



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Food-Safety Policy: Balancing Risk and Costs

Lorna Aldrich
(202) 219-0877

The United States is often said to have the safest food supply in the world, yet some consumers and policymakers counter that it is still not safe enough. The U.S. Department of Agriculture (USDA) and the Food and Drug Administration (FDA) of the U.S. Department of Health and Human Services are continually examining ways to reduce the risk of foodborne illnesses.

But regulatory actions come at a cost to the Government, industry, and consumers. These costs can in turn raise prices for consumers. On the other hand, greater safety may not cost significantly more if it can be achieved through stricter control of existing practices.

With budgets stretching ever tighter, tradeoffs are involved. Those concerned with food safety are asking: How much risk does each individual actually face from foodborne illnesses? And, how much should society pay to reduce that risk?

Although it is difficult to determine the total amount spent on food safety by the Federal Government, local and State authorities, the food processing and distribut-

ing industry, and consumers, the total is high.

Many Federal agencies are involved in ensuring the safety of the U.S. food supply. Expenditures on food safety by FDA alone totaled \$206.3 million in fiscal 1992, up from \$93.8 million in fiscal 1980. USDA's Food Safety and Inspection Service (FSIS) spent about \$473.5 million in fiscal 1992, down from \$530.7 million in fiscal 1980. Furthermore, Government expenditures are a small part of the total,

because most of the cost of regulation is paid by private parties—processors, retailers, and food-service operators—complying with health regulations.

Foodborne Illnesses Vary in Frequency and Severity

Since a risk-free existence is not possible, society must decide how much it is willing to spend on public safety and where these dollars



The cost of additional Government regulation to reduce foodborne disease will be shared by all consumers. Because foodborne illnesses vary in frequency and severity, the costs for each alternative need to be carefully identified and compared with the reduction in risks.

The author is Acting Associate Director of the Commodity Economics Division, Economic Research Service, USDA.

will have the greatest impact. The likelihood and severity of the risk, as well as its distribution in the population, are all factors to consider.

The probability of a person becoming infected at some time with either *Salmonella* or *Campylobacter*—two of the most common foodborne bacteria—is estimated at 1 in 65 people per year.

At the lower end of the probability scale, the risk of death from *E. coli* O157:H7 (the bacterium responsible for deaths from fast food in Washington State in January 1993) is between 1 in 700,000 and 1 in 1,700,000 people per year. The range is large because many cases may not be identified or reported to health authorities.

The consequences of foodborne illnesses can range from a bout of

mild diarrhea to an extensive hospital stay or even death. *Salmonella* and *Campylobacter* each cause about 2 million cases annually, but salmonellosis is more likely to be fatal. The risk of dying is estimated to be 5 to 8 times higher for salmonellosis than for campylobacteriosis. That is, about 1 in 1,000 to 1 in 2,000 cases of salmonellosis results in death, compared with 1 out of 21,000 to 4 out of 21,000 cases of campylobacteriosis.

The consequences depend on the virulence of the microorganism, how much of the microorganism the person consumed, and whether the person's immune system can fight against the microorganism. Certain segments of our society—infants and children, the elderly, and immunosuppressed individuals—are at higher risk.

Benefits, While Large, Are Difficult To Pinpoint

There are two approaches to estimating the benefits of reducing foodborne illness—benefits that can be compared to costs in allocating budget dollars to food safety.

The first method is to consider the benefits as costs avoided—lost wages and medical costs. This is a very conservative approach. It does not take into account the value people place on being well and on avoiding premature death. Considering only the cost of medical care and lost wages implies that longer life and health are valued only because they contribute to earnings and avoid doctor bills. Clearly, longer life and better health are ends in themselves. USDA generally has used the medi-

Table 1
Alternative Valuations of Reducing Deaths From Foodborne Illnesses

Foodborne pathogens	Estimated cases	Estimated deaths	Two approaches to measuring benefits		
			Medical costs and lost wages ¹		Implied value of avoiding deaths ² (deaths only)
			Medical costs for all cases and lost wages for survivors	Lost wages due to deaths	
	Number	Number	Million dollars		Million dollars
Bacteria:					
<i>Salmonella</i>	1,920,000	960-1,920	839-889	349-699	3,840-13,440
<i>Campylobacter jejuni</i> or <i>coli</i>	2,100,000	120-360	863-885	44-131	480-2,520
<i>Escherichia coli</i> O157:H7	7,668-20,448	146-389	34-91 ³	182-489 ³	584-2,723
<i>Listeria monocytogenes</i>	1,526-1,581	378-433	106	103-127	1,513-3,034
Parasites:					
<i>Toxoplasma gondii</i>	2,090	42	2,610	18	167-293
<i>Trichinella spiralis</i>	131	0	.8	NA	NA
<i>Taenia saginata</i>	894	0	.2	NA	NA
<i>Taenia solium</i>	210	0	.1	NA	NA
Total			4,453-4,582	696-1,464	6,584-22,010

Notes: 1992 cost data. Excludes toxoplasmic encephalitis infections in 2,250 to 10,200 AIDS patients, 50 percent of which may have a foodborne origin. Costs exclude cystercercosis, which may have indirect foodborne transmission. NA = Not applicable. Sources: This table further divides the data presented in "New Approaches To Regulating Food Safety" by Tanya Roberts and Laurian Unnevehr, elsewhere in this issue. For further details, see also: ¹M. Weiss, T. Roberts, and H. Linstrom, "Food Safety Issues: Modernizing Meat Inspection," *Agricultural Outlook*, USDA, ERS, June 1993, pp. 32-36; ²Centers for Disease Control and Prevention and W.K. Viscusi, "The Value of Risks to Life and Health," *Journal of Economic Literature*, Vol. 31, No. 4, 1993, pp. 1,912-1,946; and ³S. Marks and T. Roberts, "E. coli O157:H7 Ranks as the Fourth Most Costly Foodborne Disease," *FoodReview*, Vol. 16, Issue 3, USDA, ERS, Sept.-Dec. 1993, pp. 51-59.

cal costs and lost wages approach in order to avoid overstatement.

Another way to measure benefits is to find records of how much people have paid to avoid death and disease. Consumers, often without realizing it, place such a value on life and health when they pay more for safer products or earn higher wages by taking jobs that incur risks. Economists have calculated this "implied value" of saving a life through these choices at \$4 million to \$7 million. This approach yields higher benefits from reducing foodborne diseases than does the approach based on medical costs and lost wages. FDA and some other Federal agencies have used the implied value approach for analyses of proposed rules. (Economists have not been able to reach consensus estimates for reductions in nonfatal illnesses and disabilities because of the wide range of severity.)

These two methods yield different levels of benefits to society. While eliminating *Salmonella* would generate \$1.2 billion to \$1.6 billion in avoiding medical costs and lost wages (from about 1,920,000 illnesses and 960-1,920 deaths), eliminating only the deaths would be valued at \$3.8 billion to \$13.4 billion by the implied value approach. While the total costs saved (by eliminating eight microorganisms for which USDA has made estimates) is \$5.1 billion to \$6.0 billion annually by the medical costs and lost wages approach (see table 1), the value of the lives saved alone would be \$6.6 billion to \$22.0 billion each year under the implied value approach.

Consumers Confused About Risks

Contracting a foodborne disease is one of a number of risks that society faces everyday (see box), but certainly not the greatest hazard. Research by social scientists indicates that sometimes the general

Foodborne Illness One of a Number of Threats

Consumers continually face a number of risks that can lead to premature death, of which foodborne illness is but one (table 2). The risk of death from foodborne illness is 1 in 29,000—a greater probability than dying in a fire, but less of a risk than having a fatal motor vehicle accident.

The risks reported below reflect the risks of fatal incidents after the intervention of health and safety systems and regulations. For example, public-safety systems and regulations—such

as mandatory sprinkler systems in hotels and other building codes or the use of fire-resistant material for infant sleepwear—as well as private safety measures, such as installing a smoke detector, have reduced the annual risk of death in fires to 1 in 50,000.

Similarly, food-safety practices or regulations, such as meat and poultry inspection and adequate cooking of foods, are responsible for lowering the risk of fatal encounters with foodborne pathogens.

Table 2

Annual Fatality Risk From Selected Events

Source of risk	Risk of fatality Probability in population
Cigarette smoking (per smoker)	1/150
Cancer	1/300
Motor vehicle accident	1/5,000
Work accident (per worker)	1/10,000
Home accident	1/11,000
Foodborne illness (all food)	1/29,000
Poisoning	1/37,000
Fire	1/50,000

Sources: W.K. Viscusi, "The Value of Risks to Life and Health," *Journal of Economic Literature*, Vol. 31, No. 4, 1993, pp. 1,912-46. J.V. Bennett and others, "Infectious and Parasitic Diseases," *Closing the Gap: The Burden of Unnecessary Illness*, NY: Oxford University Press, 1987. USDA's Economic Research Service.

public underestimates relatively high probabilities of risk (such as dying in a automobile accident) and overestimates low probabilities of risk (such as dying in a fire). Possibly this is because familiarity (such as with automobiles) creates a sense of the "safe and ordinary," while the uncommon (such as the risk of contracting a

relatively rare foodborne disease) can become distorted due to publicity.

The possibility that risks could be systematically misunderstood has several implications for food-safety regulators. For example, consumers may underestimate the relatively high probability of a generally nonfatal illness (such as sal-

monellosis), thereby handling food improperly or failing to encourage elected officials to support Government safety efforts in these areas. Consumers may overestimate the low probability of other health risks (such as botulism or trichinosis) and demand more regulations than the risk warrants to guard against these hazards, which may be more serious but less likely to occur than others. Such misperceptions about food-safety risks pull limited resources away from other more serious food-safety risks.

Information Is the Key

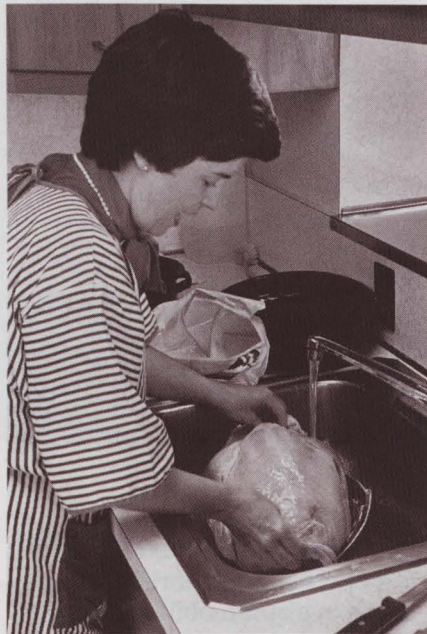
If consumers had complete information about the characteristics of a product—including the risks associated with consuming it—producers would need to reduce the risks to acceptable levels or risk losing sales. (Of course, consumers' "acceptable" levels may still be quite risky.) However, consumers rarely have complete information, especially about food products. For example, consumers do not know the safety procedures used by meat and poultry processors, so they cannot choose meat and poultry products on this basis.

Even when consumers' information about the production of a product is incomplete, regulation may not be necessary. Reportage, consumer experience, warranties, and legal proceedings sometimes have the effect of remedying consumers' information gaps. But these mechanisms rarely apply to foodborne illnesses, because it is often difficult to connect an illness with the source of a raw product, even if the actual cooked or processed food which caused the illness is identified. For example, beef from several slaughterhouses may be combined into a shipment of ham-

burger delivered to a fast-food chain, making it difficult to determine where the problem originated.

Also, the illness often occurs in a different time and place from the consumption of the product. Symptoms may arise after several hours or days, during which time various other foods may have been consumed. A large proportion of foodborne illnesses are not reported to public health officials or food retailers. These problems remove the market discipline experienced by producers of more easily identified and traced products.

In some segments of meat and poultry markets, brand names and producers' regard for reputation do offer consumers partial protection from illnesses caused by pathogens in the products. To protect the value of reputation, many producers make extensive efforts to avoid the possibility of contamination



Education for food workers and consumers (particularly high-risk individuals) about safe food preparation is one approach to curtailing foodborne illnesses.

that could produce an outbreak of disease.

How Much and What Kind of Regulation?

Because many of the traditional mechanisms to deter unsafe products—such as consumer experience with the product, warranties, legal liability—are not easily applied to food products, there remains a need for education and Government regulation.

But how much regulation? Possibly more, or different, regulations than currently exist, given apparent public concern with food safety (see "Food Safety: Meal Planners Express Their Concerns," elsewhere in this issue).

Alternative policies include more specific regulations, such as requiring carcasses to be sprayed with pathogen-reducing substances in slaughterhouses. FDA has proposed a new program for seafood safety, which focuses on regulating the producer's safety control process in addition to detecting contaminants (for more details, see also "New Inspection Program for the Nation's Seafood" in this issue). USDA is considering similar action for meat and poultry plants.

Education for food workers and consumers about safe food preparation is another approach to curtailing foodborne illnesses. FDA has recently issued the 1993 *Food Code*, which provides Federal recommendations on proper food-safety procedures by retail establishment employees.

The costs, public and private, for each alternative need to be carefully identified and compared with the reduction in risks. Different policies, or combinations, will be

appropriate in different circumstances.

Educational programs, for example, may be a good approach for particularly high-risk individuals, such as infants, the elderly, and the immunocompromised. The high-risk population, or their caretakers, may be able to take precautions, which could be unnecessarily costly if imposed on the whole population. Alternatively, food products that have been produced under stricter standards could be certified for these groups.

Other approaches are also possible (see "New Approaches To

Regulating Food Safety," elsewhere in this issue). None will come without costs, which will be shared by all consumers—through either purchase costs or taxes. The challenge is to use the expenditures wisely.

References

Weiss, M., T. Roberts, and H. Linstrom. "Food Safety Issues: Modernizing Meat Inspection," *Agricultural Outlook*, AO-197, USDA, Economic Research Service, June 1993, pp. 32-36.

Roberts, T., and S. Marks. *Food Safety: Microbial Risks and Costs*,

AIB-664-53. USDA, Economic Research Service. Sept. 1993.

Scitovsky, T. "The Benefits of Asymmetric Markets," *Journal of Economic Perspectives*, Vol. 4, No. 1, 1990, pp. 135-48.

Viscusi, W.K. "The Value of Risks to Life and Health," *Journal of Economic Literature*, Vol. 31, No. 4, 1993, pp. 1,912-46.

Viscusi, W.K. "Toward a Diminished Role for Tort Liability: Social Insurance, Government Regulation, and Contemporary Risks to Health and Safety," *Yale Journal of Regulation*, Vol. 6, No. 1, 1989, pp. 65-107. ■

USDA's Newest Series

Issues for the 1990's

This new agricultural series offers 70 timely factsheets organized into these categories:

- Trade
- Conservation
- Commodity Programs
- Marketing
- Food and Nutrition
- Rural Economy
- Environment
- Technology

These reports streamline research topics, graphically present the latest USDA data and analyses, and target the most important agricultural issues you'll face in this decade.

All this for only \$24.50. For foreign addresses (includes Canada), the price is just \$31.

To order, just dial ERS-NASS at 1-800-999-6779 (toll free in the U.S. and Canada), and ask for *Issues for the 1990's* (stock #AIB-664). Other areas, please call 1-703-834-0125.

