



# FSRC Food Safety Information Infrastructure Project: Phase 1

## Typology of Food Safety Data

DRAFT – COMMENTS WELCOME

This working data typology is intended to capture the broad range of data relevant for food safety, including supplementary data that is not specifically collected for food safety purposes but which is or may be considered in food safety decision making. There are 36 total categories and 8 major groupings. There are likely other data types not yet captured in this table, the boundaries are in some cases fuzzy, and some data types might be included in multiple categories.

Human Health	<i>Quantifying and characterizing human illness</i>
1 Public Health Surveillance	Surveillance of human sicknesses, such as outbreak, hospital, lab testing data, <u>patient characteristics</u> (age, gender), basic patient <u>outcomes</u> (hospitalization, death), including <u>underreporting</u> information.
2 Medical/Clinical	Details on illness beyond incidence, including % who have certain conditions, treatment options, etc, such as <u>symptoms, severities, outcomes, durations, drug treatments, etc</u>
3 Host Factors	Characteristics of persons that affect whether or not they may become ill - <u>age, gender, race, diet, immunocompromised</u> (e.g. AIDS), existing medical conditions
4 Attribution	<u>Connecting human illnesses with factors or vectors of illness</u> such as food vehicles or animal reservoirs (food attribution), location of consumption (restaurant, etc), food preparation behavior, or other risk factors.
5 Health Valuation	Valuing illness in economic or HRQL (Health Related Quality of Life) measures. Economic data include <u>medical costs, productivity losses, &amp; willingness-to-pay</u> , while HRQL include <u>QALYs, DALYs</u> , etc
Contamination Testing	<i>Measurements of pathogens and chemical residues</i>
6 Microbial Pre-Harvest Contamination	Prevalence (levels or counts) of pathogens or indicators (biomarkers) measured on <u>live food animals or plants</u> (taken from flocks of animals, or on the vegetable farm prior to processing)
7 Microbial Post-Harvest Contamination	Prevalence (levels or counts) of pathogens or indicators on <u>animals post-slaughter or plants post-harvest</u> (during processing, packaging, transportation, retail, in the kitchen, etc).
8 Microbial Environmental Contamination	Prevalence (levels or counts) of pathogens or indicators in public environment (oceans, rivers, air) and <u>along farm-to-fork continuum</u> (e.g. in animal feed or water, on processor equipment, on cutting board, etc.)

9	Chemical Pre-Harvest Contamination	Prevalence of <u>chemical residues</u> (antibiotics, pesticides, sulfonamides, etc), in levels or counts, on <u>live food animals or plants</u> (measurements taken from flocks of animals, or on the vegetable farm)
10	Chemical Post-Harvest Contamination	Prevalence of <u>chemical residues</u> (antibiotics, pesticides, sulfonamides, etc), in levels or counts, on <u>animals post-slaughter or plants post-harvest</u> (processing, packaging, retail, in preparation, etc)
11	Chemical Environmental Contamination	Prevalence of <u>chemical residues</u> (antibiotics, pesticides, sulfonamides, etc), in levels or counts, in <u>public environment</u> (oceans, rivers, air) or along <u>farm-to-fork continuum</u> (e.g. in animal feed, on equipment, etc)
12	Other Post-Harvest Contamination	Prevalence on post-slaughter animals or post-harvest plants of contaminants other than pathogens or chemicals, such as physical objects, rodent excreta, insect parts, radionuclides, etc.
13	Contamination of Imports	Prevalence of pathogens (levels or counts) or chemical residues (antibiotics, pesticides, etc) measured on <u>imported food</u> or at <u>point of production</u> or processing in source countries
<b>Other Indicators of Contamination</b>		<i>Other signs of food contamination or risk other than testing</i>
14	Animal Health/Disposition	Data on animal illnesses - <u>animal diseases</u> and health issues including reports of when animals are <u>condemned as unfit</u> for human consumption (antemortem or postmortem).
15	Recalls and Violations	Data on <u>foods recalled</u> due to pathogen or chemical contamination, or data on firm <u>violations of regulatory standards</u> for pathogens or chemical residues
16	Sanitation	Combination of environmental data and sanitation behavior throughout food production, processing, storage, and preparation, including retail establishments and restaurants
<b>Hazard Identification</b>		<i>Detecting, identifying, and characterizing food safety hazards</i>
17	Detection Methods	Research into different methods for the detection, identification, and quantification of <u>pathogens, toxins, and chemical residues</u> on foods, animals, or in environments, including test <u>sensitivity and specificity</u> .
18	Pathogen Subtyping	<u>Microbial fingerprinting</u> for detailed identification of isolates, including phenotyping and genotyping: serology, phage typing, PFGE, etc. Method is used in prevalence testing, for source attribution, etc.
19	Pathogen Characteristics	Understanding pathogen behavior; Used to identify emerging pathogens, develop interventions, model pathogens, etc. Includes <u>growth behavior</u> under certain conditions, <u>anti-microbial resistance</u> , etc.

<b>Hazard Modeling</b>		<i>Estimating exposure to hazards &amp; estimating illnesses from exposure</i>
20	Dose-Response	(Also Concentration-Response) <u>Lab studies</u> of hazard exposure and resulting health outcomes (e.g. animal or epidemiological studies) - includes <u>toxicity, pathogenicity, virulence, etc</u> - also <u>DR models</u> based on analysis of lab data & used in risk assessments
21	Exposure Assessment	Quantitative <u>estimates of exposure</u> to pathogens or chemical residues (e.g. cfu/person*year) based on ingestion of contaminated foods, food consumption patterns, and other variables
22	Model Parameters	<u>Supplementary data</u> gathered for or used in quantitative risk assessments to model hazards, often related to a specific process being modeled (e.g. data on transportation times and temperatures).
23	Risk Models and Analyses	Models and analyses of risk, including chemical and microbial <u>risk assessments</u> (beyond exposure assessments), intervention modeling, assessments of vulnerabilities, farm-to-fork process models, etc.
<b>Industry Information</b>		<i>Characterizing food production and food safety interventions</i>
24	System Management	Information regarding performance and nature of <u>food safety management practices</u> and systems (e.g. HACCP implementation). Baseline information on food safety activities prior to additional interventions.
25	Intervention Efficacy	Effectiveness of specific new technologies, equipment improvements, process changes, and regulatory interventions, as well as unintentional consequences of interventions.
26	Implementation Costs	Direct costs of specific intervention <u>technologies</u> , process changes, or changes to food safety system management.
27	Economic Impacts	Analyses of the impacts to industry and/or the economy due to food safety regulations, interventions, or contamination events (intentional or unintentional), including indirect costs such as market loss.
28	Production Characteristics	Characterizing <u>industrial organization and practices</u> related to food safety (e.g. pesticide usage, rates of production, processing configurations, transportation). Often used in industrial process models.
<b>Consumer Information</b>		<i>Characterizing population demographics, behavior, and consumption</i>
29	Food Consumption	Quantities of food <u>consumed, produced, sold</u> , etc, for different populations and consumption environments (e.g. home vs restaurant)
30	Consumer Behavior	Characterizing consumer <u>activities</u> such as food storage, handling, preparation, etc, as well as sensitivity to price, shopping patterns, and <u>market behavior</u>

31	Risk Perception/ Communication	Characterizing <u>consumer perceptions, preferences, and attitudes</u> about foodborne risks, including food safety knowledge, risk aversion, & communicating risks to consumers.
32	Population and Demographics	Information about <u>population and demographics</u> such as age, gender, race, income, immunocompromised, etc
<b>Miscellaneous</b>		<i>Additional information important for food safety</i>
33	Food Characteristics	<u>Nutrients, acidity, water content</u> and other characteristics of foods that may be related to food safety (e.g. characteristics that may mitigate or increase risk)
34	Environmental Characteristics	Measurements of <u>temperature, humidity, pH, etc</u> - may be taken from public environment (ie. oceans, soil, air) or private environment (ie. on the farm, in the plant)
35	Traceback	Data that allows foods found to be contaminated to be <u>traced back through the food system</u> to the farm or processing facility.
36	International Trade	Quantities and locations of food <u>imports and exports</u> , and other related information necessary to measure impact of contaminated imports and exports

Comments welcome to:

Michael Batz  
[mbatz@rff.org](mailto:mbatz@rff.org)  
(202) 328-5020

June 13, 2006

---

A project of the **Food Safety Research Consortium** based at the  
**University of Maryland School of Medicine**  
<http://www.rff.org/fsrc/fsii/>