



## **Backgrounder on The Food Safety Research Consortium**

### *What is the FSRC?*

The Food Safety Research Consortium (FSRC) is multi-disciplinary collaboration among researchers from eight diverse institutions to improve public health by making food safety decision making and priority setting more science- and risk-based. The FSRC is led by a Steering Committee that oversees an Executive Director and represents member institutions:

- Mr. Michael Taylor, (Chair), School of Public Health and Health Services at [The George Washington University](#);
- Dr. Rob Atwill, The Western Institute for Food Safety and Security (WIFFS) at [University of California, Davis](#).
- Dr. Julie Caswell, The Food Marketing Policy Center at the [University of Massachusetts](#);
- Dr. Michael Doyle, The Center for Food Safety (CFS) at the [University of Georgia](#);
- Dr. Sandra Hoffmann, [Resources for the Future](#) (RFF);
- Dr. Helen Jensen, The Institute for Food Safety and Security at [Iowa State University](#);
- Dr. J. Glenn Morris, Jr., The Emerging Pathogens Institute (EPI) at the [University of Florida](#);
- Dr. Ewen Todd, Food Safety Policy Center at [Michigan State University](#);

### *What problem is the FSRC addressing?*

For over 20 years, scientists and public health regulators have worked to apply the science of risk assessment to food safety decision making. As a result, the U.S. food safety regulatory system has a deserved reputation for making careful, science-based decisions about hazards, and has high credibility with consumers as being among the best in the world.

Food safety remains, however, a difficult and dynamic problem. New food safety challenges flow from changed eating patterns, the aging of the population, increased reliance on food imports, new food production and processing technologies, and the emergence of new pathogens. The Centers for Disease Control and Prevention estimate that there are 76 million foodborne illnesses each year, including 325,000 hospitalizations, and 5,000 deaths. These challenges have led to calls for a food safety system that is more science- and risk-based in the sense that it allocates its resources more in accordance with the distribution of risks and the opportunities to reduce risk across the food supply.

The FSRC focuses on improving the allocation and effectiveness of the government's food safety resources and efforts, but it recognizes that government is only part of the food safety equation. All those involved in the production, processing, distribution, sale, and preparation of food have a role and responsibility for food safety, as do consumers. Indeed, private parties in the food system have the most direct role

and interest in ensuring food is safe, with government affecting food safety primarily through its interactions with them. Government's role is critical, however, to set and enforce food safety standards, conduct productive research and education, and collaborate effectively with the private sector. The continued success of the government program is necessary to reduce the risk of illness and to maintain public confidence in the food supply.

### *What does the FSRC do?*

The vision of a science- and risk-based approach to food safety calls for ranking the public health impact of significant foodborne risks and then prioritizing opportunities to reduce those risks. This task requires the right analytical and decision tools – organized ways of collecting and using relevant information to devise effective research, regulatory, and educational interventions and make resource allocation decisions. FSRC will work to develop these tools and to address fundamental issues that underlie the analytical approaches that need to be developed to make more risk-informed decisions.

The FSRC has undertaken a number of research and tool development projects towards this mission.

The first major FSRC effort is the **Foodborne Illness Risk Ranking Model (FIRRM)**, which ranks and compares the public health impact of microbial foodborne hazards. The model ranks pathogens, foods, and pathogen-food pathways and takes into account:

- The incidence, severities, and health outcomes of illnesses resulting from specific pathogens;
- The attribution of these illnesses to categories of foods
- The economic impact of health outcomes in medical costs and lost productivity;

- Social values and other factors beyond the economic impact of illness, such as pain and suffering and impacts on children
- The impact of health impacts in terms of Health Related Quality of Life (HRQL), namely in Quality Adjusted Life Years (QALYs)
- Uncertainties in available data

Development of the risk ranking model involves multiple disciplines and public health perspectives, and is being undertaken collaboratively by a diverse group of experts.

Researchers in the FSRC conducted an **expert elicitation** to estimate the percentages of illnesses due to eleven major pathogens that could be attributed to specific food categories. This large-scale survey resulted in quantitative estimates, with self-assessed uncertainties and inter-expert differences, that can be compared to empirical estimates based on incidence data.

The FSRC convened a **Food Attribution Workshop** that explored the various principles, approaches, and challenges in attributing foodborne illnesses to foods. This workshop explored the use of outbreak data, case-control studies, community studies, microbial fingerprinting, expert elicitation, and other approaches for attribution.

The second major FSRC effort has been the ongoing development of a **Conceptual Framework for Prioritizing Opportunities to Reduce Foodborne Illness Risk**. The framework identifies the key principles, characterizes the analytical components, and describes the decision process that incorporates these analyses. The framework:

- Addresses two different types of food safety priority setting: the broad system-wide perspective that characterizes resource allocation, and the targeted risk management regarding interventions for specific hazards

- Takes into account the feasibility, effectiveness, and cost of possible interventions.
- Requires understanding the relative contributions of specific foods and pathogen-food combinations to the risk of illness, as revealed by the risk ranking model;
- Needs the knowledge of how and where in the food system significant public health risks arise and can be controlled, including their amenability to reduction through government intervention;
- Builds an understanding of how the current food safety system, including both public- and private-sector efforts, contributes to reducing potential risks;
- Evaluates the feasibility and effectiveness of possible interventions, including research, regulation, and education; and
- Compares the costs of various interventions to the degree of risk reduction likely to be achieved and the benefits of reduced health impacts (cost-effectiveness and cost-benefit analysis).

By integrating these factors, it is possible to identify opportunities for government intervention, including collaborations with the private sector, that are likely to achieve the greatest reductions in foodborne illness risk.

Building on the lessons and principles of the conceptual framework, FSRC experts have proposed development of or have developed conceptual models for specific hazards in particular food products. These models have addressed:

- *E. coli* O157:H7 in lettuce and leafy greens, including modeling pathways for contamination from off-farm sources including water, air, and direct animal contact, and a risk assessment model to be developed as part of a large CSREES NIFSI grant to the University of Georgia;
- *Salmonella* and *Campylobacter* in broiler chickens, using in-plant microbial data on

prevalence and enumeration to build a processing model to identify intervention points and evaluate intervention efficacy

- *Salmonella* in pork, using an economic and behavior model to incorporate incentives within the product chain

The FSRC convened, in collaboration with MED-VET-NET, a European Network of Excellence, an International Conference on **Priority Setting for Foodborne and Zoonotic Pathogens**. Held in Berlin, Germany, this meeting brought together scientists, experts, government representatives, and food safety decision makers to compare approaches for prioritization. The conference explored methods and data needed to: estimate disease incidence; measure and characterize health outcomes; attribute illnesses to foods; estimate economic impact; develop integrated measures of disease burden, and identify emerging pathogens.

Researchers in the FSRC are currently exploring the challenges and opportunities to improve the **Food Safety Information Infrastructure (FSII)** in the U.S.. This project has convened four workshops to explore how food safety data are shared or made accessible between parties in the system including FDA, USDA, CDC, and other federal agencies, state and local public health and agricultural agencies, private firms and trade associations, academic research institutions, and consumers. This project will describe the current landscape of data collection and sharing, describe the obstacles that impede data openness, such as institutional policies, individual incentives, the lack of adequate mechanisms, and many others, and present recommendations for system improvement.

Two new projects by FSRC researchers will explore food safety resources and policies at the local, state, and federal level. These include the development of a **Descriptive Framework for Analyzing Food Safety Resources** and a workshop-based project to

## **Enhance State and Local Roles in a National Integrated Food Safety System.**

### ***How does the FSRC conduct its work?***

The work of the FSRC is inherently interdisciplinary and requires the efforts of experts in both the natural and social sciences and from many institutions. The FSRC seeks the widest possible collaboration on specific projects with individual researchers and research institutions and welcomes additional institutions as project participants and as members of the consortium. Because the FSRC intends its work to be of practical value to government policymakers and risk managers, it seeks and values dialogue and collaboration with government officials and experts.

A key component of every FSRC research or tool development project is a process (consisting of meetings, workshops, consensus conferences, or other vehicles) to directly engage and solicit input on the project from interested experts and stakeholders, and to disseminate the results of the project. The FSRC will also convene, upon request, forums to disseminate and solicit comment on the work of others.

The FSRC provides a flexible vehicle for identifying research needs and opportunities, and for planning projects. Specific projects may be carried out by the consortium as a whole, by two or more of the participating institutions, or by FSRC participants working on an *ad hoc* basis with other individuals and institutions. In addition, FSRC participants will continue to pursue their own food safety projects and activities independent of the consortium.

The results of FSRC projects are published in the scholarly literature and in reports and other forms accessible to non-technical audiences.

### ***How is the FSRC funded?***

Other than initial funding to form the FSRC, provided by the The Milbank Memorial Fund, all other funds have been provided through project-specific grants. The FSRC's initial risk ranking project was funded by The Robert Wood Johnson Foundation (RWJF), with follow up funding from USDA's National Integrated Food Safety Initiative (NIFSI), administered by the Cooperative State Research, Education, and Extension Service (CSREES). The CSREES' NRI grant program funded the development of the framework for prioritizing opportunities to reduce risk. RWJF has funded additional work on the food safety information infrastructure, on analyzing food safety resources, and on state and local roles in a national integrated food safety system.

The USDA's Economic Research Service and Office of Risk Assessment and Cost-Benefit Analysis, FDA's Center for Food Safety and Applied Nutrition, and the Joint Institute for Food Safety and Applied Nutrition have also supported FSRC programs.

### ***FSRC Contact***

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