

# USDA Food Safety Research Agenda

## I. Ecology, Epidemiology, and Virulence of Foodborne Pathogens and Intervention Strategies for Pathogen Control

- Investigate the ecology, epidemiology, virulence, and genetic characteristics related to pathogenicity for *E. coli* O157:H7, *Salmonella*, *Listeria monocytogenes* and other foodborne pathogens from farm to table to identify targeted control measures and determination of the association of human illness to specific reservoirs.
- Develop effective on-farm, feedlot, transportation, handling, and other pre-processing intervention strategies for reducing the incidence and levels of
  - *Salmonella* strains of public health significance in beef, pork, poultry, and eggs,
  - *E. coli* O157:H7 in beef and on fresh produce,
  - *Listeria monocytogenes* on fresh produce,
  - *Campylobacter jejuni/coli* in poultry, and
  - antibiotic resistant microorganisms.
- Develop, validate and transfer technology of new and improved processing methods to prevent the growth, reduce, or eliminate
  - *E. coli* O157:H7 in bovine products and fresh produce,
  - *Salmonella* in poultry, bovine, and porcine product,
  - *Listeria monocytogenes* on Ready-To-Eat (RTE) foods,
  - *Vibrio* spp. in seafoods, and
  - *Cryptosporidium*, *Cyclospora*, and other parasites in fresh fruits and vegetables.
- Develop rapid and sensitive detection methods for abnormal prions to prevent potential spread of transmissible spongiform encephalopathies and develop strategies to keep meat from infected animals out of the food supply.

## II. Sampling and Detection Methods Development

- Develop sensitive, high-throughput methodology for detecting and quantifying *Salmonella* spp., *E. coli* O157:H7, *Listeria monocytogenes*, *Campylobacter jejuni/coli*, *Vibrio* spp. and viruses in raw and RTE foods and for use in epidemiological investigations.
- Develop advanced analytical methods for use in surveillance of pesticide residues.

- Optimize sampling protocols to effectively represent product and production environment.
- Identify microorganisms, quality attributes and other product characteristics that could serve as indicators of food contamination by bacterial, viral, and parasitic pathogens.

### **III. Risk Assessment**

- Determine the sources of pathogens related to foodborne illness, points of contamination, and transfer rate and level of contamination from production through processing, distribution, and consumption.
- Identify factors and develop associated models for determining the growth, survival, inactivation and/or cross-contamination of microbial pathogens during processing, handling, distribution and preparation.
- Develop databases in support assessing and analyzing public health risks associated with microbial toxins in seafood, produce, grains, and other foods.

### **IV. Food Safety Education and Training Evaluation and Delivery Techniques**

- Identify Good Agricultural Practices/Good Manufacturing Practices and effective strategies for implementing and evaluating food safety training programs for primary animal and plant production.
- Characterize effective strategies for delivery and evaluation of food safety training programs for food processors, distributors, transporters, and retailers.
- Determine food handler behaviors that affect food safety and evaluate the effectiveness and methods for optimizing food safety education, training, and risk communication to the consumer.