**5.0 Food Safety**

**Brief Summary of Program**

Cornell’s statewide food safety research and education program serves a broad constituency including food producers, processors, distributors, retailers, commercial and institutional food service and retail establishments, consumers—both youth and adult—, and research scientists. The program encompasses NIFA food safety components: causes of microbiological contamination and microbiological resistance, education of consumers and food safety professionals, and developing food processing and storage technologies.

The program to reduce the incidence of food borne illness and provide a safe food supply is developed and delivered through: workshops, community presentations, research-based publications appropriate for targeted audiences, participation in cooperative research projects, development of audio-visual training programs, technical support for policy makers and regulators, technical assistance and timely responses to emergent and continuing state and national outbreaks and issues.

Cornell's National Good Agricultural Practices Program is an example of an educational effort addressing the contemporary issue of the safety of fresh fruits and vegetables. The program provides growers, packing house operators, government officials and industry trade association personnel with educational information and strategies to protect consumer health and reduce hazards and risks in the production of fresh fruits and vegetables. Farm owners and others receive information on microbiological contamination of raw produce during growing, harvesting and processing and assistance in using good agricultural practices and good manufacturing practices to reduce the risks of these hazards. Educational materials designed and developed at Cornell are being used by collaborators in twenty-five states to provide farmers with a better understanding of good agricultural practices.

Consumer education programs focus on safe handling and preparation of foods, conveying important practices in preventing illness along with avoiding food cross-contamination. Programs target moderate and low income adults, 4-H and other youth. Food thermometer use, safely handling perishables and leftovers, safely defrosting meat and poultry and the importance of immediately discarding food that may be unsafe and hand washing are emphasized.

**Situation and Priorities Statement**

The food supply must be safe to ensure a healthy, well-nourished population. While the United States has one of the safest food supplies in the world, each year about 76 million illnesses occur, more than 300,000 persons are hospitalized, and 5,000 die from foodborne illness. Illnesses, such as E. coli and salmonella, not only take a toll on American consumers’ health, they cost the United States $152 billion annually in health care and other losses, according to a report funded by the Pew Charitable Trusts. Center for Disease Control compiled data indicate that known pathogens account for an estimated 14 million illnesses, 60,000 hospitalizations, and 1,800 deaths. Three pathogens, Salmonella, Listeria, and Toxoplasma, are responsible for 1,500 deaths each year, more than 75% of those caused by known pathogens, while unknown agents account for the remaining 62 million illnesses, 265,000 hospitalizations, and 3,200 deaths. An untold number of foodborne illnesses go unreported because people may not seek medical attention and due to varying capabilities of local and state health departments to collect and report incidences. Food contamination also affects the viability of firms in the food system, from small, to regional to international companies. Recent outbreaks have resulted in large recalls of peanuts, spinach and peppers. In 2008 and early 2009, salmonella contamination in peanut butter crackers and peanut paste sickened 714 people in 46 states and prompted the largest recall in history. Safety from farm to retail and then in the home can be improved through research and its application to training, collaboration among all involved in the food system, and information sharing.
Over the last several decades there has been a noticeable increase in the consumption of fresh fruits and vegetables in the United States. Public health officials have observed significant increases in the number of produce-associated food-borne disease outbreaks. Recently outbreaks of salmonella and \textit{E. coli} infections caused serious health consequences, disrupted the supply of nourishing foods and caused significant economic harm.

A variety of good agricultural and manufacturing practices can reduce the spread of microbes among plant foods and animals and prevent the contamination of foods at retail. The safety of prepared foods is also of concern given the important proportion of foods consumed away from home and purchased already prepared. Targeted training for food producers, preparers and retailers is a priority. In addition, consumer education on proper food handling and preparation in the home is a vital component to ensuring food safety. Consumers continue to improve their food safety practices but some are still unknowingly practicing some unsafe behaviors. The country's ability to pinpoint a food contamination source is hampered by the lack of an integrated system for federal agencies and the food industry to coordinate information through compatible electronic databases. Coordination, practice and policy changes are needed.

Assumptions

- Food safety can be increased by improving: agricultural practices before harvest; how foods are processed, stored and marketed and how foods are handled and served in the home and commercially.
- Cornell and other research on food contamination will be applied to education on effective food safety practices.
- Policies and practices across the food system affect the safety of foods and can be better coordinated.
- Community, federal, state, and local government support will be provided to implement extension outreach.

Ultimate Goal(s) of Program

- Provide for the nutritional well-being and safety of New York State residents through helping to assure a continuous, reasonably priced supply of wholesome foods.
- Improve food safety and food-handling practices throughout the food system.
- Reduce incidence of food-borne illnesses.

Activities

This is a comprehensive program entailing a wide range of applied research activities and multiple education methods depending on context and need. Campus-based faculty and extension associates, regional specialists and county-based educators all are involved in designing, implementing, and evaluating tailored educational efforts depending on the focus and scope of their role.

Examples activities are:

- Convey general knowledge and understanding of food safety science to New York State residents and beyond via varied communication strategies;
- Provide educational programs in collaboration with regulatory agencies involved with assuring the safety and wholesomeness of food processed, prepared, sold and handled and consumed by the public in New York State;
• Via courses, presentations and materials, support transfer of new research-based information for appropriate applications in the agricultural production, manufacturing, retailing and food service industries;
• Communicate current food safety production, manufacturing and technical problems to researchers at Cornell;
• Conduct specialized instruction in the effective application of laboratory methods to maintain and improve product safety and quality in the dairy and food industry.

Description of Target Audiences

Audiences reached include: processors, producers and consumers with targeted programs for moderate and low income families; 4-H youth; nutrition, health, and family professionals; front-line family workers; food service and food production staff and their managers and directors; and government and agency leaders at the local, state, and federal level.

Output and Outcome Indicators Highlighted indicators are collected annually. Codes in parentheses are (new) and (old) classification system.

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<thead>
<tr>
<th>Outputs</th>
<th>Near-Term Outcomes</th>
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<td># patents</td>
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5.1 Food Safety and Consumers

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<tbody>
<tr>
<td>(5.1a) # of consumers participating in programs on: reducing food safety and/or food borne risks and illnesses including recommended purchasing, handling, storage, and preparation practices.</td>
<td>(5.1b) # of consumers who demonstrate knowledge or skill gains related to reducing food safety and/or foodborne risks and illnesses including recommended purchasing, handling, storage, and preparation practices.</td>
<td>(5.1c) # of consumers documented to have implemented new and/or increased application of ongoing safe food purchasing, handling, storage, and preparation practices.</td>
<td>(5.1d) Reduced incidence of foodborne illness among program participants. (no target).</td>
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5.2 Food Safety and Producers/Processors/Retailers/Food Service Providers

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<tr>
<td>(5.2a) # of producers/processors/food service providers participating in programs on: reducing food safety and/or food borne risks and illnesses including recommended production, processing, storage, handling, marketing, and preparation practices (no target).</td>
<td>(5.2b) # of producers/processors/food service providers who demonstrate knowledge or skill gains related to reducing food safety and/or food borne risks and illnesses including recommended production, processing, storage, handling, marketing, and preparation practices.</td>
<td>(5.2c) # of producers/processors/food service providers documented to have implemented new and/or increased application of ongoing safe food production, processing, storage, handling, marketing, and preparation practices.</td>
<td>(5.2d) Improved safety of foods available through wholesale and retail outlets and institutional foods.</td>
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### 5.3 Food Safety and Decision Makers

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<td>(5.3a)</td>
<td># food safety decision-makers, policy makers and other officials reached with science-based information to improve food safety practices and policies.</td>
<td>(5.3b) # of food safety decision-makers, policy makers and other officials who demonstrate knowledge gains relative to improved food safety practices and policies.</td>
<td>(5.3c) # of communities/firms/or organizations documented to have assessed practices of food safety policies as a result of participating in relevant educational programs.</td>
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#### External Factors

- Large-scale food illness outbreaks are attributed to a number of factors such as the complexity of evolving microbes and changing food consumption patterns which influences the conduct of research and development of educational programs. Unknown agents account for approximately 81% of foodborne illnesses and hospitalizations and 64% of deaths, according to the Center for Disease Control, constraining the design of programs.
- Lack of an integrated system for federal agencies and the food industry to coordinate food contamination information hampers research and education. Changing and sometimes complex governmental policies and regulations affect implementation of food safety measures.
- Food from countries beyond the US may further complicate control and implementation of effective food safety measures.

#### Evaluation

The evaluation approach for this and all other logic models included in our plan is more accurately described as an evaluation "system" rather than as bounded "studies" or investigations. Because each of the plans addresses a broad combination of applied research and extension initiatives spanning multiple audiences, methods, and intended outcomes, a combination of routine program monitoring and documentation, near-term outcome assessment, and targeted follow-up activities is required to provide comprehensive assessment. In addition, specialized data needs of funding partners must be addressed, sometimes using methods and/or accountability structures required by the funders. In support of each of the logic models, we are working to provide educators with recommended evaluation strategies and standard instruments for their use. We will continue our work with the Cornell Office for Research on Evaluation to develop these resources. This year, we reviewed the draft national outcome framework and have selected several to link to our statewide outcome framework. We expect to continue work to align our evaluation priorities with the national framework in coming years.