (5) make owners, operators, or designees available for consultation with FSIS.

Plants using SIS, NELS, and NTIS systems benefited by being permitted to increase line speeds beyond the FSIS-mandated speed of 70 birds per minute, while FSIS benefited by shifting bird dressing requirements to plant personnel from FSIS staff. By 1995, about 22 percent of all poultry slaughter plants used the SIS, NELS, and NTIS. This percentage included 45 broiler and cornish hen slaughter plants and 27 turkey slaughter plants. There is no detailed information on the size of these plants.

How Total and Partial Quality Control Programs Vary by Plant Size

Table 2.1 shows the number of Total and Partial Quality Control programs for processing and hoofed animals and poultry slaughter. The adoption of Total Quality Control programs may be a better indicator of plant commitment to public health quality control because TQC programs were entirely voluntary while Partial Quality Control programs could be either voluntary or mandated. Moreover, since TQC programs dealt with the entire plant, use of these programs illustrates the willingness of plants to adopt programs that control overall plant operations. Also, since plants used PQC programs to address specific problem areas in the plant, large plants, due to their more complex operations, likely had more such programs per plant. Finally, note that if a PQC was required for a particular process and the plant was a TQC plant, then the

plant incorporated the PQC program into its specifications for its TQC program.

An inherent feature of all voluntary programs is that plants adopt a program only if the benefits exceed the costs of adoption. For plants with TQC and other quality programs, these benefits included a reduction in overtime costs, more rapid introduction of new products, scheduling flexibility, and, in the case of poultry, faster line speeds. If these cost reductions exceeded the costs of the program, then a plant would not adopt the program. The low overall adoption rates for TQC programs (table 2.1) suggest that the costs of program adoption exceeded the benefits for most plants.

Table 2.1 also shows that adoption of TQC programs was much weaker for slaughter operations. This is not surprising because TQC and PQC programs dealt with post-mortem meat and poultry processing practices. As such, slaughter plants benefited from the program only if they had cut-up or further-processing operations.

Second, as plant size increased, there was a striking increase in the percentage of plants, particularly further-processing plants, using TQC programs. For further-processors, participation increased from 2.4 percent of plants in the smallest plant category to 21.4 percent in the largest one. This makes a lot of sense. One of the chief benefits granted to plants with TQC programs was permission to introduce new products prior to formal approval of all the necessary labels, greatly reducing the time from product development to product introduction. This savings of time and money favored large plants because new product introductions were costly for small plants.

Another benefit of TQC was more flexibility in scheduling for FSIS inspections. FSIS inspectors were required to be present for some operations, and if these operations occurred outside of normal operating times, the plant was required to pay the overtime costs of the inspector. In TQC plants, many of these tasks were allowed to occur without an FSIS inspector's presence, but documentation had to be accurately maintained prior to final inspection and release by FSIS. So, added flexibility meant that plants could avoid paying the inspector overtime and, perhaps, more efficiently schedule production. This benefit probably helped larger plants more than smaller ones because large plants typically have more complex operations calling for greater labor specialization. This greater specialization permits less leeway in scheduling, making inspec-

tor flexibility more attractive. Additionally, inspector overtime costs could be greatly reduced by a plant's becoming a TQC plant. Finally, plants with TQC programs could apply labels stating that products were produced under a TQC program, but this benefit was not widely used.

The costs of TQC programs appear to have been higher for smaller plants. Smaller plants are less likely to have quality control personnel devoted only to product quality, so a TQC program would require them to hire such a person. Since the small plant may have lower revenues over which to spread fixed costs, average costs go up.

Adoption of TQC programs is important to current policy for two reasons. First, the program was very similar to Hazard Analysis and Critical Control Point (HACCP) programs and other process control measures related to public health. These similar elements—i.e., the use of sanitation programs, the monitoring of critical control points with FSIS verification, and flexibility in designing food safety process control program—suggest that the cost differences between the two would be small.

There are some differences, however, the terms of enforcement being the most striking. Whereas FSIS can shut down a plant if it does not fulfill the requirements of its HACCP program, it could not shut down a TQC plant for failing to adhere to its TQC plan as long as the product was not adulterated. FSIS could force a TQC plant that was not practicing its quality program to relinquish its TQC status, however. Another difference was that TQC encompassed more than food safety control practices while HACCP deals only with food safety. Furthermore, FSIS clarified the rules related to enforcement for HACCP.

Summary

This chapter shows that efforts to regulate meat and poultry for public health reasons began in the 1890s but only recently began to emphasize these elements. In the 1980s, FSIS introduced the TQC, PQC, SIS, NELLS, and NTIS programs that shifted some of the inspection burden to plants in exchange for more flexibility in regulatory requirements in the case of TQC and PQC programs and increased line speeds for the SIS, NELLS, and NTIS systems. FSIS also granted TQC plants the right to apply a label to its products stating that the plant used an approved quality control program. At the same time, these programs applied the same sanitation and other regulatory requirements to all establishments, regardless of the type of program.

Although there were some apparent benefits from participation in an FSIS-sponsored quality control program, industry showed only a modest interest. By 1992, less than 5 percent of all plants had adopted a TQC program, and the number of PQC programs for public health purposes as a share of total plants was only 36.4 percent. These were both voluntary and mandatory, and there could be more than one per plant. Large meat processors were the most likely plants to adopt a TQC program, with almost 20 percent of all large plants having such a program. Slaughter plants had much lower adoption rates. Still, larger slaughter plants were more likely to adopt TQC than smaller ones. This low adoption rate could explain why FSIS made the adoption of HACCP programs mandatory. Note, the higher adoption rate of larger plants does not mean that small plants had less effective process control programs, only that large plants derived more benefits from such programs.

Table 2.1—Total and Partial Quality Control programs as shares of plants, 1992¹

Size of plant	Total plants	Total Quality Control programs		Partial Quality Control			
				Nonfood safety		Food safety	
	<i>Number</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>
Processing plants:							
Pounds of meat—							
Fewer than 500,000	3,516	83	2.4	438	12.5	471	13.4
500,000 - 999,999	462	16	3.5	150	32.5	186	40.2
1 million - 9.9 million	1,063	76	7.1	764	7.1	687	64.6
10 million - 99 million	475	63	13.3	964	202.0	601	127.0
100 million or more	56	12	21.4	163	291.0	85	152.0
Total	5,572	250	4.5	2,479	44.5	2,030	36.4
Hoofed animal slaughter plants:							
Number of hoofed animals—							
Fewer than 1,000	330	2	0.7	33	10.0	72	21.8
1,000 - 9,999	337	3	0.9	20	5.9	144	42.7
10,000 - 99,999	187	1	0.5	91	48.6	110	58.8
100,000 - 999,999	90	3	3.3	111	123.0	99	110.0
More than 1 million	46	3	6.5	155	337.0	85	185.0
Total	990	12	1.2	410	41.4	510	51.5
Poultry slaughter plants:							
Number of birds—							
Fewer than 10,000	72	0	0.0	14	19.4	33	45.8
10,000 - 999,999	50	0	0.0	12	24.0	10	20.0
1 million - 9.9 million	61	2	3.3	114	187.0	41	67.2
10 million - 49.9 million	130	2	1.5	118	90.8	34	26.2
More than 50 million	53	2	3.8	74	140.0	31	58.5
Total	366	6	1.6	332	90.7	149	40.7

¹ There can be more than one Partial Quality Control (PQC) program per plant, but only one Total Quality Control program. Since large plants have more operations, it is reasonable that they should have more PQC programs. TQC programs are voluntary, and there were significant outlays. They had to apply for prior approval and then get modified FSIS inspection. PQC programs could be voluntary or required and also required prior approval but no special FSIS changes in personnel.