Strategy and Policy in the Food System: Emerging Issues

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19. A Policy Perspective on Improving Benefit/Cost Analysis: The Case of HACCP and Microbial Food Safety

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Introduction

Policy concerns are raised and regulatory development ensues when a hazard is identified that poses a threat to health, safety, or the environment. Since complete information about hazards, their probability of occurrence or the magnitude of their effects in the population or on the environment is often unavailable or unknown, policy makers and regulatory analysts are left to construct policies and intervention strategies without full knowledge. The intervention strategies (mitigation measures) are often expensive costing industry and ultimately consumers a great deal of money without concomitant increases in productivity. On the other hand, failure to take action may result in harm or death to citizens or destruction of species or unique environments. The goal is always to protect appropriately with the least cost: creating regulations that are both effective and efficient. Risk analysis—comprised of risk assessment, risk management, and risk communication—is a tool which was invented for just this purpose.

Risk assessment is the structuring of all available, relevant scientific information in a way which allows for the development of strategies for mitigating the hazards. Risk management is the choice of available mitigation measures based on cost-benefit and other analyses. Ideally, risk communication will be open and multi-dimensional during this process, including all affected parties, including the policy (decision) makers. The best regulatory development for human health, safety, or the environment begins with good analyses: risk assessment and risk management.

Risk assessment is the process of carefully answering three questions. (1) What can go wrong? This is the hazard identification, and there are a variety of methods and approaches to identifying hazards. (2) What is the likelihood that this event will go wrong? This is known as the probability element. (3) What is the magnitude of the consequences if the hazard occurs? Given in biological terms, it might answer the question of how many people become ill or die from a given hazard. Questions 2 and 3, the probability and the magnitude, constitute the concept of risk.

Risk assessment is traditionally conceived as an adjunct to policy analysis and decision making. However, it can be usefully employed to support evaluation of research priorities. A brief discussion is given later in this chapter.

Risk management asks three parallel questions. (1) What can be done about the hazard? This question addresses the potential mitigation measures which are available. The risk reduction realized by each mitigation measure should be estimated. (2) What are the costs and benefits presented by the mitigation measures? In this process, the costs and benefits for each of the mitigation measures must be considered. That is, what are the costs for a given amount of risk reduction achieved? (3) What are the impacts of current decisions on future options? This analysis should evaluate a variety of concerns. For example, will a given mitigation measure for the hazard of initial concern be replaced by a hazard of equal or greater concern by the mitigation. Does the mitigation measure provide a remedy which limits flexibility for future choices; does carrying out the mitigation result in an irreversible situation? The importance of this is emphasized by the apocryphal story from a South American city which stopped chlorinating its water supply in response to a report that chlorinated hydrocarbons (arising from chlorinated water supplies) cause cancer. The decision makers in this city decided to stop adding chlorine to their water supplies immediately without considering the risks associated with this decision. Thousands died acutely with cholera and other water-borne diseases.

Setting Microbial Food Safety Priorities for Research

Microbial food safety priorities can be set from risk-based evaluation. The actual hazards for food safety risk assessment have been identified, though an in-depth characterization of these may be lacking. Certainly the likelihood of occurrence and the severity of the impact of each hazard is less well understood. One can only argue for more research, more and better active surveillance, more vigilant physicians and better data collection.

In trying to develop a rational strategy for food safety research to guide regulatory action, how might we set priorities for research? One way is by tackling the most serious problems first, whether in research or in regulatory policy making. In risk jargon, this is called the "worst first" strategy. If the focus, for sake of an example, is on making beef a safer product, what type of beef is most often involved in outbreaks of disease? The sparse data available suggest that ground or comminuted products are implicated more often as the vehicle for disease. Further investigation shows that fresh ground hamburger is the culprit. Is that based on hamburger's popularity or on some proportional relationship between the vehicle and the frequency of consumption? If hamburger consumption risk is high, the next step is to consider where most hamburger comes from. Does it come equally from all slaughter classes of animals? Most dairy beef goes into hamburger, and present evidence suggests that about 40 percent of hamburger comes from dairy beef. Dairy beef comes disproportionally from smaller slaughter houses (CEAH 1994). This brief analysis suggests that further research to reject or confirm these statements should be made. If they prove to be correct, then under the worst first strategy, risk management would focus on small slaughter establishments and/or production of dairy beef as part of the risk management for this hazard.

In this example of the worst first strategy, both research and regulatory action strategies can be designed. However, note that the choice of the analyst in this example, to focus on beef only, is itself a management judgment. Ideally, one would consider the entire range of foodborne hazards from all livestock categories, ask the questions for risk assessment, and assure that enough confirmatory research is completed to guide policy makers to appropriate regulatory actions. Performing this analysis on the entire data set from foodborne outbreaks would result in numeration of the most frequent problems with the greatest severity. A relative ranking of the risks could then direct research efforts as well as policy making.

Appropriate Roles of Academia, Consumers, Government, and Industry

Food safety research is a large complex enterprise in which many groups have valuable information to share. Collaboration is clearly in the best interests of all parties. However, there is no "market" for collaboration, no driving force which insists on collaboration. There needs to be another way to promote this activity.

The collaborative mode would allow better identification of hazards and more complete understanding of risks; a sharing of successful strategies as well as data. In order to assure that such collaborative interaction occurs, the formation of an Institute for Food Safety encompassing academia, consumers, government, and industry is proposed. The focus would be to develop the Institute as a center for database maintenance and information exchange, with two-way communication between the Institute to all collaborating parties. This Institute should encompass information collection and exchange on all livestock food production activities, processing, and consumer behavior. Ultimately it should be international in scope.

Improving Future Research and Data Collection

Future research and data collection are of three general types. First, arrangements should be in place to collect as much pertinent data as possible from "natural experiments," wherever they occur. That is, when outbreaks of foodborne illness occur, as in Japan in mid-1996, every opportunity should be taken to understand as much as possible. Second, the use of decision analysis, risk assessment with uncertainty analysis, and cost-benefit analysis should be used to guide future research and data collection from producers and others. Third, with the insight gained from risk assessment and decision analysis, plans for scientific research should be coordinated among collaborators to assure that timely concerns are being researched.

Successful Strategies for Reducing Microbial Contamination of Foods

There has been great emphasis on high technology in developing tests for microbes, instruments for treatment of carcasses, or for sterilizing food packages. Though these are all laudable enterprises, it is important to remember that not all wisdom lies with high tech. My favorite story is the one about the abattoir which uses a bell activated by the inspector. Following the evisceration step, if the inspector finds visible fecal contamination, s/he immediately rings a bell and announces which line the contaminated carcass came from. This simple act of providing immediate feedback is said to have cut visible fecal contamination rates significantly where it has been instituted. If it works, use it!

Note

[1]A. S. Ahl is Director of the Office of Risk Assessment and Cost-Benefit Analysis (ORACBA). I would like to thank Dr. Michael McElvaine for reading the manuscript and with his comments, providing insight and information to improve it.

Reference

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