

FSRC Food Safety Information Infrastructure Project: Phase 1
Workshop on Public Sector Food Safety
Data Collection, Access and Sharing
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The Purposes of Food Safety Data Collection

Introduction

Food safety information is collected by a variety of stakeholders to meet the specific purposes of their institutional missions. Federal, state and local agencies are charged primarily with protecting public health, and thus their food safety data collection activities center around information that is used to determine human health risk, assess compliance with food safety measures in food production and retail, manage programs, and target food safety research. Food producers, retailers and industry associations collect data for their food safety management systems and to support compliance with state and/or federal regulations. Academic and scientific communities predominantly collect food safety information as a part of research, with the hope of future public health benefit through activities that support both the public and private sectors. Consumers and consumer advocates are most often the recipients of food safety information, but in some cases also generate original data or serve as a conduit to share information with the public.

To facilitate discussion of opportunities to improve data collection, access, and sharing, the FSII project staff developed a detailed typology of food safety data types, which divided the food safety data universe into eight broad categories: (1) human health information, (2) measures of contamination, (3) indicators of contamination, (4) hazard identification information, (5) information for hazard modeling, (6) information related to trade and industry, (7) consumer and consumption information, and (8) food and environment information. The purposes for data collection in these categories are summarized briefly below.

Human Health Information

Epidemiological surveillance is the key mechanism by which human health information associated with foodborne illness is collected. Collection of these data occurs at the local, state and federal level through passive or active surveillance, and through outbreak investigations. Follow-up case-control studies by federal agencies or academia provide a further method of increasing the richness of human health data collected after an outbreak. The purpose of collecting human health data is to provide information regarding the prevalence, incidence and trends of foodborne illness, attribution of illness, and the human factors and economic costs associated with such illness. These data can also be used to follow disease trends over time, which may help to ascertain the public health efficacy of food safety interventions. Human health data are valuable for program management by allowing resources and research to be targeted at specific illnesses, sources, and/or host factors. Human health information also provides critical 'real life' information for the development of specific hazard-commodity risk assessments.

Measures of Contamination

Large amounts of pathogen and chemical contamination data are collected by local, state, and federal agencies to support inspection and compliance activities, as well as by industry in response to

regulatory requirements. Companies also collect microbial contamination data for their own food safety management purposes, or to meet requirements of third-party audits. Comprehensive studies may also be performed by federal agencies or by academia to determine baseline prevalence of pathogens or chemicals in particular foods. These data provide the necessary background upon which changes in prevalence of pathogens or chemicals can be determined and serve as a useful benchmark for assessing intervention effectiveness.

Indicators of Contamination

Indirect indicators of contamination include reporting on observations made and measures taken by public sector agencies in the course of their oversight activities. These indirect indicators provide an additional source of food safety information beyond microbial and chemical testing data. For example, animal health and disposition data, which is collected as part of federal inspection activities, and observations made during sanitation inspections conducted at retail and in processing establishments, can help identify conditions and practices that may relate to potentially harmful contamination. Similarly, information from voluntary food recalls that are based on harmful contamination can provide an indication of patterns or trends that can improve understanding of food safety problems and solutions.

Hazard Identification Information

The public and private sectors, along with academia, are heavily involved in the detection, identification, and characterization of food safety hazards. This includes the development and use of hazard detection methods and understanding of pathogen biology and chemical toxicity. The purpose of developing new detection methodologies is to increase the sensitivity and specificity of tests (i.e., improve accuracy), increase throughput, and decrease the time and expense associated with running tests. Public sector efforts also focus on standardization of methodologies to allow comparison of results across many testing platforms. Determining pathogen subtypes is instrumental in outbreak investigations, both in tracking clinical isolates and determining the source of contamination. Subtyping is also important for determining the incidence and prevalence of particular groups of organisms, and tracking them in the environment and within human populations. The study of pathogen biology is principally carried out by the public sector and academia as research with the purpose of providing information on pathogenesis and ecology. Pathogen biology and ecology is critical background information to understanding, and ultimately reducing, food safety risks. This information is used in risk assessments and in the development of new intervention strategies for both preventing and treating foodborne illness. Chemical toxicity testing and toxicology research are important activities of government, industry and academia and provide information critical to safety assessments of chemicals in food.

Information for Hazard Modeling

Hazard modeling includes estimating exposure to hazards and estimating illnesses from exposure. Much of the information needed for hazard modeling is collected for other purposes by members of the food safety stakeholder community. This includes human health information (epidemiology), measures and indicators of contamination, pathogen biology, chemical toxicity, food consumption, food composition, and environmental characteristics. These data are then used to determine dose-response characteristics, assess exposure and finally the development of risk assessment models. Risk assessments are primarily developed by federal agencies, non-governmental organizations, or

academia for the purpose of presenting the current state of knowledge about a hazard and estimates of the risks associated with specific hazard-commodity combinations.

Information Related to Trade and Industry

Data on private sector food safety activities range from general information characterizing food production and processing practices to information on specific food safety practices, including the effectiveness and cost of food safety interventions and the economic impact of food safety problems and solutions. The government and the private sector collect such information for a variety of purposes, including the support of regulatory oversight, private food safety system management, and the understanding of food safety in the marketplace. Local, state, and federal government may also collect basic information about facilities and sites as part of registration activities intended to support public health programs. The private sector collection of information to support HACCP programs or other food safety management systems occurs along the complete farm-to-fork continuum, though the extent of data collection depends significantly on the industry sector, the size of the company, the commodity, and food safety risk. Information on food safety intervention cost, feasibility, and effectiveness may be generated or collected through research by the private sector, government agencies, or the academic and scientific research communities. Trade associations play a key role in supporting industry food safety activities by funding research, and by collecting and disseminating information relevant to the industry.

Consumer and Consumption Information

The public and private sectors, and academia collect consumer-related information to better understand food safety population risks, to document consumer food handling and preparation practices, and to understand consumer acceptance of food safety interventions, among other reasons. Information on population, demographics, and consumption patterns may help identify at-risk populations. Knowledge about consumer practices may help in risk assessments for specific product pathways, and may help in the development of educational initiatives and risk communication activities aimed at improving consumer food safety practices.

Food and Environment Information

Information on food characteristics and composition – such as nutrients – and on environmental characteristics – such as weather – are collected primarily for purposes outside of food safety, but may be used secondarily to inform an understanding of food safety risks. For example, nutrient or food composition may affect bacterial growth or host susceptibility, and information on flooding may indicate pathways for upstream runoff to contaminate produce.