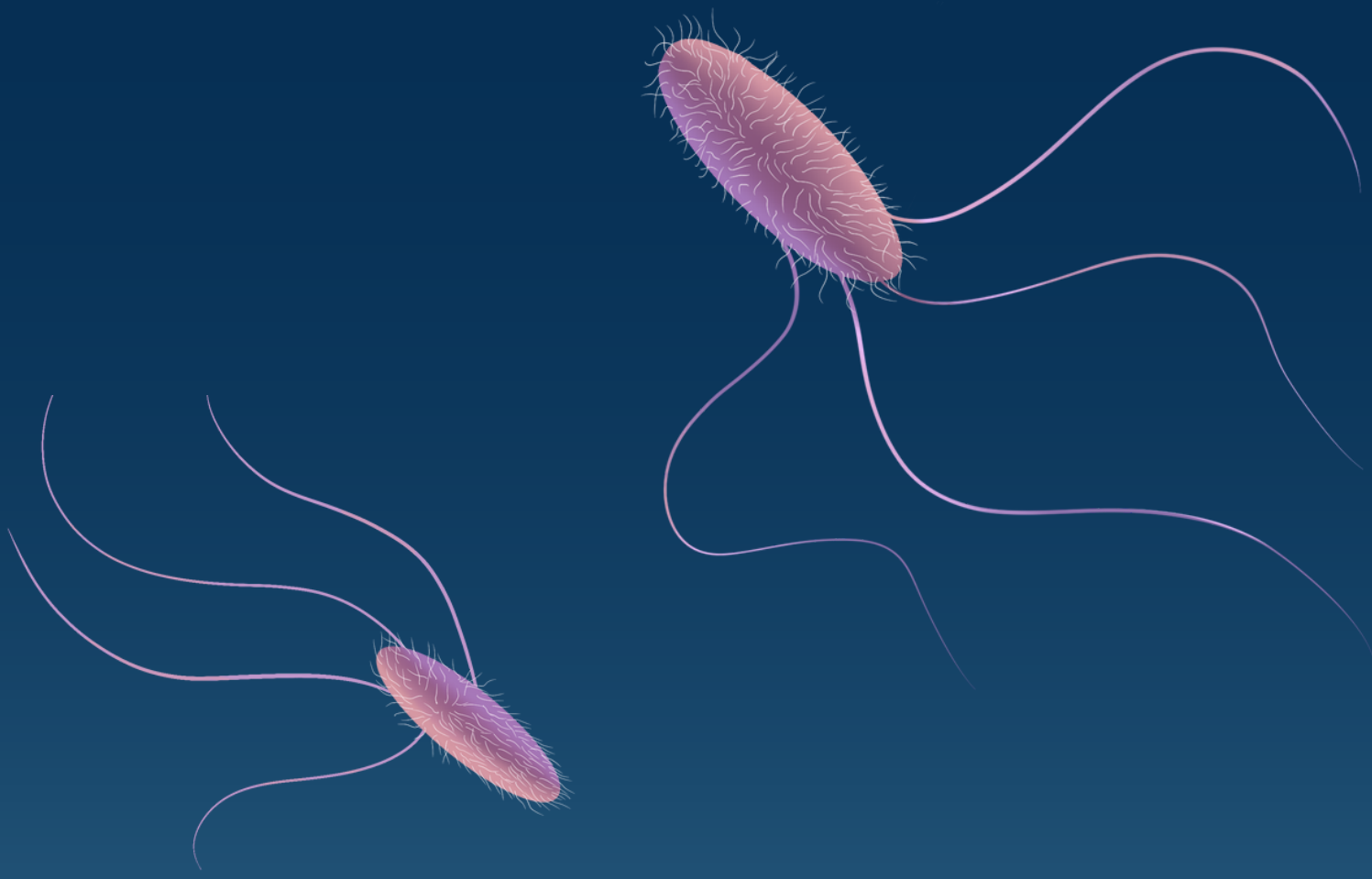
AN ACPV WORKSHOP

SALMONELLA OUTBREAKS:

DIFFERENT PERSPECTIVES ON FOODBORNE PATHOGEN OUTBREAKS

APRIL 14, 2024 | SALT LAKE CITY, UTAH



2024 ACPV Workshop

SUNDAY, APRIL 14, 2024

SCHEDULE AT A GLANCE	
Regulations and Foodborne Outbreak Investigation Perspectives	
8:00 AM	**Continental Breakfast**
9:00 AM	**Welcome** Dr. Michelle Kromm, *Food Forward LLC*
9:05 AM	**Past, Present, Future of Food Safety Regulations** Dr. Emilio Esteban, *Office of Food Safety, USDA*
9:25 AM	**Past, Present, Future of Diagnostic Approaches to Food Safety** Dr. Heather Carleton, *Enteric Diseases Laboratory Branch, CDC*
9:45 AM	**Q&A**
Outbreak Communication	
10:00 AM	**Introduction of Second Session Speakers** Dr. Bruce Stewart-Brown, *Perdue Farms*
10:05 AM	**How Interagency Communications Work** Dr. Matt Wise, *Outbreak Response and Prevention Branch, CDC*
10:25 AM	**Journalist's Perspective on Food Borne Illness Outbreaks** Mr. Michael Grabell, *ProPublica*
10:45 AM	**Food Company's Actions and Stakeholder Communication** Dr. Bob O'Connor, *PurePath Dynamics LLC*
11:05 AM	**Q&A**
11:35 AM	Lunch
Role of Litigation	
1:00 PM	**Introduction of Third Session Speakers** Dr. Tim Johnson, *University of Minnesota*
1:05 PM	**Plaintiff's Perspective** Mr. William Marler, *Marler Clark*
1:25 PM	**Defense Perspective** Ms. Alyssa L. Rebensdorf, *Faegre Drinker Biddle & Reath LLP*
1:45 PM	**How Litigation has Influenced Food Systems' Policy** Panel Discussion
2:00 PM	**Break**
How Do We Improve Human Health Outcomes	
2:15 PM	**Introduction of Fourth Session Speakers** Dr. Trish Marsh Johnson, *Eastman Chemical Company*
2:20 PM	**Private/Public Partnerships are Possible-Case Examples** Dr. Randy Singer, *University of Minnesota*
2:40 PM	**Risk Assessment- Identification of the Next Outbreak Strain** Dr. Tim Johnson, *University of Minnesota*
3:00 PM	**Q&A**
3:15 PM	Closing Comments

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Michelle's Letter

Past, Present, Future of Food Safety Regulations
Dr. Emilio Esteban, *Office of Food Safety, USDA*
9:05 AM

Biography

Dr. José Emilio Esteban was sworn in as under secretary for food safety on January 4, 2023. In this role, Dr. Esteban leads the Office of Food Safety at the U.S. Department of Agriculture (USDA), overseeing the Food Safety and Inspection Service (FSIS), which has regulatory oversight for ensuring that meat, poultry and egg products are safe, wholesome and properly labeled.

In August 2018, he was appointed FSIS chief scientist where he served as the primary scientific advisor on matters of public health and food safety that affect the mission of the agency. In 2002, Dr. Esteban joined the FSIS Office of Public Health Science (OPHS) as the director of the Western Laboratory. In this role, he directed the implementation of the sampling program and was responsible for the facility, equipment and personnel infrastructure. In 2008, he was appointed as the FSIS science advisor for laboratory services and then as executive associate for laboratory services, where he harmonized the operation of all three FSIS laboratories, maintained operations to meet with the ISO17025 standard and coordinated emergency response.

Dr. Esteban has also been very active in the international food safety arena, serving as Chair of the Codex Committee on Food Hygiene from 2008 to 2023. Prior to joining FSIS, Dr. Esteban worked in several positions at the Centers for Disease Control and Prevention (CDC). From 1994 to 2002, he was as an epidemic intelligence service officer; a staff epidemiologist in the National Center for Environmental Health; and an assistant director for the CDC Food Safety Office.

He received his doctorate in veterinary medicine from Mexico's Universidad Nacional Autonoma de Mexico, a Master of Business Administration from the Panamerican Institute, and a Master of Preventive Veterinary Medicine, as well as a doctorate in epidemiology from the University of California at Davis.

Abstract

Session Title: Regulations and Foodborne Outbreak Investigation Perspectives
Presentation Title: Past, Present, and Future of Food Safety Regulations
Dr. Emilio Esteban, DVM PhD MPVM MBA

The Food Safety and Inspection Service (FSIS) is the public health agency of the U.S. Department of Agriculture (USDA). The agency is responsible for ensuring that domestic and imported meat, poultry, and egg products are safe, wholesome, and properly labeled. FSIS' authority is derived from several Acts of Congress, including the Poultry Products Inspection Act (PPIA). FSIS ensures food safety through a series of regulations that define how establishments can operate to produce a safe and wholesome product and FSIS inspection personnel verify that establishments meet the regulatory requirements. Since the PPIA was established in 1957, FSIS' regulations have evolved along with changes in the poultry industry and advancements in science and laboratory technology.
FSIS has focused on reducing *Salmonella* in poultry products since enactment of the Pathogen Reduction and Hazard Analysis and Critical Control Point (PR/HACCP) rule in 1996. Among other things, the PR/HACCP final rule established *Salmonella* pathogen reduction performance standards to allow FSIS to verify whether establishments have effective process controls to address *Salmonella*.

The initial performance standards were chosen based on achievability (establishments had at least an 80% chance of passing if their *Salmonella* prevalence was equivalent to the industry average). Since publishing the PR/HACCP final rule, FSIS has updated the performance standards for poultry products through a series of *Federal Register* notices that describe changes in FSIS sampling protocols (e.g., set-based, moving average), how FSIS evaluates establishment performance (e.g., pass/fail, categorization), and consequences for establishments that do not meet performance standards. Concurrently, FSIS has adopted new laboratory technology, such as pulsed field gel electrophoresis (PFGE) subtyping and whole genome sequencing (WGS).

FSIS' existing performance standards cover chicken and turkey carcasses, comminuted chicken and turkey, and chicken parts. The standards for these products are based on a 2015 risk assessment model that predicted a 25% reduction in the prevalence of *Salmonella*-positive standards following implementation of each standard. Results of FSIS' *Salmonella* verification sampling show that the current prevalence-based performance standards have been effective in reducing *Salmonella* contamination in poultry (e.g., during the 5-year period from 2017–2021, the number of chicken samples in which FSIS detected *Salmonella* decreased by more than 50 percent).

Even as *Salmonella* prevalence in raw poultry products has declined, the incidence of salmonellosis has remained stagnant. The Department of Health and Human Service's Healthy People target for a 25% reduction in incidence of salmonellosis was not met in 2010 or 2020 and remains the current goal for Healthy People 2030. The Centers for Disease Control and Prevention estimates that *Salmonella* is responsible for over 1 million cases of foodborne illness each year in the United States. Since the Interagency Food Safety Analytics Collaboration first began generating attribution estimates in 2012, it has estimated that between 17% and 23% of domestically acquired foodborne *Salmonella* illnesses are attributable to consumption of poultry.

In October 2021, FSIS announced that it was launching a comprehensive effort to revise its existing strategy for controlling *Salmonella* contamination in raw poultry products in a way that would reduce human illness. The agency initiated a range of activities to gather the science and data necessary to support action, including hosting a scientific roundtable; initiating development of a risk profile of the *Salmonella* subtypes connected with poultry-associated outbreaks and two quantitative risk assessments for *Salmonella* in raw chicken and turkey; seeking recommendations from the National Advisory Committee on Microbiological Criteria for Foods on how to enhance *Salmonella* control in poultry; conducting an exploratory sampling program in young chicken carcasses; and introducing *Salmonella* enumeration methodology into routine FSIS sampling.

In October 2022, FSIS shared a framework under consideration for a new comprehensive strategy to reduce *Salmonella* illnesses. The framework outlines three components to target *Salmonella* at different points in the slaughter and processing operation. These components include industry testing for *Salmonella* before birds enter an establishment, enhancing establishment process control monitoring and FSIS verification, and implementing an enforceable final product standard that accounts for the risk from different serotypes and quantities of *Salmonella*.

Building on the framework and as a first step towards a new approach, FSIS also proposed declaring *Salmonella* an adulterant at 1 CFU/g in not-ready-to-eat breaded, stuffed raw chicken products in April 2023. Since 1998, FSIS and its public health partners have investigated 14 *Salmonella* outbreaks and approximately 200 illnesses associated with these products. Despite changes in labeling to better inform consumers that these products are raw, data from outbreaks and FSIS' consumer research

show that some people may not realize these products contain raw chicken because the outside is browned and may appear cooked.

In the coming months and years, FSIS will continue to advance its goal of reducing *Salmonella* illnesses attributable to poultry. Science and data will remain the foundation of the agency's evolving approach to pathogens and data sharing will strengthen decision-making for effective policies. Laboratory and vaccine technology will support a One Health approach to controlling *Salmonella* throughout the poultry supply chain. The Agency will continue to enhance food safety and public health through the pillars of innovation, science, and transparency.

Past, Present, Future of Diagnostic Approaches to Food Safety
Dr. Heather Carleton, *CDC*
9:25 AM

Biography
Dr. Heather Carleton, MPH, PhD is the chief of the Enteric Diseases Laboratory Branch (EDLB) in the Division of Foodborne, Waterborne and Environmental Diseases in NCEZID at the US Centers for Disease Control and Prevention. The mission of EDLB is to provide and use quality data, expertise, and effective tools to improve the control and prevention of enteric diseases in the U.S. and around the world. Dr. Carleton joined the CDC in 2012 as a microbiologist and led the development of whole genome sequence-based analysis tools for the transition of the foodborne molecular surveillance network, PulseNet, from pulsed field gel electrophoresis (PFGE) to whole genome sequencing (WGS). She serves as chair of PulseNet USA and co-chair of PulseNet International steering committees. Dr. Carleton leads activities in prevention of enteric diseases, bioinformatics, metagenomics and next generation sequencing in EDLB.

Abstract
Use of Whole Genome Sequencing in the PulseNet National Molecular Surveillance Network

Whole Genome Sequencing (WGS) technologies have revolutionized how United States Public Health and Regulatory Agencies have responded to foodborne disease surveillance, detection, and response. PulseNet, the national molecular surveillance network of over 80 labs that connects food, water, and one-health related illnesses that may be part of an outbreak, fully implemented WGS in 2019. WGS data is comprehensive: antimicrobial resistance, virulence markers, serotype markers, plasmids, and core and accessory genes are all characterized as part of the WGS workflow. Additionally, sequence data is portable and is shared between federal agencies and public repositories, including the National Center for Biotechnology Information, NCBI. Currently, PulseNet sequences approximately 55,000 *Salmonella* isolates annually. The microbial sequence data and analyzed results, associated sample metadata (e.g. year of collection, isolate source, geographical information), and epidemiological information are combined to identify potential outbreaks and other strains, including Reoccuring, Emerging, and Persisting (REP) strains. In this session, we will cover the different ways we can characterize *Salmonella* using WGS and highlight identification and characterization of REP strains.

Outbreak Communication

How Interagency Communications Work
Dr. Matt Wise, *CDC*
10:05 AM

Biography

Matthew Wise is a Captain in the United State Public Health Service and currently serves as the Chief of the Outbreak Response and Prevention Branch in CDC's Division of Foodborne, Waterborne, and Environmental Diseases. His branch is responsible for coordinating epidemiologic investigations into complex, multistate foodborne and zoonotic outbreaks caused by Salmonella, Shiga-toxin producing E. coli, Listeria monocytogenes, and Campylobacter and for leveraging outbreak findings to drive overall prevention of foodborne and zoonotic disease. He joined CDC in 2008 as an Epidemic Intelligence Service Officer assigned to the Division of Healthcare Quality Promotion where he investigated outbreaks of viral hepatitis and other pathogens in healthcare settings. He earned his PhD in epidemiology from the University of California at Los Angeles while working as an epidemiologist at the Los Angeles County Department of Public Health.

Abstract

Session: Outbreak Communication
Presentation Title: How interagency communications work
Presenter: Matthew Wise, CDC

On average, each multistate salmonellosis outbreak in the U.S. includes illnesses in over 10 states. Some outbreaks include illnesses in nearly every state and can include illnesses in other countries depending on the extent of distribution of the contaminated food. U.S. states vary in their structure, but many local health departments have primary responsibility for public health activities. These local health departments number in the thousands. This means that any given multistate outbreak investigation can involve gathering information from people working in hundreds of different agencies that need to collaborate on what information to collect, on how to analyze and interpret that data, and on what public health actions to take. As an outbreak investigation gathers increasing specificity about the potential cause for an outbreak, additional partners from local, state, and federal regulatory agencies and the food industries become involved. The large and diverse number of agencies and other organizations involved in multistate outbreaks may have differing priorities or interpretation of investigational findings, making communication, information sharing, collaboration, and consensus-building key to rapidly and effectively responding to prevent illnesses.

Once a multistate outbreak investigation is initiated, several mechanisms exist to help support partner coordination. The first is the System for Enteric Disease Response, Investigation, and Coordination, or SEDRIC. This information sharing and visualization platform is accessible by health officials at CDC, in state health departments, and in some local health departments. It is also accessible by federal regulatory agencies including the Food Safety and Inspection Service (FSIS) and the Food and Drug Administration (FDA). The goal of this platform is to bring together epidemiologic and microbiologic data streams so that all investigators, regardless of agency, can access and analyze the same outbreak data in real time. The second major mechanism for interagency communications are multiagency conference calls. CDC hosts one type of these calls, referred to as a "Multistate Call", during which each agency can share investigation updates, including any regulatory agencies that are involved. These calls allow agencies to collectively interpret the most recent findings and develop consensus on the next investigational steps.

Collaboration and communication between federal food safety agencies during multistate outbreaks has evolved significantly over the last decade, with regulatory agencies becoming involved earlier in the CDC epidemiologic investigation (when there is any suspicion a product they regulate may be causing the outbreak) and CDC remaining involved later in the regulatory investigation to support activities such as product testing and traceback. In addition to large interagency investigational calls (e.g., Multistate Calls), CDC is in daily contact with federal regulatory agencies to share data, to identify information gaps, to develop consensus on interpretation of the strength of evidence linking a potential food to the outbreak, to coordinate outreach to industry, and to determine the need for taking public health actions. In addition to these operational discussions, several opportunities exist to ensure federal agencies agree about the strategic direction of an outbreak investigation.

Making a link between a food and an outbreak is done by assessing the collective weight of the epidemiologic, microbiologic, and traceback information that has been gathered. Once a source for an outbreak is strongly suspected or confirmed, the pertinent regulatory agency may convene a call with the company involved to share details about the investigation, to ask the company about actions they plan to undertake in response to an outbreak (e.g., voluntary recall), and to tell the company about federal agency plans (e.g., issuing an outbreak advisory). These interactions can be complex because they involve balancing evolving investigational data with some inherent uncertainty with the need to act rapidly to prevent illness. When possible, sharing information with companies potentially involved in an outbreak earlier in the investigation (even when significant data gaps exist) can be useful in establishing a more collaborative posture between the company and federal food safety agencies. In outbreaks where public health actions may broadly affect food industries, calls can be held with trade and professional organizations to help them prepare for any actions they may need to take in response to product recalls or consumer advisories.

Interagency communication and coordination can be challenging in outbreaks linked to commercially distributed foods, but significant improvements have occurred in the last decade. Further innovation in interagency interactions, as well as interactions between public health agencies and industry, will continue to be needed to advance food safety in the United States. As whole genome sequencing allows for identification of pathogen strains that not only cause outbreaks, but persist in the U.S. food supply, new models of collaboration will be needed to characterize and intervene to prevent illnesses from these strains.

Steps in a Multistate Foodborne Outbreak Investigation | CDC
Key Partners in Foodborne Outbreak Investigations | CDC
Issuing Foodborne Outbreak Notices | CDC

Journalist's Perspective on Food Borne Illness Outbreaks
Mr. Michael Grabell, *ProPublica*
10:25 AM

Biography
Michael Grabell is a senior editor at ProPublica, where he has written about economic issues, labor, immigration, and trade. He has reported on the ground from more than 35 states, as well as some of the remotest villages in Alaska and Guatemala. His work has appeared in The New Yorker, The Atlantic, and The New York Times and on CBS News and NPR.

Grabell has won two George Polk awards and has twice been a finalist for the Pulitzer Prize — in 2021, as part of a team covering COVID-19, and in 2019, with Ginger Thompson and Topher Sanders, for stories that helped expose the impact of family separation at the border and abuse in immigrant children's shelters. The latter work also won a Peabody award and was a finalist for the Goldsmith Prize for Investigative Reporting.

His work on food safety with Bernice Yeung won a National Press Club Award; his investigation with Howard Berkes at NPR into the dismantling of workers' compensation systems nationwide won the Gerald Loeb Award for business journalism; and his series on the growth of temp and gig work in the economy won an American Society of News Editors award for reporting on diversity.

Grabell is also an adjunct professor at Columbia University and the author of Money Well Spent: The Truth Behind The Trillion-Dollar Stimulus, the Biggest Economic Recovery Plan in History (PublicAffairs, 2012).

Abstract

In May 2018, a rare and virulent strain of salmonella caught the attention of America's top disease detectives. The source of the infections seemed to be everywhere — in patients, grocery stores and chicken plants across the country. Even more alarming was that this strain of salmonella, known as multidrug-resistant infantis, was resistant to four of the five main antibiotics that doctors used to fight severe food poisoning.

Yet with a public health threat unfolding across the country, the Centers for Disease Control and Prevention closed the outbreak investigation nine months later even though people were continuing to get sick. The U.S. Department of Agriculture, which oversees meat and poultry, seemed powerless to act and said nothing to consumers about the growing threat. So supermarkets and restaurants continued selling chicken tainted with drug-resistant infantis.

In 2021, reporters at ProPublica decided to look deeper, diving into USDA's bacteria sampling results and a public inventory of genetic data on foodborne illness cases maintained by the NCBI Pathogen Detection Project at the National Institutes of Health. The analysis showed that infantis continued to run rampant through the country's chicken supply, affecting not just one product or plant but the entire industry. And it was still making thousands of people sick every year. That puzzled the reporters. If the outbreak was still active three years later, why weren't the CDC and USDA warning consumers?

Those questions drove a nearly yearlong examination of America's food safety system, illuminating a dysfunctional regulatory bureaucracy and explaining in part why the U.S. has failed to reduce the rate of salmonella food poisoning over the past 25 years, even as several European countries have seen dramatic declines.

To analyze genomic sequencing data, the reporters worked with a ProPublica data reporter with a background in bioinformatics, who had developed computational tools for analyzing sequencing data as part of her doctoral research at Stanford. They then combined that data with additional data obtained through more than 100 public records requests. The analysis, along with hundreds of internal government records and interviews with nearly two dozen scientists, allowed ProPublica to piece together how gaps in regulations had allowed infantis to spread.

In addition, ProPublica reporters, including one with a master's degree in food systems, built an interactive database called Chicken Checker, which allows users to look up the salmonella records of the plants that produced their chicken and turkey. Rather than relying solely on the USDA's sampling results, the database focuses on the CDC's list of the top 30 serotypes associated with human illnesses.

Building the first-of-its-kind app required combining 15 different datasets and understanding the intricacies of microbiological sampling in food plants.

Through additional reporting, ProPublica documented how efforts to fix the food safety system have failed again and again over nearly 70 years. And to illustrate that the salmonella problem isn't unsolvable, they showed how the turkey industry worked with researchers to eradicate a similar drug-resistant strain known as Reading that had run rampant through its flocks.

Michael Grabell, a senior editor at ProPublica who worked on the salmonella and food safety series, will discuss the project and answer questions about how journalists work.

Food Company's Actions and Stakeholder Communication
Dr. Bob O'Connor, *Retired from Foster Farms*
10:45 AM

Biography
Dr. Bob O'Connor began working in the poultry industry as a preceptor during Veterinary School. Upon graduating with a Doctorate in Veterinary Medicine he matriculated at the University of Georgia into their Master of Avian Medicine program. From there he successfully passed the certification exam of the American College of Poultry Veterinarians. Initially working as a Lab Director for the state of Alabama, Dr. O'Connor transitioned into Production Medicine in 1998, employed as a staff Veterinarian for the largest producer of poultry on the west coast of the United States. In his role as a Production Veterinarian he worked both broiler and turkey growout, breeders and hatcheries. Infectious Bronchitis, Laryngotracheitis, Avian Influenza, Mycoplasma and hatchery Quality Control were areas of focus. Eventually Dr. O'Connor broadened his responsibilities to include finished product Food Safety, Regulatory Compliance and Product Quality. He successfully worked with his team through the 2013 Salmonella Heidelberg outbreak, one of the largest food safety outbreaks attributed to Salmonella in poultry products in the U.S. This first-hand experience enhanced his knowledge of crisis management and the process needed to successfully work through a food safety outbreak. In 2023, Dr. O'Connor retired and is currently available for private consulting for issues related to poultry health, food safety and regulatory compliance.

Abstract
Veterinarians employed by a food animal production company, in my experience, are some of the most intelligent members of the management team. They are also probably some of the most under-rated in that regard. Above Operations, Marketing, Sales, Finance and H.R. stand the Veterinarians. The profession most trusted as confidantes, we tend to know where the proverbial "skeletons are buried", and the deficiencies that ultimately lead to issues, whether in bird health or finished product food safety and quality. Veterinarians are trained in problem-solving like no other persons in the company. We take all the subjective data, combined with objective data, to form an assessment of the problem and lay out a plan to solve it. The proverbial "S.O.A.P." process, as we were taught during our time in Veterinary School. This process is unique to Veterinarians and needs to be respected and incorporated into all aspects involved with resolving a food safety crisis.

Food Safety crises, if Veterinarians are engaged, are more than likely to involve microbes - a subset of the Animal Kingdom we all were taught extensively in school. No other person in the company, with a possible exception being an in-house Microbiologist, would or should know more about this field of study. As such, Veterinarians need to take a seat at the table and have a voice in how a

company responds to an outbreak, how they put together a plan to determine root cause and ultimately how it is solved. We can't take all the credit, because it will be a team effort, but pivotal to success in bringing a company through a food safety crisis is a Veterinarian(s) in my experience.
The process of communicating during a food safety outbreak involves essential steps that a Veterinarian should either take up directly or contribute to:

First – acknowledge the outbreak and concede the company's role and responsibility. This first step is often more difficult to take than might be thought. A lot is at stake, when admitting responsibility for causing an outbreak. The highest leader in the company should perform this step. A CEO is likely the best candidate. The Veterinarian plays a role too, as they provide technical input for any public statements. It is important for highly technical people, such as a Veterinarian, to qualify messaging to its audience. This might be a challenge for some, but it is important for broad messaging that will be read by the general public.

Second – gathering critical information and data to actually resolve the outbreak. This is where Veterinary problem-solving skills absolutely come into play. There is little time to waste during an outbreak, and consumers want to see action being taken by the responsible parties. Wading through the subjective opinions of many internal parties is important but superseded by the goal of gathering objective data to understand the root-cause. Veterinarians should lead in this endeavor. Putting together a solid sampling plan, which is statistically-based is important. Data is only as useful as your ability to compile, process and analyze it. Engaging personnel who have that capacity is key. This might require outside resources in many smaller corporations. Publicizing the basics of this sampling plan is a component to gain consumer confidence that the company is engaged and embracing their responsibility to resolve the issue. A Veterinarian, at this point, may need to explain to the media this sampling plan and its objectives.

Third – with accurate data in-hand, and the root-cause(s) determined, the Action Plan for resolution must be formulated, resourced and put into motion. Consumers want/need to know what is the root-cause of the outbreak and the plausible solution for containing it. This step is crucial for brand survival. Conveying this plan to the media is where the Veterinarian might play a significant role. Oftentimes, there are multi-factorial causes to an issue. The microbes involved, and their detailed nuances, are often beyond the capacity of a C.E.O. or heads of Marketing/Sales/Operations/Finance or H.R. to describe. The Veterinarian must step into the discussion at this point as the most knowledgeable and trusted source of information relative to the cause and the solution.

Fourth – validation of the Action Plan's progress or success needs to occur within a reasonable timeframe. Years cannot go by before the company communicates the decreased risk or eradication of the root cause. Oftentimes the audience at this point is broader than simply the media and consumers. Health Department officials, Regulatory agencies and critical customers require specific communications and will benefit from direct 1-on-1 presentations. Again, the credibility of the Veterinarian is invaluable to the company at this point. Heads of Sales or Marketing will be viewed as biased, which they oftentimes are. Operations staff are not technically astute enough for this role, and Finance executives are completely out of their field with this subject matter. It might be useful to engage a third party auditing firm to further bolster the results of the Action Plan. Such consultants can corroborate the message put forth by the staff Veterinarian. A C.E.O. will not generally be capable of explaining the science that's required to pull together Root-Cause, Action Plan and final Resolution. Technical questions will be difficult for them to field. If the C.E.O. does convey the message, they are often accompanied by the Veterinarian to provide answers to more detailed

questions. "Media Training" is a valuable tool for the Veterinarian to have gained well before this moment.

Fifth and final – the Veterinarian needs to piece together a sampling plan that continuously verifies the Action Plan continues to work. Media and consumers don't forget about food safety outbreaks quickly. It can be several years before the company and its issue are no longer referenced in articles or publications that describe similar outbreaks caused by other companies. The questions will arise as to "current state", and whether the company is still vigilant in preventing another outbreak. History is a prelude to the future, and forgetting the past or pretending it never happened will doom a company to repeating its mistakes. The Veterinarian plays a key role as an "historian" of the truth and the facts of the outbreak. Continuing to promote investments in the Action Plan, even in a scaled-down fashion, is the duty of the Veterinarian.

Role of Litigation

Plaintiff's Perspective
Mr. William Marler, *Marler Clark*
1:05 PM

Biography
Bill Marler is a lawyer best known for his work in food safety and foodborne illness litigation. He is the founder of Marler Clark, a law firm based in Seattle, Washington, that specializes in representing victims of foodborne illness outbreaks. Marler has represented clients in some of the most high-profile foodborne illness cases in the United States, including the 1993 Jack in the Box E. coli outbreak, the 2006 Dole spinach E. coli outbreak, the 2011 Listeria outbreak linked to cantaloupes from Jensen Farms and the 2018 Romaine E. coli outbreak.

Bill has also been a strong advocate for food safety reform and has worked with government agencies and industry leaders to improve food safety standards to prevent future outbreaks. Bill has been recognized for his work with numerous awards and accolades, including both the Seattle University Distinguished Law Graduate and Professional Achievement Awards, the Washington State Public Justice and Outstanding Lawyer Awards. Bill's work has been profiled in the book "Poisoned" and in the Netflix documentary of the same name.

Abstract
N/A

Defense Perspective
Ms. Alyssa L. Rebensdorf, *Faegre Drinker Biddle & Reath LLP*
1:25 PM

Biography
Alyssa Rebensdorf leverages more than two decades of litigation and food law experience to help food industry clients solve their legal challenges. A core member of Faegre Drinker Biddle & Reath's nationally recognized Food Litigation and Regulatory practice group, Alyssa's practice emphasizes providing strategic counsel and legal services to food and ingredient manufacturers, distributors and

retailers during post-recall litigation in state and federal courts nationwide. She also advises food industry clients on various risk management and regulatory compliance issues to help them avoid litigation. She specializes in defending foodborne illness claims as well as guiding clients through other post-recall challenges, including root cause investigation, supply chain concerns, evidence preservation protocols, third-party claims for recall losses and claims resolutions strategy. With a strong comfort zone in the world of science, she enjoys working with experts to translate complex medical and microbiological information for clients and fact finders alike.

Abstract
N/A

How Do We Improve Human Health Outcomes

Private/Public Partnerships are Possible-Case Examples

Dr. Randy Singer, *University of Minnesota*
2:15 PM

Biography
Randall S. Singer, D.V.M., M.P.V.M, Ph.D.

Dr. Singer is a Professor of Epidemiology at the University of Minnesota in the Department of Veterinary and Biomedical Sciences, College of Veterinary Medicine. He received his DVM and MPVM from UC Davis in 1995 and his PhD in Epidemiology from UC Davis in 1999. Dr. Singer's research and educational program has focused on predicting the emergence, spread and persistence of infectious diseases. He has devoted most of his research program to the topics of antimicrobial use and resistance and foodborne illness. He served as a voting member of the U.S. Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria from 2015 to 2019. He currently serves as Editor-in-Chief of the journal Zoonoses and Public Health as well as the journal Avian Diseases.

Abstract
Developing public/private partnerships to better understand the spread of foodborne pathogens.

Randall S. Singer
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Salmonella continues to be a significant human health problem, and while illnesses due to some foodborne bacteria have decreased, salmonellosis cases in the U.S. have remained steady. Many of the illnesses are attributed to animal agriculture. When viewed in the farm to fork continuum, monitoring and surveillance systems in the U.S. for foodborne pathogens have focused primarily on the processing plants, retail meats, and reported human illnesses. Each of these components is overseen primarily by a different agency of the U.S. federal government. In this framework, USDA-FSIS conducts sampling in the processing plants, FDA-CVM oversees sampling in the retail sector, and CDC works with state and local health departments to assemble reported human illness data. Over the past decade, these three data streams have become more integrated. However, there is currently no consistent and representative effort to collect data from animal production systems, and access to sensitive on-farm data currently requires collaboration with the animal producers and/or production companies. To understand the spread of foodborne pathogens in the U.S., it is necessary to incorporate data from U.S. animal production systems. There are different ways in which this can be accomplished, each with its challenges and palatability.

One approach to gaining access to on-farm data would be through state or federal legislation. As an example, Senate Bill 2782 was introduced by Senator Booker in September 2023 (https://www.govinfo.gov/app/details/BILLS-118s2782is/summary). The short title of this Bill is the "Expanded Food Safety Investigation Act of 2023" and would "provide the Food and Drug Administration with authority to conduct microbial sampling on concentrated animal feeding operations as necessary to facilitate a foodborne illness outbreak investigation, determine the root cause of an outbreak of foodborne illness, or address other public health needs." Specifically, the Bill states that the "Secretary [of Health and Human Services] may request access to a concentrated animal feeding operation in order to conduct microbial sampling, if the Secretary determines that such microbial sampling is necessary in order to facilitate a foodborne illness outbreak investigation, determine the root cause of an outbreak of foodborne illness, or address other public health needs." Legislating access to farms without consent of the producers or production companies, or even utilizing the expertise of those responsible for raising the animals, is one approach to understanding the spread of foodborne pathogens but is likely to be poorly received by the animal production sectors. This approach will also likely lead to a biased sampling design, failing to fully appreciate the ecological landscape of Salmonella in farm environments.

A second approach, and the one that I believe would result in more stakeholder participation and would be more likely to provide value-added data, is the development of public/private partnerships. In this type of arrangement, the animal producers and production companies (private sector) partner with the state and federal governmental agencies to share data and information on foodborne pathogens. Because of the sensitivity of the on-farm information, a third party can serve as an intermediary in these types of relationships, and academia can (and often has) serve this function. Under this type of arrangement, the data can be anonymized, protecting the identity of specific farms or companies. In 2018, USDA-APHIS led a series of workshops and meetings to help link multiple governmental agencies with animal industry stakeholders. The goal was to develop a framework for the sharing of information related to foodborne pathogens while maintaining the privacy of animal production facilities and their data. Although progress was being made, the COVID-19 pandemic stalled this effort. Rather than taking the heavy-handed legislative approach to data sharing, my hope is that efforts to create a framework for effective public/private partnerships can be restarted.

Risk Assessment- Identification of the Next Outbreak Strain
Dr. Tim Johnson, *University of Minnesota*
2:20 PM

Biography
Tim Johnson
Professor, University of Minnesota College of Veterinary Medicine

Dr. Tim Johnson is a Professor in the College of Microbiology at the University of Minnesota. He has worked on bacterial pathogens of poultry for over 20 years, focusing primarily on avian pathogenic Escherichia coli and Salmonella. Tim's laboratory combines high-throughput genomics with traditional microbiology to understand the ecology and evolution of these pathogens. His laboratory has published more than 160 peer-reviewed scientific articles on these topics. Tim is also the Director of Research and Development at the Mid-Central Research and Outreach Center in Willmar, MN, and he co-directs the poultry training programs at the University of Minnesota. Tim lives with his wife Sara and two children in Kimball, MN.

Abstract
Human illness due to foodborne consumption of Salmonella continues to occur, despite efforts to regulate and reduce its occurrence in food. Poultry is one food animal that contributes significantly to this problem. Current molecular tools in place are quite effective at identifying and tracing Salmonella through production chains, and companies have developed extensive mitigation strategies to reduce or eliminate problematic clones once they occur. However, this reactive approach often results in human illness burden before mitigation is achieved, and it is costly for the producer to alleviate the problem in a time of chaos. Reducing the gap between identifying and mitigating high-risk clones is a pressing need for producers. This presentation will introduce a new concept for identifying high-risk Salmonella strains using a combination of high-resolution genomic analyses, rapid phenotypic screens, and predictive modeling. A similar approach will also be discussed for avian pathogenic Escherichia coli, one of the most impactive pathogens in poultry production. The development of a simple-to-use web-based tool for such real-time surveillance will also be presented. Collectively, this work will aid in understanding of how genomic shifts in poultry bacterial pathogens can be identified, and how this information can be used to proactively mitigate risk.