

Interagency Food Safety Analytics Collaboration (IFSAC) 2017-2021 Action Plan

As discussed in the Interagency Food Safety Analytics Collaboration (IFSAC) 2017-2021 Strategic Plan (Plan), IFSAC plans to build on its previous accomplishments with its primary focus on continuing to improve estimates of foodborne illness source attribution and to develop methods to estimate how sources change over time. Three goals underpin the overarching focus of the Plan:

1. Improving the use and quality of new and existing data sources,
2. Improving analytic methods and models, and
3. Enhancing the use of and communication about IFSAC analytic products.

This document provides information to support the implementation of the Plan, specifically our ongoing and potential future projects; their alignment with the goals, strategies, and objectives of the Plan; and project interdependencies and tentative initiation timelines.

Ongoing projects

- **Template for annual tri-agency attribution update and dissemination (Annual Report)**
 - a. Goal: Use IFSAC tri-agency harmonized attribution methodology and estimates to develop and routinely distribute updated estimates with each year's new data as they become available
 - b. Alignment with Strategic Plan goals: 2.2.3, 3.1.2
 - c. Tentative initiation: Ongoing, initial reports expected calendar year (CY) 2017
- **Evaluation of dataset utility for identifying food contamination points (Point of Contamination)**
 - a. Goal: Evaluate possibility of attributing point of contamination
 - b. Alignment with Strategic Plan goals: 1.1.3, 1.2.1, 2.2.1
 - c. Tentative initiation: Ongoing
- ***Campylobacter* attribution (*Campylobacter* Review and Reanalysis)**
 - a. Goal: Better understand features of *Campylobacter* attribution and find improved ways of informing estimates
 - i. Aim 1: Comparative literature review
 - ii. Aim 2: Case-control reanalysis using traditional and advanced modern statistical methods
 - b. Alignment with Strategic Plan goals: 2.2.1-3, 3.1.1
 - c. Tentative initiation: Ongoing
- **Multi-ingredient (complex) food attribution (Multi-Ingredient Foods Attribution)**
 - a. Goal: Use solved single and multiple ingredient food outbreaks to attribute unsolved multi-ingredient food outbreaks, which represent about half of outbreaks
 - b. Alignment with Strategic Plan goals: 1.3.1, 2.1.1, 2.1.3, 2.2.1, 2.2.4
 - c. Tentative initiation: Ongoing

Communication Efforts

- **Information sharing, outreach, and engagement**
 - a. Goal: To enhance communication activities both for and with stakeholders. Communication goals include a comprehensive effort to engage stakeholders through the following avenues:
 - ii. Two webinars planned for CY2017

- iii. One public meeting sharing work on synthesizing different models related to single pathogens is tentatively planned for CY2018
 - iv. Continued submission of IFSAC manuscripts in peer-reviewed journals, including reports on the model developed to estimate harmonized attribution estimates and the scheme for categorizing foods implicated in outbreaks
 - v. Continued participation in scientific conferences, such as the International Association for Food Protection (IAFP) and the Council of State and Territorial Epidemiologist (CSTE)
 - vi. Engagement with surveillance system and other data source teams inside of CDC, including the CDC-led Foodborne Diseases Active Surveillance Network (FoodNet) and National Outbreak Reporting System (NORS)
 - vii. Consideration of annual/semi-annual roundtable interaction with other groups with aligned multiagency missions (e.g., Interagency Risk Assessment Consortium (IRAC), etc.)
- b. Alignment with Strategic Plan goals: 2.3.1, 3.1.1-2, 3.2.2
 - c. Tentative initiation: CY2017

Future projects

- **Further evaluation of temporal trends in foodborne disease outbreaks, illnesses, and evaluation of changes over time (Temporal Trends)**
 - a. Goal: Building on prior work on temporal trends and tri-agency food categorization methodologies, develop pathogen-food category specific time-series models
 - b. Alignment with Strategic Plan goals: 2.1.2-3, 2.2.1, 2.2.3
 - c. Tentative initiation: CY2017
- **Explore case exposure ascertainment and population level exposure data to estimate attribution of *Salmonella* Enteritidis illnesses to major food categories (SE Attribution, Part 2)**
 - a. Goal: Explore use of population exposure data (e.g., National Health and Nutrition Examination Survey) to develop attribution estimates for *Salmonella* Enteritidis (SE) to major food categories
 - b. Alignment with Strategic Plan goals: 1.3.2, 2.2.2-3
 - c. Tentative initiation: CY2017
- **Whole genome sequencing based attribution for *Salmonella* Enteritidis (WGS for *Salmonella* - Enteritidis)**
 - a. Goal: Expand prior work on *Salmonella* Enteritidis attribution to chicken and eggs based on whole genome sequencing (WGS) by incorporating epidemiologic information, supervised machine learning, and a wider group of food and non-food samples
 - b. Alignment with Strategic Plan goals: 1.1.3, 1.3.1, 2.1.1, 2.1.3, 2.2.1-2, 2.2.4
 - c. Tentative initiation: CY2018
- **Evaluate biases in outbreak and other data sources for IFSAC models (Bias Evaluation)**
 - a. Goal: To better understand biases in outbreak and other data sources used to develop IFSAC models to improve models and inform ways to impute missing data
 - b. Alignment with Strategic Plan goals: 1.1.1-3, 2.2.1-2
 - c. Tentative initiation: within the next 1-3 years
- **Improve *Campylobacter* attribution (*Campylobacter* Data Integration)**
 - a. Goal: Integrate use of other studies, case exposure ascertainment, WGS data, and antimicrobial resistance data to improve *Campylobacter* model-based attribution

- b. Alignment with Strategic Plan goals: 1.2.2, 1.3.1, 2.1.3, 2.2.1-2, 2.3.2
- c. Tentative initiation: Within the next 1-3 years; dependent on the *Campylobacter* Review and Reanalysis Project
- **Stakeholder needs assessment (Needs Assessment)**
 - a. Goal: Assess needs around attribution related to food and other sources for pathogens commonly transmitted by foods through evaluation of the needs of internal and external stakeholder groups
 - b. Alignment with Strategic Plan goals: 3.1.1-2, 3.2.1
 - c. Tentative initiation: CY2017
- **Development of a tri-agency illness count method (Attribution of Illnesses over Time)**
 - a. Goal: Create a refined model for annual reporting of attribution using the number of illnesses by pathogen and food category
 - b. Alignment with Strategic Plan goals: 2.2.1-3, 3.1.2, 3.2.3
 - c. Tentative initiation: Within the next 4-5 years; dependent on the release of IFSAC's annual attribution report (Annual Report) and temporal trends project (Temporal Trends)

Project Alignment by Strategic Plan Goal/Objective

- **Goal 1:** Improve the use and quality of new and existing data sources to conduct analyses and develop source attribution estimates
 - *Objective 1.1: Enhance the collection and quality of relevant source data*
 - Ongoing Projects: Point of Contamination
 - Future Projects: WGS for *Salmonella* Enteritidis; Bias Evaluation
 - *Objective 1.2: Enhance the use of existing regulatory and foodborne illness surveillance data sources*
 - Ongoing Projects: Point of Contamination
 - Future Projects: *Campylobacter* Data Integration
 - *Objective 1.3: Incorporate genomic data and other novel data sources*
 - Ongoing Projects: Multi-Ingredient Foods Attribution
 - Future Projects: SE Attribution, Part 2; WGS for *Salmonella* Enteritidis; *Campylobacter* Data Integration

- **Goal 2:** Improve analytic methods and models
 - *Objective 2.1: Explore ways to address key gaps in data quality, methods, and models*
 - Ongoing Projects: Multi-Ingredient Foods Attribution
 - Future Projects: Temporal Trends, WGS for *Salmonella* Enteritidis; *Campylobacter* Data Integration
 - *Objective 2.2: Develop new analytic approaches and models to maximize use of already available data*
 - Ongoing Projects: Annual Report; Point of Contamination; *Campylobacter* Review and Reanalysis; Multi-Ingredient Foods Attribution
 - Future Projects: Temporal Trends; SE Attribution, Part 2; WGS for *Salmonella* Enteritidis; Bias Evaluation; *Campylobacter* Data Integration; Attribution of Illnesses over Time
 - *Objective 2.3: Expand the availability of technical and scientific expertise through collaboration with internal and external partners*
 - Future Projects: *Campylobacter* Data Integration

- **Goal 3:** Enhance the use of and communication about IFSAC products
 - *Objective 3.1: Enhance relationships and engagement with both internal and external groups*
 - Ongoing Projects: Annual Report; *Campylobacter* Review and Reanalysis
 - Communication Efforts: Information sharing, outreach, and engagement
 - Future Projects: Needs Assessment; Attribution of Illnesses over Time
 - *Objective 3.2: Improve the synthesis, interpretation, and dissemination of analytic products for multiple audiences*
 - Communication Efforts: Information sharing, outreach, and engagement
 - Future Projects: Needs Assessment; Attribution of Illnesses Over Time

Long-Term Themes

These themes represent long-term threads that have run longitudinally through IFSAC's work starting with our original Strategic Plan in 2012:

▪ **Improved attribution estimates**

Developing updated attribution estimates across multiple pathogens that can be used by all three IFSAC partners not only allows for consistency across the federal government, but also improves transparency and provides for clearer communication with stakeholders. Further, by integrating multiple approaches across one pathogen, e.g., *Campylobacter*, to develop more robust estimates, IFSAC's work allows for a greater understanding of how estimates can and should be used over time.

- Ongoing Projects: Annual Report; *Campylobacter* Review and Reanalysis; Multi-Ingredient Foods Attribution
- Future Projects: SE Attribution, Part 2; WGS for *Salmonella* Enteritidis; *Campylobacter* Data Integration

▪ **Improving outbreak-based models**

Solved outbreaks represent some of the best data for connecting illnesses with their sources. Expanding our models to impute sources for unsolved outbreaks using a variety of data sources and methods will improve our models and our understanding of foodborne illness.

- Ongoing Projects: Multi-Ingredient Foods Attribution
- Future Projects: Temporal Trends; WGS for *Salmonella* Enteritidis

▪ **Expanding beyond outbreak-based models**

Although outbreak data are important, key outbreaks represent a relatively small proportion of all illnesses. In addition, attributing illness to specific food sources is only one of several relevant types of attribution. Improving our understanding of the biases related to the use of outbreak data, improving our methods to incorporate sporadic illnesses (e.g., using case exposure data and genomic information from isolates), and considering other types of attribution beyond food sources (e.g., point of contamination) will improve our understanding of foodborne illness. *Campylobacter* has been a particular focus of this theme as outbreak-based models do not appear to fully reflect the source attribution for this pathogen.

- Ongoing Projects: Point of Contamination; *Campylobacter* Review and Reanalysis
- Future Projects: SE Attribution, Part 2; WGS for *Salmonella* Enteritidis; Bias Evaluation; *Campylobacter* Data Integration; Attribution of Illnesses over Time

▪ **Monitoring and reporting changes in attribution over time**

Our ultimate goal is to reduce the burden of foodborne illness. Toward that end, we must have methods not only to estimate illness, but methods that allow us to monitor emerging natural changes and to evaluate the effects of interventions.

- Ongoing Projects: Annual Report
- Future Projects: Temporal Trends; Attribution of Illnesses over Time

▪ **Enhanced communication with stakeholders and partners**

For IFSAC's work to be effective in reducing the burden of foodborne illness, we must be able to communicate our findings and gather input on our efforts. IFSAC maintains a Communication Work Group that focuses on these issues; from assessing the needs of the public in obtaining and using IFSAC's work, to publishing in peer-reviewed journals; to hosting public webinars. Maintaining open lines of communication is key to ensuring that IFSAC's work is timely and meaningful.

- Communication Efforts: Information sharing, outreach, and engagement