

2013

YEAR IN REVIEW



The American Meat Institute Foundation (AMIF) is a non-profit research, education and information foundation established and funded by the American Meat Institute (AMI) to study ways the meat and poultry industry can operate more efficiently and produce the safest and most nutritious products possible. Since 1999, the AMI Foundation research program has directly sponsored more than 100 food safety research projects at leading universities and research labs, totaling more than \$8.4 million.

AMIF's leaders set clear goals for the Foundation's food safety program: to reduce and ultimately eliminate Shiga toxin-producing *Escherichia coli* in fresh beef, *Listeria monocytogenes* in ready-to-eat meat and poultry products and *Salmonella* in meat and poultry products. In addition to these priority areas, AMIF has "Other Food Safety" research priorities that are designed to identify and address emerging topics of concern. AMIF publicly disseminates research findings, best practices and other educational materials on a broad range of food safety, worker safety, nutrition and consumer information projects.

Dear AMI Members and Stakeholders,

As new challenges confront the meat and poultry industry, I am again pleased to report that the American Meat Institute Foundation (AMIF) has achieved significant accomplishments that are helping the industry adapt to an ever-changing regulatory and consumer environment. Our primary focus remains on improving the safety of meat and poultry products, but increasingly, AMIF is devoting more resources and energy to assuring the wide array of products our industry produces remain part of a healthy lifestyle.

On the food safety front, *Salmonella* control in all segments of meat and poultry production emerged as a top priority for both the industry and government agencies. Recent foodborne illness outbreaks linked to raw meat and poultry products has reemphasized the need to address this pathogen in a more targeted and innovative manner. AMIF met this important food safety challenge by conducting a comprehensive analysis that compared foodborne illness and outbreak data to the prevalence and types of *Salmonella* found on meat and poultry products. The analysis emphasized the need to develop an in-depth public health risk assessment to identify specific causes of human salmonellosis.

While the attention shifted to *Salmonella*, AMIF continued to address issues associated with preventing *Listeria* in ready-to-eat meat and poultry products and Shiga toxin-producing *Escherichia coli* (STEC) in fresh beef products. The industry's continual safety improvements have reduced the prevalence of these pathogens on meat and poultry products to historic lows.

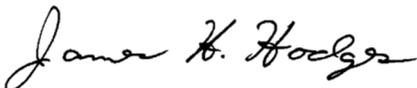
As we look forward to the coming year, the industry faces external threats posed by some nutritional epidemiologists that have found statistical associations with the consumption of processed meats and adverse health outcomes. The *Dietary Guidelines for Americans, 2015* process has begun and defending processed meats as part of a healthy diet will be challenging. AMIF will champion the scientific evidence to promote a "back to balance approach" where all foods in proper proportions can fit into a healthy lifestyle for every American.

The welfare of food-producing animals continues to be a focal point of AMIF activities. In addition to our internationally recognized animal handling guidelines, AMIF is developing an antibiotic stewardship program to address the growing concern of assuring judicious use of antibiotics in animal agriculture.

The accomplishments highlighted in the *Year in Review* would not have been possible without the coordination and cooperation of our industry and government research partners. In particular, we want to thank the National Cattlemen's Beef Association, National Pork Board and U.S. Poultry and Egg Association. AMIF and these industry associations will be jointly hosting a research conference early next year to showcase the research that has made many production and processing improvements possible.

We gratefully thank you for your support and encouragement and look forward to another successful year in 2014.

Sincerely,



James H. Hodges
President

Food Safety Progress

The AMI Foundation's (AMIF) Food Safety Initiative launched nearly 15 years ago to reduce and ultimately eliminate key pathogens on fresh and ready-to-eat (RTE) meat and poultry products has continued its sustained efforts, and federal data continue to reflect similar sustained progress in reducing these pathogens on its products and driving down human illnesses associated with the pathogens.

Data from the Centers for Disease Control and Prevention show that from 2000 to 2012 there were reductions in foodborne illnesses in key categories, including:

- A 45 percent decrease in illnesses caused by *E. coli* O157;
- A 24 percent decrease in illnesses caused by *Listeria*; and
- A 7 percent decrease in *Campylobacter*.

FSIS regulatory data show an 81 percent reduction of *L. monocytogenes* (*Lm*) on RTE meat and poultry products between 2000 and 2011, which is the most recent data available.

It's noteworthy that sometimes success is measured by what doesn't happen. In 2013, there again were no recalls from federally inspected meat and poultry establishments due to listeriosis cases. In fact, there hasn't been a listeriosis illness triggered recall since 2003. That's a very positive development.

Overall, *Salmonella* is declining on meat and poultry. Consider that USDA data showed:

- A 79 percent decline in *Salmonella* in young chickens from the original performance standard and a 43 percent reduction from the new standard in 2012;
- An 89 percent decline of *Salmonella* in turkey from the original performance standard and a 29 percent increase from the new standard in 2012; and
- In terms of *Salmonella*, the downward trend continues with an 85 percent reduction of *Salmonella* in market hogs, 100 percent reduction in cows and bulls, and a 75 percent reduction in ground beef, 37 percent reduction in ground chicken and a 78 percent reduction in ground turkey, all from the performance standard. Only steers and heifers saw a 10 percent *Salmonella* increase from the performance standard.

Despite these successes, challenges remain for the industry. CDC data released in 2013 showed a 17 percent increase in salmonellosis cases in people. It's unclear precisely the extent meat and poultry products contribute to salmonellosis cases, but any illness is one too many. AMIF will continue to coordinate scientific research and best practices that will drive down further *Salmonella* on meat and poultry products and ultimately improve the public health.

"The progress that we made in reducing *E. coli* O157:H7 in fresh beef products and *Listeria monocytogenes* on ready-to-eat meat and poultry products were the result of focus and persistence," said AMI Foundation President James H. Hodges. "We intend to use that same level of effort and persistence in reducing *Salmonella* and other emerging pathogens."

Renewed Focus on Diet and Health

With the *Dietary Guidelines for Americans, 2015* in development now, the AMIF team invested significant efforts in 2013 compiling science to support the strong case for meat and poultry in the diet. AMI Foundation Vice President of Scientific Affairs Betsy Booren, Ph.D., will deliver remarks before the Dietary Guidelines Advisory Committee in January 2014 where she will outline the nutrition benefits that meat and poultry offer and industry efforts to provide choices in the marketplace that meet a variety of nutrition needs.

As part of its efforts to communicate the science about meat and poultry nutrition to a consumer audience, AMIF commissioned a new nutrition piece authored by a registered dietician that outlines the benefits of meat as part of a balanced diet. The piece also explains the value of meat in the diet among certain populations like children, when major growth is occurring, and among the elderly where the risk of muscle loss or "sarcopenia" is great. The piece will be available on www.AMIF.org.

AMIF also continued to be a scientific voice and resource on sodium reduction in the meat industry and helped highlight the food safety and functionality benefits sodium offers, arguing the sodium reduction efforts should proceed with the larger picture in mind.

Booren delivered important remarks about industry's voluntary sodium reduction efforts at the American Heart Association's sodium reduction conference and the Grocery Manufacturers Association-National Restaurant Association-Center for Science in the Public Interest (CSPI) joint conference "Getting to 2,300: A Progress Report and Opportunities for Further Progress."

CSPI this year acknowledged industry's efforts to reduce sodium in an article published in *JAMA Internal Medicine* called "Changes in Sodium levels in Processed and Restaurant Foods, 2005-2011."

CSPI analyzed sodium levels in 480 packaged and restaurant foods over 2005-2011 and did not show dramatic across-the-board reductions. The analysis did, however, highlight the significant reductions in some retail products over the time period: 27 percent in pork, 21 percent in sliced deli turkey breast and 16.2 percent in sliced cheddar cheese, among others.

Leading For Sustained Improvement in Animal Care and Handling

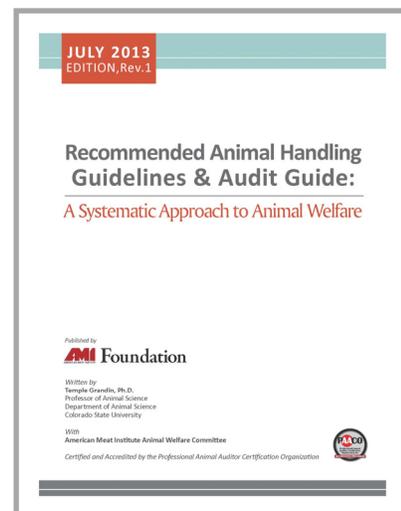
The AMI Foundation continued its leadership in improving animal handling and stunning throughout the meat and poultry industry. A newly updated *Recommended Animal Handling and Audit Guide* was released in 2013 and received the Professional Animal Auditor Certification Organization (PAACO) seal of approval. The guidelines were authored by Colorado State University Professor of Animal Science Temple Grandin, Ph.D.

AMIF's guidelines are the only guidelines approved by PAACO from an association or association foundation.

Likewise, AMIF created a video also featuring Dr. Grandin to clarify the proper use of driving tools in livestock. The video is aimed at educating plant workers about what is acceptable and what is not.

Attendance at the 2013 AMIF Animal Care & Handling Conference approached nearly 300 this year as numerous attendees were drawn by two new tracks: Turkey and Handling and Stunning for Small Plants. Attendees also benefitted from timely education on a systematic approach to animal welfare, proper stunning, consumer attitudes and the customer perspective on animal welfare.

In addition, the *Kansas City Star* covered the conference extensively with a focus on the high school students who were invited to speak about their experiences in learning from the American Meat Institute's Glass Walls videos, which featured video tours of beef, pork and turkey plants narrated by Grandin.



Research

Ongoing Projects

Investigating the Development of Thermal Processing Tools to Improve the Safety of Ready-To-Eat Meat and Poultry Products

*Jeffrey Sindelar; Kathy Glass; Bob Hanson
University of Wisconsin; HansonTech*

This study will investigate the impact of compositional, physical, and intrinsic factors on pathogen lethality and the relationship between relative humidity and wet bulb control to determine if wet bulb could be utilized as a more effective and suitable lethality tool. This project builds on previous AMIF-funded research.

<http://www.amif.org/research/12-321/>

Salmonella Levels in Bone Marrow and Neck Skin of Turkey that are Utilized for Ground Turkey in Relation to Salmonella in Spleen as Predictor

*Walid Alali
University of Georgia*

Research will determine *Salmonella* contamination levels in bone marrow, neck skin, and spleen of turkey carcasses in relation to *Salmonella* status in ground product.

<http://www.amif.org/research/12-304/>

Evaluation of Control Strategies for *Listeria monocytogenes* in Retail Deli Environments with Evidence of High Prevalence

*Haley Oliver
Purdue University*

The project will evaluate control strategies for *Listeria monocytogenes* in retail delis identified as having a higher risk of *L. monocytogenes* prevalence and persistence. The proposed experiments will build on results from an ongoing AMIF, Food Marketing Institute Foundation (FMIF) and USDA funded study, which has identified niches in retail deli environments and utilized existing collaborations with retail chains.

Project is co-sponsored by the FMIF.

www.amif.org/research/11-214/

White Paper: Public Health Impact of Multi-Drug Resistant Pathogens

*Ellin Doyle
University of Wisconsin*

This white paper will define multi-drug resistance as related to different bacterial pathogens; discuss sources of multi-drug resistance and how resistance genes are transmitted among different strains and different species of bacteria; identify multi-drug resistant bacteria associated with different foods and food production animals; evaluate efficacy of interventions to prevent development of multi-drug resistance and to prevent contamination of foods with multi-drug resistant pathogens; and recommend risk mitigation strategies in a preventive food safety process management system.

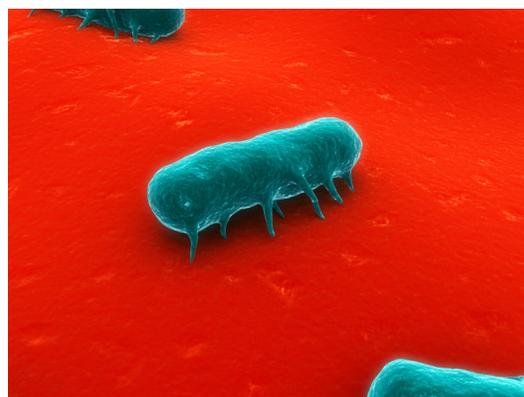
<http://www.amif.org/research/12-401/>

Role of Protozoa in the Persistence of *Listeria monocytogenes* in a Ready-to-Eat Poultry Processing Plant

*Richard Meinersmann; Mark Berrang; James T. Hollibaugh;
Joseph Frank
USDA - Agricultural Research Service; University of Georgia*

This research will determine if bacterivorous protozoa contribute to shaping bacterial communities in food processing plants and influence the survival of *Listeria monocytogenes* in floor drains. The proposed project is designed to identify *Listeria*-lytic protozoa and isolate them for further research in the use of naturally decontaminating floor drains.

www.amif.org/research/08-207/



Completed in 2013

Mitigation of *Salmonella* in Lymph Nodes using Pre-Harvest Interventions

Mindy Brashears; Guy Loneragan; Chance Brooks; Mark Miller; Alejandro Echeverry; Kendra Nightingale; Sara Gragg; Dayna Harhay; Dan Schaefer
Texas Tech University; USDA-ARS, U.S. Meat Animal Research Center; Cargill, Inc.

The project evaluated supplementation of cattle diets with *Lactobacillus acidophilus* NP51 to reduce *Salmonella* in lymph nodes at slaughter and concluded high doses of NP51 could be a viable intervention.
www.amif.org/research/11-304/

Development of Real-time PCR Methodology for the Rapid Enumeration of Low Numbers of *Salmonella* Gram of Ground Beef Without Enrichment

Robert Levin
University of Massachusetts

The study developed methodology to allow the Rti-PCR reaction to detect low numbers (5 cells/g) of *Salmonella* in ground beef of 7, 15, and 27% fat.
www.amif.org/research/11-300/

Developing Validated Time-Temperature Thermal Processing Guidelines for Ready-To-Eat Deli Meat and Poultry Products

Jeffrey Sindelar; Kathleen Glass; Robert Hanson
University of Wisconsin; HansonTech

This study focused on developing new Appendix A style time-temperature tables for non-beef ready-to-eat products such as turkey deli-breast and boneless ham. Researchers also compared the baseline results from the original work that was conducted to develop Appendix A to the results of this study for *Salmonella* in roast beef and confirmed the validity of its effectiveness for pathogenic *E. coli* and *L. monocytogenes* strains.
www.amif.org/research/10-304/

White Paper on Human Illness Caused by *Salmonella* from All Food and Non-Foods Vectors: Update March 2013

Ellin Doyle
University of Wisconsin

This white paper summarized all epidemiological data on the relationships between food and non-food vehicles and vectors, and human illnesses caused by *Salmonella* published in the past 5 years; compares data published since 2008 with that presented in the 2009 white paper for AMIF on vehicles associated with human illness caused by *Salmonella*; describes surveillance strategies, regulations, and industry initiatives to control this pathogen; and identifies gaps in understanding of food attribution data and surveillance strategies for illness caused by *Salmonella*. Funded in part by the Beef Checkoff, Pork Checkoff and U.S. Poultry and Egg Association.
www.amif.org/research/12-350/

Identification of Bovine Reservoirs of Human Pathogenic Non-O157 Shiga Toxin-producing *E. coli*

Mick Bosilevac; Terrance Arthur; Norask Kalchayanand; Steven Shackelford; Tommy Wheeler
USDA-ARS, U.S. Meat Animal Research Center

This project determined the prevalence, level, and types of O157 and non-O157 Shiga toxin-producing *E. coli* in cattle from different production systems.
www.amif.org/research/11-129/

Effect of Flagellin and Intimin Type Expression on Colonization of Bovine Intestine by Non-O157 Shiga Toxin-producing *E. coli* (STEC)

Rodney Moxley
University of Nebraska

Research demonstrated that STEC O26, O45, O103, O111, O121, and O145 strains expressing different flagellar types and variants of intimin adhered to bovine colonic epithelium and induced the formation of attaching-effacing lesions. Interventions that block the effects of flagella, intimin, and other adherence mechanisms in non-O157 STEC may be effective for pre-harvest control of non-O157 STEC in cattle.
www.amif.org/research/10-516/

Listeria Control Ready-to-Eat (RTE) Meat and Poultry Industry: A White Paper on the "Seek and Destroy" Philosophy

*Martin Wiedmann
Cornell University*

This project developed a white-paper addressing the scientific support behind current *Listeria monocytogenes* process controls employed by the ready-to-eat meat and poultry industry. The "Seek and Destroy" strategy is a systematic approach to finding sites of persistent growth in food processing plants, with the goal of either eradicating or monitoring and mitigating effects of niches.

www.amif.org/research/11-213/

White Paper: Review on Epidemiology of Foodborne Listeriosis

*Ellin Doyle
University of Wisconsin*

This white paper provides information on epidemiology of foodborne listeriosis and interventions for controlling this pathogen. Reports of human illness and outbreaks and on levels of contamination of meat and other foods were gathered to demonstrate trends in recent years and identify foods and environments where contamination problems persist.

www.amif.org/research/11-221/



Reducing or Preventing Recovery of Injured Listeria monocytogenes on Ready-to-Eat Natural and Organic "Uncured" Processed Meats

*Joseph Sebranek; James Dickson; Byron Brehm-Stecher;
Stephanie Jung; Aubrey Mendonca
Iowa State University*

Due to the concern for recovery of injured *L. monocytogenes* on natural and organic processed meats where many conventional antimicrobials cannot be used, a series of compounds with antimicrobial potential for use in these products combined with different post-lethality treatments were evaluated for the most effective combinations. The studies demonstrated that selected natural antimicrobial ingredients and post-lethality interventions currently available to manufacturers of natural and organic ready-to-eat processed meats are effective at addressing the potential presence of *Lm* on such products. Moreover, the work further substantiated the effectiveness of a multiple hurdle approach for the control of *Lm* in RTE processed meat products.

www.amif.org/research/10-203/

White Paper: Clostridium difficile as a Risk Associated with Animal Sources

*Ellin Doyle
University of Wisconsin*

The white paper summarizes all historical data on *C. difficile* infections in humans; evaluates epidemiological data on animals, non-animal sources, and foods that have the potential to cause human infections and factors that affect transmission of *C. difficile*; evaluates hospital acquired *C. difficile* infections; evaluates worldwide understanding of *C. difficile* infections and their sources; and identifies the data gaps and discusses how these gaps influence the understanding of *C. difficile* and proposes tasks needed to close the gaps.

www.amif.org/research/11-400/

AMI Foundation Education & Training Programs

Each year, AMIF conducts annual conferences and educational workshops to meet the needs of AMI members, others in the meat and poultry industry and their retail and foodservice customers. AMIF will continue to provide annual conventions and conferences for segments of the meat and poultry industry and to develop special workshops, seminars and other programs to meet needs as they arise.

Below is a brief summary of the objectives of the programs and the results of the training offered in 2013.

Advanced *Listeria monocytogenes* Intervention and Control

More than 85 people attended the Advanced *Listeria monocytogenes* Intervention and Control Workshop, which was held on October 29-30, in Kansas City, Missouri. This workshop focused on the basics for process control and how to build a solid foundation for *Listeria* control through sanitary equipment, facility design techniques and sanitation best practices. In addition to the hands-on sanitary equipment design breakout session, attendees had the opportunity to participate in a heat intervention demonstration at the Weber, Inc. facility in Kansas City.

Animal Care and Handling Conference

The Animal Care and Handling Conference was held October 16-17, in Kansas City, Missouri. In addition to timely presentations on handling and stunning, this year's conference featured presentations on public perceptions of animal welfare, including a panel discussion with Future Farmers of America advisors and students. The conference also featured two new tracks of education: Turkey Handling and Management and Policy: Focus on Small Plants. With Temple Grandin, Ph.D., as the featured instructor, this year's conferences attracted 285 registrants.

Annual Meat Conference

The Annual Meat Conference, co-sponsored by AMIF and the Food Marketing Institute, was held February 24-26, in Nashville, Tennessee, at the Gaylord Opryland Resort & Convention Center. More than 930 registrants attended educational sessions that provided practical, useful information on varied topics including global meat department trends, consumer choices, store innovation strategies, and the impact of the economy on the meat and poultry industry. This year's attendance increased by almost four percent and the annual Product Tasting Reception and Innovation Technology Solutions Exhibits were premier events during the conference.

Conference on Worker Safety, Human Resources and the Environment

The Conference on Worker Safety, Human Resources and the Environment, held March 20-21, at the Westin Crown Center in Kansas City, Missouri, continued to keep attendees ahead of the curve on key safety and environmental issues specific to the meat and poultry industry. Nearly 200 registrants attended sessions covering health clinic programs, plant security and food defense, wastewater design, contractor safety, greenhouse gases and active shooter preparedness. This year, a Fall Protection Short Course was offered as a pre-conference workshop, which attracted almost thirty registrants. Both the Environmental Recognition and Achievement Awards and the Worker Safety Recognition Awards were presented at the Awards Ceremony on March 20, 2013.

Safety Recognition Award Program

The primary goals of the safety recognition award program, administered by the National Safety Council, are to motivate employers to improve their safety performance through the establishment of sound safety and health programs at the plant level and to recognize those plants that have achieved a high level of safety performance as part of a continuing effort to reduce occupational injury and illness.

AMIF recognized the 131 safety award winners in a joint awards ceremony with the Environmental Recognition Awards on March 20. AMI President and CEO J. Patrick Boyle was on hand to distribute the awards and congratulate the award recipients.

Environmental Awards Programs

The Environmental Recognition Awards are administered by the Education and Professional Development Department in conjunction with the Environmental Affairs Committee. The four-tier awards program was developed to provide recognition of a company's dedication to continuous environmental improvement, as witnessed by the development and implementation of Environmental Management Systems. AMIF recognized 124 award winners at the joint Awards Ceremony on March 20. This year, 12 plants were recognized for completing Tier 1; 11 for Tier 2; 61 for Tier 3 and 40 for Tier 4.

An additional eight meat and poultry plants were honored with Environmental Achievement Awards. These biennial awards are presented to member companies that go beyond environmental compliance by designing and successfully implementing an innovative plant upgrade, environmental program or outreach initiative.



Land O'Frost, Inc. receives the Worker Safety Award of Honor for the Lansing, Illinois, Madisonville, Kentucky and Searcy, Arkansas plants.



Indiana Packers Corporation accepts the Worker Safety Award of Merit and the First Place Environmental Achievement Award in Social and Economic Sustainability.

2014 Calendar of Events

Meat and Poultry Research Showcase
January 30, 2014
Atlanta, Georgia

Annual Meat Conference
February 16-18, 2014
Atlanta, Georgia

Conference on Worker Safety, Human Resources and the Environment
April 9-10, 2014
Kansas City, Missouri

Animal Care and Handling Conference
October 16-17, 2014
Kansas City, Missouri

Advanced *Listeria monocytogenes* Intervention and Control Workshop
Fall 2014

AMI Foundation Builds Relationships With Information and Outreach

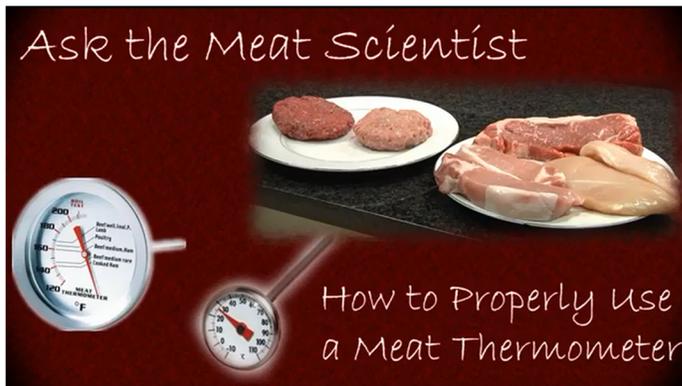
AMIF continued efforts this year to educate consumers on a host of key issues.

For September's National Food Safety Month, AMI created a new "Ask the Meat Scientist" video about proper thermometer use. In the video, AMI Foundation Vice President of Scientific Affairs Betsy Booren, Ph.D., demonstrates how to take accurate temperatures in patties, beef and pork roasts, and whole birds. She also explains the different types of meat thermometers that can be used to measure temperatures.

Also this year, AMIF released to the media a new directory of experts with in-depth knowledge on a host of meat and poultry related topics, from antibiotic use to *Salmonella* to economics. The spiral bound, easy-to-use guide is organized by name and by area of expertise and offers journalists a ready reference to reliable scientists who can help offer commentary and provide background on scientific and technical issues. Hundreds of journalists received the guides this year by mail.

Reporters also benefitted from AMIF's rapid response to a host of studies on diet and health, cancer and pathogens. AMIF experts were quoted widely in leading newspapers and other media outlets.

A forthcoming meat nutrition brochure authored by a registered dietician also will be used as part of AMIF's efforts to provide accurate, science-based information to media and consumers.



Other Activities

Salmonella Summary: An Examination of Foodborne Estimates, Outbreak and Regulatory Data

In March 2013, the AMI Foundation released a new report "*Salmonella Summary: An Examination of Foodborne Estimates, Outbreak and Regulatory Data*" in an effort to glean a greater understanding of the complexity of *Salmonella* in our food supply and why the incidence of salmonellosis is not decreasing in the U.S.

This report examined the Centers for Disease Control and Prevention (CDC) foodborne illness estimates and outbreak data, as well as the Food Safety and Inspection Service (FSIS) *Salmonella* Performance Standard data. The current regulatory approach for the meat and poultry industry is to target all *Salmonella* serovars, yet despite this approach, illness rates remain unchanged. So how do public health agencies, FSIS and the industry work together to decrease salmonellosis?

The report found that significant data gaps still existed. These gaps need to be addressed and thoroughly considered before any regulatory policy is developed, such as:

- A comprehensive all food risk assessment determining public health risk attributable to *Salmonella* and be conducted by FSIS, FDA and CDC. As part of that comprehensive risk assessment the public health risk of *Salmonella* is needed for beef, pork, chicken, turkey and RTE products.
 - The risk assessment should better understand differences in isolates identified from carcass testing compared to product specific testing such as ground product or parts.
 - The risk assessment should identify data gaps among the commodity classes, *i.e.* address data gaps on effective interventions on trim and final ground product across all specie commodity classes.
 - The risk assessment should assist in developing and implementing effective food safety process management programs to prevent pathogen contamination.
- Identify factors that differ between pathogenic *Salmonella* serovars compared to non-pathogenic serovars and does it vary among species, environment, among other consideration such as competitive exclusion, *etc.*
- Current strategies employed by the meat and poultry industry do not fully support elimination or prevention of specific *Salmonella* serovars. However, there is limited research demonstrating that certain interventions are effective in controlling the prevalence of certain *Salmonella* serovars. Establishments should be afforded the autonomy to target the serovar of greatest hazard as determined by their own internal process control analysis.
- Current testing platforms and methodologies may not support detection of certain *Salmonella* serovars. These technologies should be fully developed to ensure proper detection and accuracy for use in the industry.
- Accurate and timely attribution data is needed.

The report stated that food safety improvements must also continue to be sought and implemented. Research and data analysis should be ongoing and continue to be evaluated to ensure priorities and data gaps are being addressed. This process should run concurrently while risks are being assessed. Findings and conclusions should be disseminated to all allied stakeholders to ensure the totality of data is included for the most robust assessment. Continuous monitoring and assessments are integral in achieving the significant change that is likely needed to improve public health outcomes.

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