The Interagency Food Safety Analytics Collaboration (IFSAC)

Overview of Accomplishments
Strategic Plan for Foodborne Illness Source Attribution
2012-2016

Outline

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Background

- To enhance the safety of our food, three federal agencies—the Centers for Disease Control and Prevention (CDC), the U.S. Food and Drug Administration (FDA), and the Food Safety and Inspection Service of the United States Department of Agriculture (USDA-FSIS)—teamed up in 2011 to create the Interagency Food Safety Analytics Collaboration (IFSAC)
- The goal of this collaboration is to improve coordination of federal food safety analytic efforts and address cross-cutting priorities for food safety data collection, analysis, and use
- Projects and studies aim to identify foods that are important sources of illnesses
- From 2011-2016, IFSAC's actions were guided by a strategic plan on foodborne illness source attribution:
  - defined as the process of estimating the most common food sources responsible for specific foodborne illnesses

https://www.cdc.gov/foodsafety/pdfs/ifsac-strategic-plan-508c.pdf

Strategic Plan Objectives

1. **Generate timely estimates of foodborne illness source attribution** (that allow for evaluation of changes in attribution over time) for important foodborne pathogens and commodities at various points in the food chain that address specific agency needs for measuring progress, allocating resources, and making programmatic decisions

2. **Identify data needs** and take steps to determine how to better acquire, improve, and organize data available for foodborne illness source attribution

3. **Validate current methods and modeling approaches** to estimate foodborne illness source attribution and develop improved methods

4. **Identify and obtain high-level commitments for personnel and financial resources** to support efforts to estimate foodborne illness source attribution

5. **Develop a collaborative communication plan** among the three agencies and between the agencies and stakeholders

Short-Term Plans

To be executed within the first 2 years of the plan:

1. Improve methods to identify and commoditize foods implicated in outbreaks

2. Use estimates from outbreak-based foodborne illness source attribution

3. Examine the uncertainties associated with current foodborne illness source attribution estimates

4. Determine gaps and identify solutions to improve foodborne illness source attribution estimates

Long-Term Plans

To be executed within the last 3 years of the plan:

1. Develop foodborne illness source attribution models using a variety of data sources

2. Determine most appropriate methods for generating both "blended" and harmonized food source attribution estimates

Communication Plan

- Develop shared process for exchanging attribution information with both internal and external stakeholders

- Utilize a wide variety of communication tools to engage stakeholders, including press releases, fact sheets, graphically designed charts and tables, a dedicated web presence, and web seminars (webinars)

- Develop and present poster and oral presentations at scientific conferences

- Develop and submit manuscripts to scientific journals for peer review and publication

IFSAC Completed Projects

- **Shared Needs**: Developed a shared understanding and statement of needs for foodborne illness source attribution

- **New Food Categorization Scheme**: Improved food categorization scheme for attributing outbreaks and related illnesses to food

- **Uncertainty and Variability Estimates**: Determined sources of uncertainty and variability in estimated attribution fractions

- **SE Attribution**: Estimated the proportion of SE illnesses attributable to shell eggs and other food categories

- **Sporadic and Outbreaks Comparison**: Compared characteristics of sporadic and outbreak-associated foodborne illnesses

https://www.cdc.gov/foodsafety/ifsac/projects/completed.html 8

IFSAC Completed Projects, Cont.

- **Modified Hald Model**: Applied models to estimate number of illnesses associated with foods and *Salmonella* subtypes

- **Improved Outbreak Analyses**: Improved analyses of outbreak data used to assign implicated foods to food categories

- **External Communication**: Communicated IFSAC activities and events to the public

- **Harmonized Estimates**: Developed a method for food source attribution for four bacteria (*Salmonella, E. coli* O157:H7, *Listeria monocytogenes (Lm),* and *Campylobacter)* using outbreak data

https://www.cdc.gov/foodsafety/ifsac/projects/completed.html

IFSAC Completed Collaborations

- Support FDA's efforts to implement the Food Safety Modernization Act (FSMA)

- Develop a shared understanding and statement of needs for foodborne illness source attribution with the Interagency Risk Assessment Consortium (IRAC)

- Support FDA's pathogen prioritization efforts through preliminary analyses of foodborne outbreaks for food source attribution (Risk Prioritization)

https://www.cdc.gov/foodsafety/ifsac/projects/collaborations.html

Ongoing and New Projects

- **Change Over Time:** Determining possible statistical modeling approaches to evaluate temporal changes in attribution estimates

- **Point of Contamination:** Estimating food source attribution along the farm-to-table continuum

- **Annual Report:** Developing a template for public communication of updated foodborne illness source attribution estimates for *Salmonella*, *E. coli* O157:H7, *Lm*, and *Campylobacter*

- ***Campylobacter* Review**: Reviewing existing body of work related to food source attribution for *Campylobacter*

- **Multi-Ingredient Foods Attribution:** Developing a method for food source attribution estimates for *Salmonella*, *E. coli* O157:H7, *Lm*, and *Campylobacter* using data from outbreaks of multiple-ingredient foods

- **SE Attribution, Part 2:** Evaluating use of whole genomic sequence and case exposure data for food source attribution of *Salmonella* Enteritidis illnesses

https://www.cdc.gov/foodsafety/ifsac/projects/current.html

Major Accomplishments: Objective 1

- **Harmonized Estimates**
  - Developed and shared through public meetings and publications harmonized foodborne illness source attribution estimates using a novel, robust approach
  - Consensus on a single analytic approach has provided greater harmony and consistency in interpretation of estimates across the federal government and have enhanced agencies efforts to inform and engage stakeholders, including industry and consumers, about food safety strategies

- **SE Illnesses**
  - Developed new baseline estimates of SE attribution among included sources; shell eggs were estimated to be responsible for the highest proportion of foodborne SE infections (40%; 95% CI: 30-51%) during the baseline period (2007-2009)
  - This baseline estimate will help improve ability to assess the public health impact of the FDA Egg Rule over time

- **Modified Hald Model**
  - Developed new estimates of the percentage of *Salmonella* illnesses attributable to food contaminated before the point of food preparation and service

Generate timely estimates of foodborne illness source attribution

Major Accomplishments: Objective 2

- **IRAC**
  - Development of an interim report with IRAC provides possible collaborative analyses using combined approaches that can improve information needed for food safety decision-making
- **Modified Hald model**
  - Modified model in several ways, including incorporating data on new food products, such as seafood, herbs, and produce, and shell eggs –which included as assessment of model results under 3 different contamination scenarios--and updates to the model to improve model performance
- **FSMA**
  - Provided FDA with data and expertise to support FDA's efforts to determine the significance of specific foodborne pathogens to address agency obligations under FSMA

Identify data needs

Major Accomplishments: Objective 3 (1)

- **Modified Hald model**
  - Expanded a U.S. model by incorporating new data to evaluate the relationships between food contamination, consumption, and human illness and estimate the percentage of illnesses attributable to food contaminated before the point of food preparation and service

- **SE Illnesses**
  - Developed a new method to estimate the proportion of foodborne SE illnesses attributable to shell eggs and other major food commodity reservoirs of SE

- **Change over Time**
  - Developed novel Bayesian latent cluster trend modeling techniques to produce more precise and useful estimates of foodborne illness attribution trends over short time periods with limited data

Validate current methods and modeling approaches

Major Accomplishments: Objective 3 (2)

- **Categorization Scheme**
  - Expanded previously used food categorization scheme to include more specific food categories that are more botanically correct, better reflect production practices and post-harvest handling systems, and more readily distinguish FDA- and FSIS- regulated products

- **Rule Development**
  - Developed an analytic approach for attributing foodborne disease outbreaks to a single food source and incorporated the new food categories into CDC's annual summaries of foodborne outbreaks and illnesses

Major Accomplishments: Objective 3 (3)

- **Sporadic and Outbreaks Comparison**
  - Compared the characteristics of ill people and foods linked to outbreaks of IFSAC's 4 priority pathogens with those associated with sporadic illnesses ascertained in FoodNet and foods consumed by the general population to determine whether outbreak illness are representative of sporadic illnesses
  - Results indicated that, with the exception of *Salmonella* illnesses among children < 3 years of age, it may be appropriate to use outbreak data to estimate which foods may be associated with sporadic illnesses in the population
- **Uncertainty and Variability**
  - Identified via a literature review important sources of uncertainty regarding the representativeness of outbreaks of the foods and pathogens causing foodborne illness in the general population, which provided a foundation for a tri-agency approach to estimate foodborne illness source attribution using outbreak data

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Major Accomplishments: Objective 4

- **Shared Needs**
  - Developed a shared understanding and statement of needs for foodborne illness source attribution to develop IFSAC Strategic Plan

- **IFSAC Charter**
  - Developed and implemented 2 Charters (2011 and an update in 2016) to formalize IFSAC's operational process as well as its organizational structure and responsibilities

Identify and obtain high-level commitments for personnel and financial resources

Major Accomplishments: Objective 5 (1)

- **Communication Plan**
  - Developed, implemented and completed a collaborative communication plan that included the following accomplishments:
    - Two Public Meetings:
      - 2012 Public Meeting introduced IFSAC and the Strategic Plan and solicited public input on opportunities and challenges to improve foodborne attribution efforts in US
      - 2015 Public Meeting sharing harmonized attribution estimates and IFSAC progress
    - Two Webinars:
      - 2013: "Improving the Categories Used to Classify Foods Implicated in Outbreaks"
      - 2014: "Are Outbreak Illnesses Representative of Sporadic Illnesses?" *Develop a collaborative communication plan*

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Major Accomplishments: Objective 5 (2)

- Webpage:
  - Designed and launched IFSAC web page: http://www.cdc.gov/foodsafety/ifsac/index.html

- Publications:
  - Comparing Characteristics of Sporadic and Outbreak-Associated Foodborne Illnesses, United States, 2004–2011 (Article and Podcast)

- Conferences
  - Over 2 dozen oral and poster presentations given at academic conferences such as Council for State and Territorial Epidemiologists (CSTE), the International Association for Food Protection (IAFP), and the Society for Risk Assessment (SRA)

Conclusion

- Developed strong tri-agency partnership that serves as a model for collaboration across government to address cross-agency needs

- Advanced attribution estimation and model development

- Created tri-agency shared products (e.g., new food categorization scheme, harmonized attribution estimates, manuscript publication)

- Enhanced interagency and external communications

Future Directions

- IFSAC released its new Strategic Plan for 2017-2021 on March 24th and held a webinar to describe the Plan and new and ongoing projects on May 31st

- An "Action Plan" summarizing IFSAC's projects and other activities in support of the new Plan will be posted concurrently on the IFSAC webpage with this Wrap-Up

For more information about IFSAC, please visit our website at
https://www.cdc.gov/foodsafety/ifsac/index.html
or contact us at
IFSAC@fda.hhs.gov
or at CDC-INFO at
https://wwwn.cdc.gov/dcs/ContactUs/Form