



ERS *Report Summary*

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The Interplay of Regulation and Market Incentives in Providing Food Safety

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The current level of food safety found in U.S. meat and poultry products is a result of both Government regulations and management-determined actions motivated by market incentives. For meat and poultry processing plants, the U.S. Government mandates both food safety process regulations that require specific technologies or production practices and performance regulations that promulgate acceptable levels of food product safety. Meat and poultry processing plants are also influenced by market incentives, including legal liability, the value of their brand, and their desire to sell more of their food product. Companies often negotiate contracts, which, in exchange for higher prices or guaranteed purchases, specify food safety levels to be achieved or technologies to be used.

What Is the Issue?

The Food Safety and Inspection Service (FSIS) recently made changes to its regulatory policies to better align its program with current food safety needs. FSIS faces pressure, however, to do more to protect the public in the area of food safety. The Economic Research Service (ERS) estimates society's costs (which includes medical costs, lost labor, etc.) of just *Escherichia coli* STEC and Guillain-Barré syndrome at about \$1.6 billion per year. The cost of foodborne illness from other sources, such as *Salmonella* species (spp.), is much higher.

Current levels of food safety process control are achieved through a combination of Government regulations (process and performance standards) and private management-determined actions, but little is known about the relative contributions of each to food safety process control. This report helps fill that knowledge void by examining the impact of food safety process regulations and management-determined actions as measured by the share of samples testing positive for *Salmonella* spp. in a testing program conducted by FSIS. The findings provide lessons for the development of new regulatory approaches to food safety process control.

What Did the Study Find?

This study's examination of the effects of mandatory process regulations and management-determined actions on *Salmonella* spp. provides new information on the role of regulations and market incentives in ensuring food safety process control. The study found that management-determined actions accounted for about two-thirds of the reduction in the number of samples testing positive for *Salmonella* spp. (*Salmonella* share)—a measure of food safety process control. By contrast, process regulations accounted for about a third of the reduction of samples testing positive. The importance of process regulation varied across plants, accounting for more than half of all food safety process control for about a quarter of the plants and for the entire food safety process

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control system of some plants. These results suggest that both process regulation and management-determined actions play vital roles in meat and poultry food safety process control.

Mandatory process regulations include cleaning and sanitation tasks and tasks required to implement a Hazard Analysis and Critical Control Point (HACCP) plan for pathogen reduction (PR). Management-determined actions include investments in human and physical capital, food safety technologies, and organizational arrangements, such as contractual relationships that enhance food safety process control. These management-determined actions are driven by market forces and federally mandated performance standards that establish limits on pathogens, but do not specify a way to reach those limits.

The study also found that nearly half of all *Salmonella* spp. reduction due to management-determined actions was motivated by direct contractual relations in which a major customer of a meat or poultry plant or supplier to a meat or poultry plant, fearing a loss of public confidence in the safety of its products, agreed to pay a price premium, make minimum purchases, or offer other inducements to suppliers in exchange for greater attentiveness to food safety process control. Management-determined actions were also motivated by indirect consumer pressure for food safety; consumers link contaminated food products to a supplier through branded products and other sources and can, in turn, cease purchases if products fail to meet their expectations for food safety.

The forces driving management-determined actions lead to the conclusion that USDA's FSIS could increase incentives by providing consumers and buyers with more information about the meat and poultry food safety control of particular plants and firms. USDA's FSIS records plant performance on *Salmonella* spp. tests and noncompliance with process regulations. Making this information public should encourage greater food safety investments by meat and poultry producers.

How Was the Study Conducted?

Food safety control is measured as the number of samples testing positive for *Salmonella* spp. as a percentage of all samples taken by FSIS for each round (sample set) in a *Salmonella* spp. testing program for four major products: broiler (young chicken) carcasses, cattle (cow/bull and steer/heifer) carcasses, market hog carcasses, and ground beef. These pathogen test results are linked with other datasets from FSIS and from the Economic Research Service (ERS). FSIS data provide measures of plant-level performance for mandated sanitation and HACCP tasks, and another dataset offers plant characteristics, such as the value of sales, number of employees, etc. The ERS data include information on plant-level food safety processing technologies, such as steam vacuum units, contractual arrangements with buyers and sellers, and some plant characteristics. Since the ERS dataset covers only information from the year 2000, the analysis was limited to that timeframe.

The analysis used a Tobit regression to evaluate the impact of process regulations and management-determined actions on shares of samples testing positive for *Salmonella* spp. After finding the marginal effects, an estimate was made of the change in *Salmonella* shares due to 20-percent changes in the variables representing process regulations and management-determined actions. The share of changes attributed to process regulations and management-determined actions were then computed.