Welcome to IFSAC's webinar

Please stand by - we will be starting the presentation soon.

IFSAC Webinar: Strategic Plan and Future Directions
Wednesday, May 31, 2017, 4:00-5:00 pm ET

Time	Speaker	Topic
4:00 – 4:05 p.m. ET	Cary Chen Parker (FDA)	Welcome
4:05 – 4:10 p.m. ET	Katherine Vierk (FDA)	Introduction to IFSAC
4:10 – 4:30 p.m. ET	Joanna Zablotsky Kufel (USDA-FSIS)	IFSAC's Strategic Plan 2017-2021
4:30 – 4:50 p.m. ET	Beau Bruce (CDC)	Future Directions
4:50 – 5:00 p.m. ET	Michael C. Bazaco (FDA)	Question & Answer Session

NOTES

Name: Please log into the Adobe Connect software with your first and last name. If you did not log in with your full name, please close your internet browser, re-open it again, and log back in by entering your full name.

Q & A: Once the webinar begins, you can submit questions by typing text into the **Q & A Box**. Questions related to the content of the presentations can be submitted at any time; but they will be answered at the end of the presentation in the order they were received. We will attempt to answer as many questions as we can in the time allotted. However due to large number of registrants, any unaddressed questions should be directed to the IFSAC inbox: IFSAC@fda.hhs.gov

Recording: The entire webinar session will be recorded (audio & visual). A recording of this webinar will be posted online in the near future.

Technical Difficulties: If you experience problems with the Adobe Connect software, please submit your technical issue in the **Q & A Box** and someone will assist you.

Today's Presenters

- **Ms. Katherine Vierk**, Director of the Division of Public Health Informatics & Analytics (DPHIA) in the Office of Analytics and Outreach (OAO) within the Center for Food Safety and Applied Nutrition (CFSAN) in U.S. Food and Drug Administration (FDA)

- **Dr. Joanna Zablotsky Kufel**, Public Health Food Safety Analyst in the Office of Data Integration and Food Protection (ODIFP) within the Food Safety and Inspection Service (FSIS) at the United States Department of Agriculture (USDA)

- **Dr. Beau Bruce**, Analytics Lead in the Enteric Diseases Epidemiology Branch (EDEB) within the Division of Foodborne, Waterborne, and Environmental Diseases (DFWED) in National Center for Emerging and Zoonotic Infectious Diseases (NCEZID) at Centers for Disease Control & Prevention (CDC)

The Interagency Food Safety Analytics Collaboration (IFSAC):

Strategic Plan and Future Directions

Introduction to IFSAC by:
Katherine Vierk, MPH
Director, Division of Public Health Informatics & Analytics
Center for Food Safety and Applied Nutrition
U.S. Food and Drug Administration

IFSAC Webinar

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IFSAC History

- IFSAC was established in 2011 by:
  - the Centers for Diseases Control and Prevention (CDC),
  - the Food Safety and Inspection Service (FSIS), and
  - the Food and Drug Administration (FDA).
- Guided by a Charter established in 2011 (updated in 2016)
- Strategic Plans 2012-2016, 2017-2021

Why IFSAC is Needed

Purpose

- Address the challenges posed by foodborne illness source attribution.
- Work collectively to:
  - Analyze and interpret human surveillance and food contamination data;
  - Share data and methods; and
  - Monitor progress toward the goal of preventing foodborne illness.

Goals

- Identify, plan, and conduct selected food safety and foodborne illness analytic projects recognized as high priority by all three agencies.
  - Foodborne illness source attribution is the current and sole focus of IFSAC's activities.
- Improve coordination of federal food safety analytic efforts.
- Address cross-cutting priorities for food safety data collection, analysis, and use.

Our Approach

Interagency collaboration which:

1. Builds on a history of working together on source attribution
2. Applies advances in source attribution methods
3. Leverages knowledge, expertise and data among agencies
4. Builds an efficient structure guided by strategy
5. Prioritizes communications and stakeholder input

Shared Structure and Strategy

- **Steering Committee (SC)**
  - 2 members from each agency able to commit resources
  - Annual rotation of chair person among agencies
  - Assess, approve and oversee IFSAC projects
- **Technical Workgroup (WG)**
  - Designated group of agency experts and analysts
  - Understand the needs of each agency
  - Develops proposals and plans for IFSAC projects
  - Coordinates IFSAC activities within each agency
- **Project Teams**
  - Assigned agency experts performing specific projects

Shared Structure and Strategy (continued)

Communications Workgroup (CWG)

- At least two people from each agency, including at least one TWG member.
- Individual agency communication specialists are welcome to attend meetings.
- Advises the IFSAC on the development and implementation of communication materials.
- Coordinates with Agency communications specialists to ensure harmonization of communication materials and messaging.
- Coordinates with IFSAC project teams to develop communication materials for external audiences
  - Conference materials, manuscripts, webinars, and press releases, among other materials.
- Coordinates and responds to media or other external inquires.

Outreach and Information Sharing

- **Established IFSAC website**
  - https://www.cdc.gov/foodsafety/ifsac/index.html
- **Public meetings**
  - 2010, 2012, 2015
- **Webinars**
  - 2013, 2014, 2017
- **Conference presentations**
  - 2011 – 2016
  - Society for Risk Analysis, International Association for Food Protection, Council of State and Territorial Epidemiologists, Association of Food and Drug Officials

Outreach and Information Sharing (continued)

- **Other presentations**
  - 2011 - FDA Risk Communications Advisory Committee consultation
  - CDC FSMA Surveillance Work Group

- **Podcast**
  - 2016 – Emerging Infectious Disease Journal Podcast

- **Article/interview on IFSAC**
  - 2017 – Food Chemical News

IFSAC Webinars

- Low cost, easily accessible mode of communication with stakeholders
- Ability to expeditiously share project updates and results before publication in peer review journals
- Goal is to have webinars annually
- Feedback from stakeholders is essential
- Today: Strategic Plan and Future Directions

The Interagency Food Safety Analytics Collaboration (IFSAC):

Strategic Plan and Future Directions

IFSAC's Strategic Plan 2017-2021 by:
Joanna Zablotsky Kufel, PhD, MPH
Public Health Food Safety Analyst
Office of Data Integration and Food Protection (ODIFP)
Food Safety and Inspection Service (FSIS)
United States Department of Agriculture (USDA)

IFSAC Webinar

Wednesday May 31, 2017

Outline

- Background
- 2012-2016 IFSAC Strategic Plan Overview and Accomplishments
- Development of 2017-2021 Strategic Plan
- Plan Structure
- Plan Goals, Objectives, and Strategies
- Ongoing Project Updates
- New Project Proposals/Ideas
- Future Directions/Action Plan

Background

- To enhance the safety of our food, three federal agencies—the Centers for Disease Control and Prevention, the U.S. Food and Drug Administration, and the Food Safety and Inspection Service of the United States Department of Agriculture—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.
- IFSAC's work is currently focused on foodborne illness source attribution, defined as the process of estimating the most common food sources responsible for specific foodborne illnesses.

IFSAC Strategic Plan 2012-2016

- As IFSAC was a new group, the first Strategic Plan contained substantial background, methods, and context sections.
- Plan contained 5 objectives, 4 short term plans, 3 long term plans, and a strong focus on communication.
- Plan was shared at 2012 public meeting and in many public forums.
- Projects described in Plan were designed to complement each other to ensure efficiency and build on each other to allow for increasingly challenging objectives and projects.
- Major accomplishments are highlighted in a “Wrap-Up” document to be published on the IFSAC webpage in the near future.

Accomplishments in First Five Years

- **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 *Salmonella* Enteritidis (SE) illnesses attributable to shell eggs and other food categories
- **Sporadic and Outbreaks Comparison**: Compared characteristics of sporadic and outbreak-associated foodborne illnesses

Accomplishments in First Five Years (continued)

- **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, *Listeria monocytogenes (Lm)*, and *Campylobacter)* using outbreak data

Development of 2017-2021 Plan

- CDC, FDA, and USDA-FSIS developed individual statements of need related to attribution.
- Statements of need were combined to develop an overarching Plan framework, in addition to exploration of new areas in need of work.
- For the 2017-2021 Plan, IFSAC focused more deliberately on high level goals and objectives, rather than specific implementation level “projects”.
- Goals, objectives, and strategies were developed to address these overarching needs and other considerations.
- Input received from the CDC Board of Scientific Counselors Food Safety Modernization Act (FSMA) Workgroup was incorporated into the final version of the Plan.

IFSAC Strategic Plan 2017-2021

Key Points:

- Builds on accomplishments from previous plan
- Continues focus on improving foodborne illness source attribution
  - Continued emphasis on developing and applying new and existing methods and models
  - Continued emphasis on quantifying and describing uncertainty
- Enhances focus on trend analysis/changes over time
- Seeks to enhance collection of data, better utilize existing data streams, and identify and apply new data streams
- Seeks to improve the stakeholder communication and feedback loop and expand communication and outreach activities

2017-2021 Plan Structure

- **Focus:**
  - Improve foodborne illness source attribution and the understanding of how it changes over time
- **3 Goals:**
  - Data Sources
  - Models/Methods
  - Communication
- **Objectives:**
  - 2-3 specific objectives per goal
- **Strategies:**
  - 2-3 activities/approaches IFSAC intends to conduct to achieve objectives

2017-2021 Goals

- **Goal 1:** Improve the use and quality of new and existing data sources to conduct analyses and develop estimates

- **Goal 2:** Improve analytic methods and models

- **Goal 3:** Enhance the use of and communication about IFSAC products

Goal 1 Objectives and Strategies

- **Objective 1.1:** Enhance the collection and quality of relevant source data
  - **Strategy 1.1.1**: Identify major gaps in relevant data and data sources
  - **Strategy 1.1.2**: Actively advocate for ways to close identified data gaps through acquisition of new and existing data and sources of data
  - **Strategy 1.1.3:** Support states and local public health agencies in the collection of data relevant to IFSAC

- **Objective 1.2:** Enhance the use of existing foodborne illness surveillance data sources
  - **Strategy 1.2.1:** Work with regulatory agencies to incorporate regulatory sampling, inspection, and enforcement data into attribution studies
  - **Strategy 1.2.2:** Evaluate the use of existing laboratory-based surveillance data

- **Objective 1.3:** Incorporate genomic data and other novel data sources
  - **Strategy 1.3.1:** Develop mechanisms to obtain and incorporate whole genome sequencing (WGS) data
  - **Strategy 1.3.2:** Explore the application of other novel public and private data sources

Goal 2 Objectives and Strategies

- **Objective 2.1:** Explore ways to address key gaps in data quality, quantity, methods, and models
  - **Strategy 2.1.1:** Explore methods that address data sparseness and missingness
  - **Strategy 2.1.2:** Explore the use of methods to better incorporate uncertainty
  - **Strategy 2.1.3:** Assess and adapt, where applicable, methods from other disciplines

- **Objective 2.2:** Develop new analytic approaches and models to maximize use of already available data
  - **Strategy 2.2.1:** Improve attribution methods based on outbreak data
  - **Strategy 2.2.2:** Develop methods to incorporate sporadic illness surveillance data
  - **Strategy 2.2.3:** Develop methods to assess changes in sources of illness over time
  - **Strategy 2.2.4:** Explore methods to integrate multiple sources of data into attribution estimates and other analyses

- **Objective 2.3:** Expand the availability of technical and scientific expertise through collaboration with internal and external partners
  - **Strategy 2.3.1:** Increase the inclusion of tri-agency participants with programmatic expertise
  - **Strategy 2.3.2:** Identify and incorporate external technical and scientific expertise

Goal 3 Objectives and Strategies

- **Objective 3.1:** Enhance relationships and engagement with both internal and external groups
  - **Strategy 3.1.1:** Enhance engagement with scientific groups and external stakeholders
  - **Strategy 3.1.2:** Engage agency stakeholders on ways to assess impact of agency policies and regulations and inform new policies

- **Objective 3.2:** Improve the synthesis, interpretation, and dissemination of analytic products for multiple audiences
  - **Strategy 3.2.1:** Identify audience for and assess gaps in IFSAC products
  - **Strategy 3.2.2:** Identify and implement improved approaches to communicate differences in attribution estimates
  - **Strategy 3.2.3:** Work with federal partners to increase use of IFSAC methods and estimates

2017-2021 Action Plan

- The IFSAC Action Plan will describe ongoing, new, and potential future projects that support the implementation of the 2017-2021 Plan.
- IFSAC will utilize its existing process for developing, approving, and monitoring progress on projects that support the Strategies and Objectives.
  - See IFSAC Charter for more detail https://www.cdc.gov/foodsafety/ifsac/overview/charter.html
- Several existing projects will continue under the new Plan and several new projects expected to begin in 2017-2018.

ONGOING AND RECENTLY INITIATED PROJECTS

Ongoing and Recently Initiated 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, *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, *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 SE illnesses.

Current Project Highlights

- Intend to release first annual outbreak attribution report with data from 1998-2013 in Fall 2017.
- Developing manuscript describing new tri-agency food categorization scheme.
- Evaluated multiple datasets to assess point of contamination information and currently developing rules to attribute outbreaks to those points.
- Developed for *Campylobacter* literature review a preliminary 'search validation' library, search and literature coding strategies, and began preliminary analysis.
- Conducted preliminary review of methods for *Campylobacter* case-control study reanalysis and plan to use additional advanced methods such as random forest, Lasso and other constrained regression methods.
- Exploring clustering algorithms for multi-ingredient foods and evaluating hierarchical modeling approaches for attributing illnesses to possible ingredients.
- Developed a model for analysis of temporal trends in total number of outbreaks (4 priority pathogens) in food categories
- Evaluated FoodNet *Salmonella* case exposure and WGS data to develop estimated attribution fractions.

NEW PROJECT PROPOSALS AND IDEAS

The Interagency Food Safety Analytics Collaboration (IFSAC):

Strategic Plan and Future Directions

New Project Proposals and Ideas by:

Beau Bruce, MD, PhD

Analytics Lead, Enteric Diseases Epidemiology Branch (EDEB)

Division of Foodborne, Waterborne, and Environmental Diseases (DFWED)

National Center for Emerging and Zoonotic Infectious Diseases (NCEZID)

Centers for Disease Control & Prevention (CDC)

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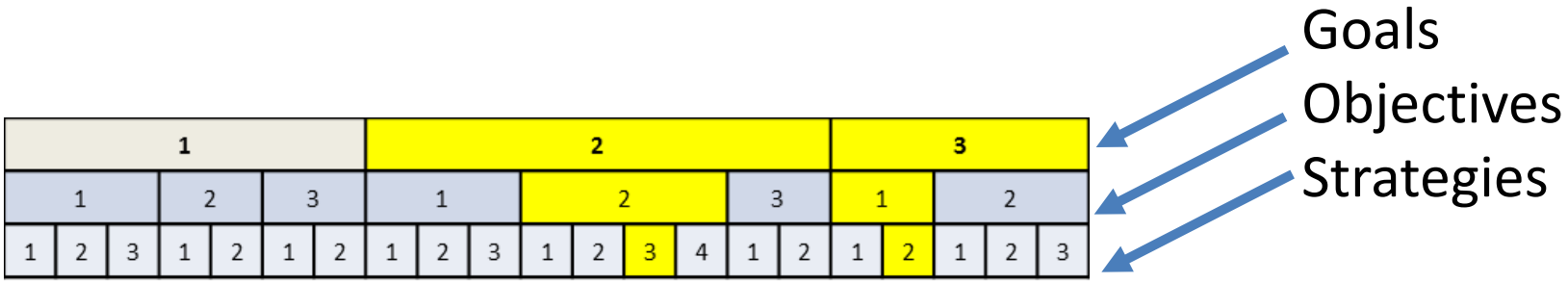
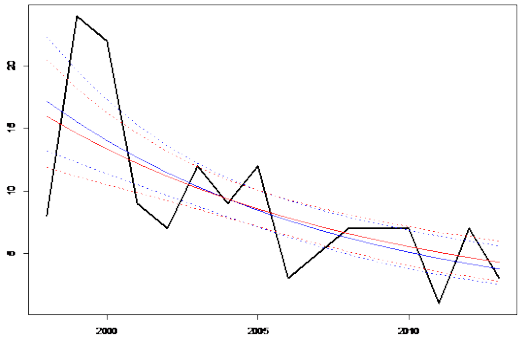
Goals/Objectives/Strategies Widget

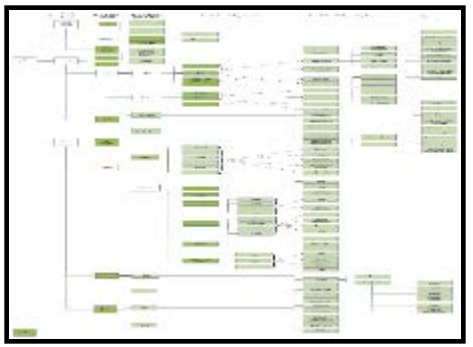
This widget will show how each subsequent project we discuss relates to the goals, objectives, and strategies of the IFSAC Strategic Plan:



Trends in Outbreaks, Illnesses, and Changes over Time

- **Evolution of "Change Over Time" project with new aims:**
  - Evaluate at the level of pathogens and food categories (using IFSAC hierarchy)
  - Evaluate illness counts in addition to outbreak counts
  - Develop methodologies for assessing statistical significance of changes between periods of time
- **Can inform improved FSIS measures and FDA FSMA evaluations**





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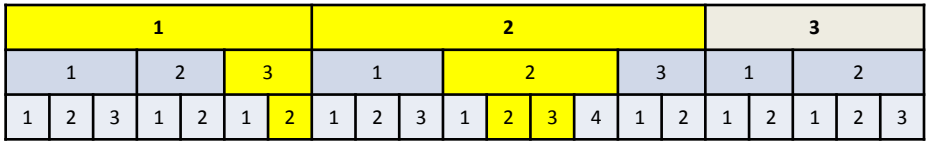
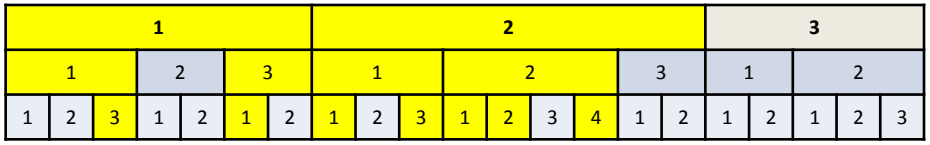
Using exposure data to update SE attribution fractions

- Evolution of case exposure ascertainment work in SE
- Prior project highlighted challenges of case-case comparison with the non-SE as “controls”
- Aim to incorporate alternative, hopefully more population representative, sources of exposure data for comparison using similar methodology, e.g., National Health and Nutrition Examination Survey (NHANES), old and new FoodNet Population Survey

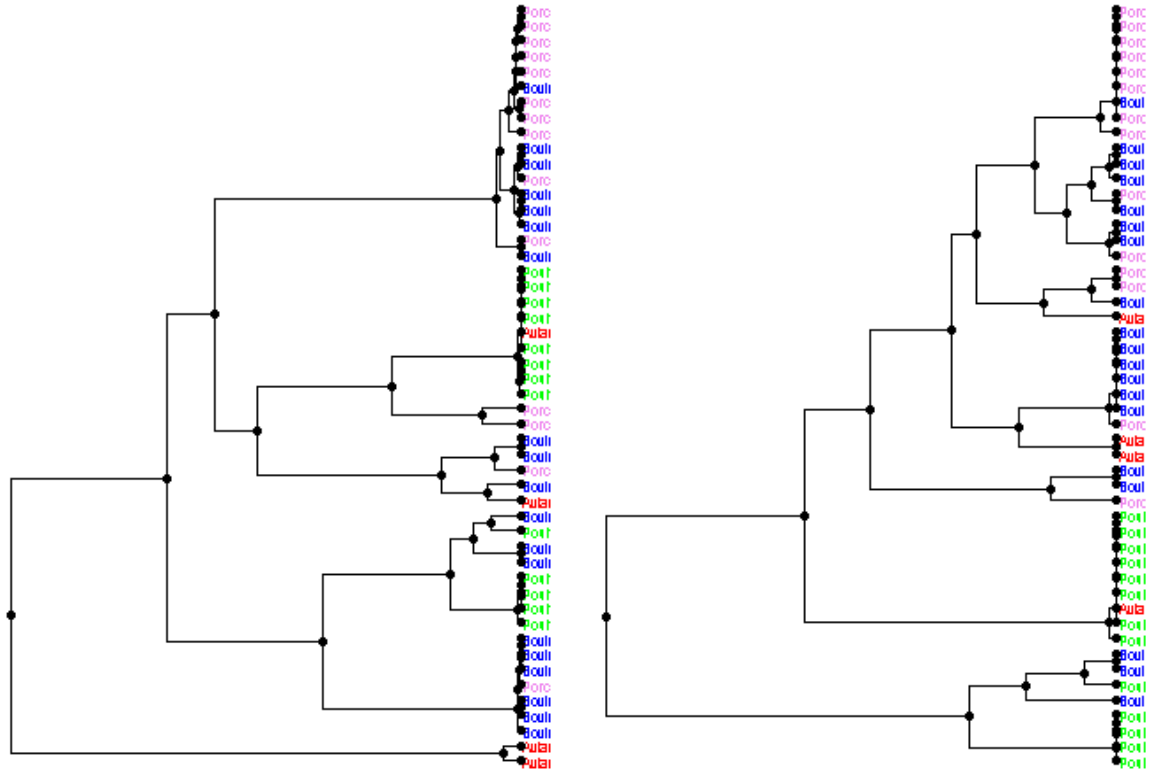


Expand WGS attribution for SE

- Evolution of prior SE WGS work
- Incorporate epidemiologic information and determine which elements are most helpful
- Compare phylogenetic methods to supervised machine learning
- Expand to a wider group of food and non-food samples
- Evaluate new algorithms, e.g., deep neural networks, that might be able to use some information even from isolates with unknown sources



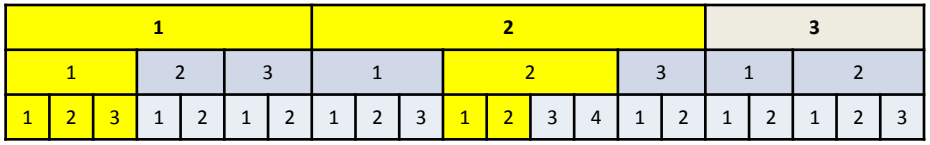
Phylogenetic tree for *Salmonella* Typhimurium



- All 1369 single nucleotide polymorphisms (SNPs) vs. only top ~100 ranked by supervised machine learning

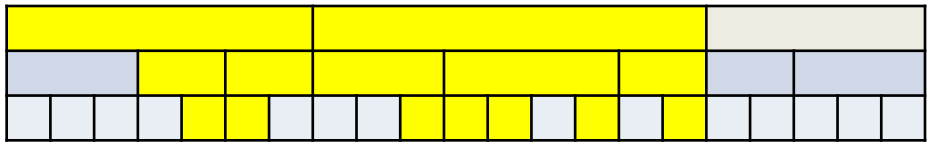
Evaluate biases in outbreak and other data

- Aim to develop improved outbreak based models and inform ways to impute missing data
- Compare multistate (presumed to generally be better investigated) to single-state outbreaks
- Compare states organized into funding tiers
  - FoodNet/FoodCORE/FDA Rapid Response Teams
  - OutbreakNet Enhanced
  - OutbreakNet



Improve *Campylobacter* attribution

- Integrate use of case exposure ascertainment, whole genome sequencing data, and National Antimicrobial Resistance Monitoring System (NARMS) data
  - Perform Hald-type (e.g., asymmetric island model with multilocus sequence typing (MLST)) attribution
- Consider meta-analytic approaches to incorporation of other attribution data into current outbreak-based approaches or inform new studies to close gaps
  - Case-control studies
  - Expert elicitation



Needs Assessment

- Assess needs around attribution related to food and other sources for pathogens commonly transmitted by food
- Evaluation of needs of various stakeholder groups
  - Internal
  - External
    - Scientific community
    - Advocacy groups
    - Industry groups
    - Foundations
    - Public
    - Etc.
- Possibly in coordination with subject matter experts within FSIS & FDA

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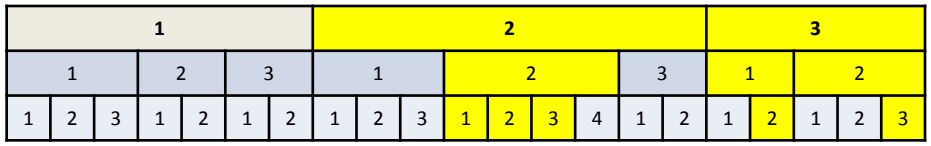
Development of a tri-agency illness count method

- Create a regularly updated national estimate of the number of all illnesses by pathogen
- Provide solution to zero-sum game limitation of current tri-agency attribution fractions
- Provide uncertainty in estimates which is currently not a feature of IFSAC's illness count measures
- Incorporate results from change over time projects
- Will likely need periodic major updates with interim methods for annual reporting



Key non-project proposals

- Communication workgroup
  - Technical update likely on trend project or tri-agency attribution report in late 2017
  - Possible public meeting around work on single pathogen synthesizing different models in 2018
- Engagement with surveillance system and other data source teams
- Consider annual/semiannual roundtable interaction with other groups with aligned multiagency missions (e.g., Interagency Risk Assessment Consortium (IRAC), etc.)

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Next Steps

- Wrap Up and Action Plan to be released on IFSAC webpage
- Continue ongoing projects, initiate new projects, and keep communicating results to the public

Question & Answer Session

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