2012 BEEF INDUSTRY SAFETY SUMMIT

Executive Summary

Marking 10 Years of Industry Collaboration on Beef Safety

March 7-9, 2012 • TAMPA, FLORIDA

2012 Beef Industry Safety Summit

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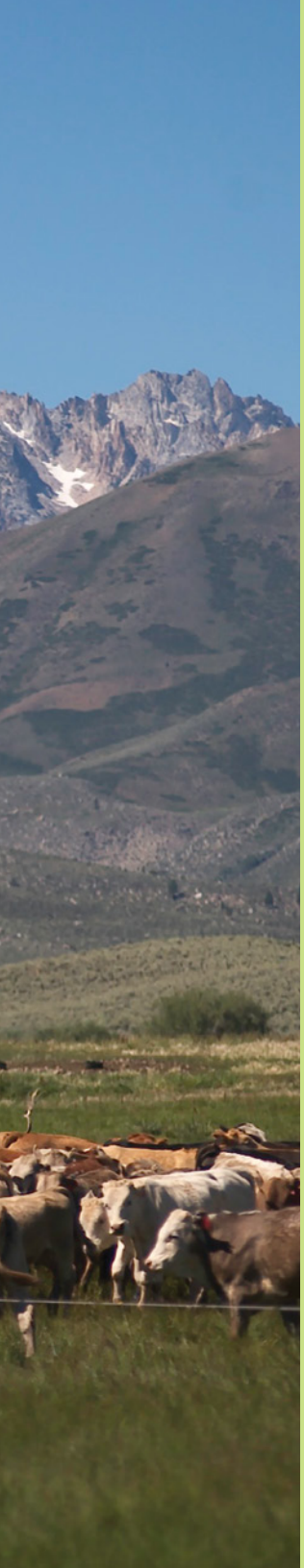
Tampa, Florida
Executive Summary

Introduction

2012 marked the 10th anniversary of the Beef Industry Safety Summit. This hallmark event was a time to look back at how much has been accomplished since the first summit was held in San Antonio, Texas in 2003. This year's summit was also an opportunity to look ahead at the new challenges that have emerged since that time.

Attendees at the 2012 summit reaffirmed their commitment to beef safety by signing a pledge to "further reduce the risks associated with foodborne pathogens by utilizing scientifically proven production practices and technologies" similar to the one presented at the first summit (see page 2).

Since 1993, beef producers have invested more than $30 million through the Beef Checkoff Program in beef safety research and outreach. The Beef Industry Safety Summit is coordinated by the National Cattlemen's Beef Association (NCBA), contractor for the beef checkoff, with the leadership of the Beef Industry Food Safety Council (BIFSCo). The summit has become the industry's premier meeting to discuss current and emerging beef safety challenges.



Looking Back, Lessons Learned and Charting the Future

The opening session at the 2012 Beef Industry Safety Summit was a once-in-a-lifetime opportunity to hear from two individuals who have become icons in the field of food safety.

Dave Theno, PhD, and former senior vice president and chief product safety officer for Jack in the Box joined Bill Marler, the personal injury attorney who made his mark when he represented Brianne Kiner, the most seriously injured survivor of the 1993 Jack in the Box *E. coli* O157:H7 outbreak. The panel discussion was moderated by James O. "Bo" Reagan, PhD, and senior vice president of research, education and innovation for NCBA.

"When we had the first summit in 2003, it marked the 10-year anniversary of the Jack in the Box *E. coli* outbreak and the tragic death of Lauren Rudolph, the first victim of that outbreak," said Reagan in his opening remarks. "That first meeting set the stage for the work we have done since, and the progress we have made in better understanding *E. coli* O157:H7 and reducing its impact on consumer health and our industry."

The session began with a video of the keynote address given by Dave Theno at the first Beef Industry Safety Summit. In 2003 Theno said, "Historically we dealt with *E. coli* O157:H7 control as something 'outside of our regular business,' because we didn't recognize just how dangerous it was. In 1992, *E. coli* O157:H7 was thought of as a unique, aberrant activity. Looking back, that assumption seems so prophetic."

In the panel discussion at this year's meeting, Theno said, "One of the themes from my 2003 address was 'linkages,' because it was so important that we shift our thinking to view the beef chain as a food chain. I had validation that my point was driven home at the Beef Industry Safety Summit a few years ago when a beef producer came to me and said his family had been in the 'cattle industry' for a long time, but now he understood that he was in the 'food industry.' That kind of thinking is what will help us win this battle because we all have to work together."

Bo Reagan asked Bill Marler his opinion of the beef industry's work in food safety since 1993. "The beef industry has done an incredible job. While you still have glitches, we are not seeing the sustained outbreak cycle that occurred every summer in the past. My challenge to you is if you don't like trial lawyers that specialize in food safety outbreaks, then put them out of business; and, while I believe you have done an incredible job of improving beef safety, I say that with the clear understanding that no one should become complacent."

The Pledge

The 2012 Beef Industry Safety Summit marked the tenth year that this meeting has been held. At the first summit in 2003, attendees signed a pledge committing to finding safety solutions. In 2012, summit attendees reaffirmed that commitment by signing a similar pledge.

The Beef Industry's Pledge to Consumers

As leaders in the beef industry, representing each link in the beef production chain, we reaffirm our commitment to further reduce the risks associated with foodborne pathogens by utilizing scientifically proven production practices and technologies. Our united goal is to produce, deliver and serve wholesome and safe beef for each and every family.

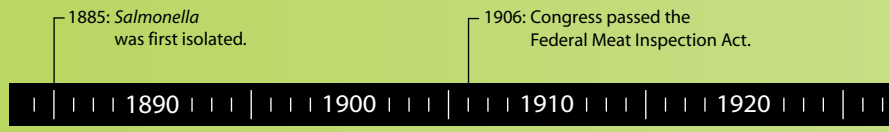
Beef industry participants have been engaged in that challenge for the last 20 years. "We have made tremendous strides," said Theno. "We are using interventions and strategies that were not even thought of 10 years ago, but we have to keep the pressure on. 'Good enough' today is not 'good enough' for tomorrow."

Dane Bernard, vice president of food safety and quality assurance for Keystone Foods presented the pledge to attendees and said, "Don't sign this unless you really mean it. For all of us here, this is not just a symbolic gesture. It is my belief that if you own your space and manage your space, you will become successful. Our 'space' goes beyond the walls of our own facilities and operations and means that we bring along everyone else in the industry to make a positive impact on beef safety."

Technical Sessions and Forums

Attendees at the Beef Industry Safety Summit include the best and brightest researchers in beef safety, as well as industry professionals who have devoted their careers to creating safer products for consumers. In addition to the Research Update that occurred prior to the opening session of the summit (see separate summary), attendees had a chance to participate in frank, open discussions about several safety issues.

Timeline of Beef Safety



Salmonella Forum

Brenden McCullough, vice president of technical services, National Beef Packing Co. LLC, moderated a session focusing on *Salmonella*, an emerging challenge in beef safety. While the Beef Industry Safety Summit's original focus was largely *E. coli* O157:H7, the scope of the summit has expanded to include other issues and pathogens impacting beef safety.

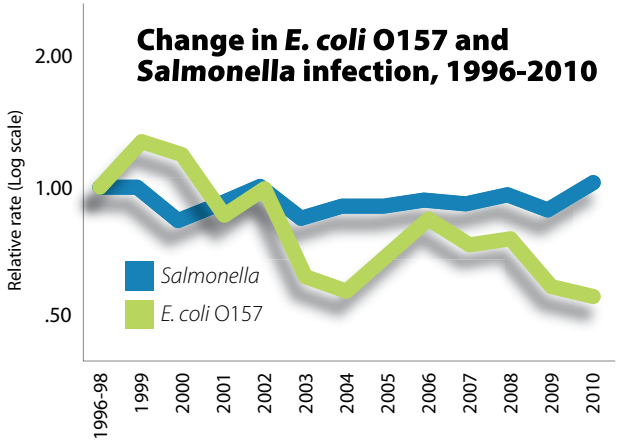
Salmonella Working Group

Formed in 2006, the *Salmonella* Working Group includes scientists who are considered leaders on the topic of *Salmonella* and is designed to optimize resources and expertise. Brian Covington, global director of regulatory affairs for Keystone Foods gave an update on the group's work.

The working group originally coordinated research projects that focused on seasonal, regional prevalence and resistance differences between beef products sourced from cull (mature) beef cattle, cull dairy cattle and the fed cattle population. Pre-harvest intervention effectiveness, including pre-harvest washes, as well as the genetic characterization of *Salmonella* Newport, one of the most common strains, were part of a series of coordinated research projects. Funding constraints have slowed some of these efforts.

"*Salmonella* seems to be challenging our paradigms," said Covington during his presentation. "Since baseline data was collected in 2003, we have not seen any observable reduction in *Salmonella* infections even though we have seen reductions in other pathogens."

Previous research work has validated that *Salmonella* is as susceptible to existing safety interventions as *E. coli* O157:H7. The concern is that the lack of change from baseline data is because *Salmonella* may be evading existing interventions by "hiding out" in the lymph nodes of cattle.



Source: Foodborne Diseases Active Surveillance Network, 2010.

A current project that is leveraging beef checkoff funds with support from the U.S. Department of Agriculture (USDA) is analyzing this concept. Ongoing research activities will include a collaboration between Texas Tech and two USDA Agricultural Research Service (ARS) facilities with the goal of discovering, evaluating and delivering best practices to reduce the risk associated with *Salmonella* in the lymph nodes of cattle at the pre-harvest, harvest and post-harvest fabrication levels. This work will ultimately culminate in the development of protocols and interventions specific to *Salmonella* that can be disseminated to the industry.

1938: Congress passed the Federal Food, Drug, and Cosmetic Act.

1970s: Centers for Disease Control and Prevention (CDC) began to routinely monitor for foodborne illnesses.

1975: *E. coli* O157:H7 was identified as a human pathogen.

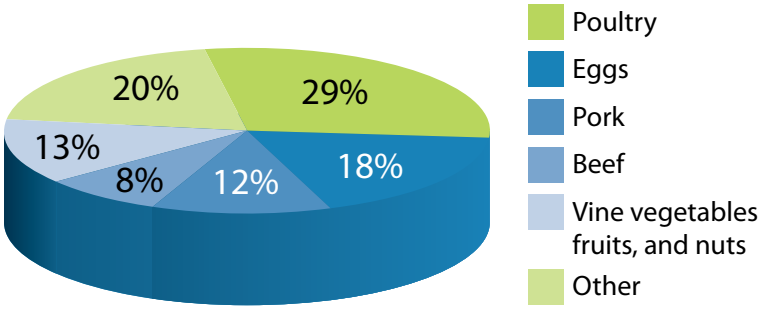
1982: *E. coli* O157:H7 was first associated with a foodborne disease outbreak.

1993: A major *E. coli* O157:H7 outbreak was tied to ground beef served at Jack in the Box restaurants in four western states.

The beef checkoff funded a Blue Ribbon Task Force of scientists to identify new ways to improve beef safety.

1930 | 1940 | 1950 | 1960 | 1970 | 1980 | 1990

Foods Associated with *Salmonella* Outbreaks



http://www.cdc.gov/vitalsigns/FoodSafety/index.html

Salmonella: Not Just a Poultry Issue

Salmonella is the second leading cause of foodborne illness, but ranks as the leading cause of hospitalizations and deaths related to foodborne illness.

Angie Siemens, PhD, vice president of technical services for Cargill concurs that the industry has seen great progress in reducing risks associated with *E. coli* O157:H7 and *Listeria*, but hasn't observed the same risk reduction relative to *Salmonella*.

Siemens presented several learnings from two voluntary recalls associated with ground turkey and emphasized that *Salmonella* is a challenge to all proteins. "We need more and better sharing of all of our best protocols. Safety should never be used as a competitive advantage among competing proteins," she said.

Summit participants were encouraged to continue to collaborate on research efforts. "Some strains are causing outbreaks and some aren't—we need to understand why," she continued. Since research is revealing how *Salmonella* is harbored in the lymph nodes of cattle, Siemens also emphasized how much more critical pre-harvest interventions may be in dealing with *Salmonella* in the cattle population.

The chart on page 5 illustrates the Healthy People 2020 objectives for the reduction in the number of human infections from *E. coli* and *Salmonella* in the United States. Healthy People is a government interagency program that provides science-based, 10-year national objectives for improving the health of all Americans. With the first objectives established in 1990, Healthy People has set benchmarks and monitored progress over time in order to:

1994: FSIS identified *E. coli* O157:H7as an adulterant. *E. coli* sampling program began in federally inspected establishments and retail stores.

FSIS enacted a rule mandating safe food handling instructions on fresh and frozen meat and poultry package labels.

The beef industry, with funding support from the beef checkoff, initiated research that over time would investigate more than 25 different harvest-level beef safety interventions, including organic acid washes, acidified sodium chlorate, steam or thermal pasteurization, and hide washes.

1995: Whole-carcass steam pasteurization was approved by FSIS.

A checkoff-funded microbial mapping study identified where bacteria on the carcass can enter the food chain and was used to facilitate effective HACCP plans.

1996: FSIS enacted a rule requiring HACCP plans for beef slaughter and processing operations.

A hot-water rinse system was developed to eliminate harmful bacteria in processing.

FSIS approved steam vacuums for removing spot contamination from carcasses.

1997: The Beef Industry Food Safety Council (BIFSCo) was formed including representatives from all segments of the beef chain.

A pre-evisceration wash was developed to help further eliminate carcass contaminants.

Hudson Foods Co. recalled 25 million pounds of ground beef due to *E. coli* O157:H7 contamination.

1995

- Encourage collaborations across communities and sectors
- Empower individuals toward making informed health decisions
- Measure the impact of prevention activities

Healthy People Goals vs. Actuals*

	2000 Actual	2010 Goal	2010 Actual	2020 Goal
***E. coli* O157:H7**	2.0	1.0	0.9	0.6
Salmonella	14.1	6.8	17.6	11.4

* per 100,000 people

Source: www.cdc.gov/foodnet/factsandfigures.htm

Antibiotics – Use and Alternatives

Scott Hurd, DVM, PhD, associate professor, Iowa State University and past USDA deputy undersecretary for food safety, discussed issues related to antibiotic resistance and its implications for food safety and food production.

"Unfortunately many of the issues associated with antibiotic resistance are driven by misconceptions," said Hurd during his presentation. "While exposure to antibiotics does select for some resistant strains leading to the potential for human infections that may be harder to treat, the goal of some special interest groups to stop the use of antibiotics in animal agriculture for preventive use and growth promotion is unwarranted."

According to Hurd, the *MISCONCEPTIONS* revolve around five premises:

1. Animal antibiotic use is just a public health issue
2. Animal antibiotic use is a risk to public health
3. Healthy animals are not important to public health
4. Banning certain antibiotic uses will improve public health without affecting animal health
5. There is nothing veterinarians can or should do

" Concern does not create risk," said Hurd.

Hurd discussed the release of Guidance 209 by the U.S. Food and Drug Administration (FDA) in June 2010. The guidance document (*The Judicious Use of Medically Important Antimicrobial Drugs in Food-Producing Animals*) includes the basic principles that limit antimicrobial use in food animals to 1) Uses necessary for animal health, and 2) Uses that include veterinary oversight.

Hurd asserted that the question that should be asked is whether the potential benefit at the human or clinical level offsets the cost at the farm level. Since benefits to livestock from preventive antibiotic administration are not allowed to be part of the regulatory discussion, Hurd emphasized a need to focus on the benefits of healthy animals to public health.

1998: FSIS established a zero-tolerance policy for *E. coli* O157:H7.

1999: FSIS published *Beef Products Contaminated with* E. coli *O157:H7* explaining the agency's policy regarding O157:H7 meat inspection and enforcement.

2000: American Foods Group voluntarily recalled approximately 1.1 million pounds of ground beef that may have been contaminated with *E. coli* O157:H7.

During the early 2000s, checkoff-funded research focused on understanding the dynamics of *E. coli* O157:H7 in feedlot settings.

2000

In a recent study, Hurd and colleagues measured the relationship between lesions suggestive of subclinical pig illness at harvest to carcass contamination and human foodborne risk. The study, which was recently published by the *American Journal of Veterinary Medical Research*, demonstrated that the probability of *Salmonella* contamination in lesioned carcasses was 90 percent higher than in non-lesioned carcasses.

Antemortem inspection usually removes clinically ill animals from the human food supply. However, subclinically ill animals appearing healthy at slaughter may have internal lesions affecting processing. These lesions may impact the evisceration process leading to cross-contamination and increased pathogen load which may contaminate the meat. Ultimately, animal health not only affects carcass quality but may also impact human health, demonstrating how antibiotic use in livestock may be beneficial to public health.

Hurd also cited data from Denmark that demonstrated that therapeutic antibiotic use increased after antibiotics were banned for growth promotion purposes in that country. According to comments from Danish government officials, the amount of antibiotic administered per pig has increased 25 percent since the ban, and the use of third and fourth generation cephalosporins in pigs has been increasing significantly from 2001 to 2007 while production efficiencies have decreased.

Hurd emphasized that as this issue continues to evolve, the livestock industry should advocate for risk-based decision making that should help overcome potential misconceptions. Additionally, the livestock industry should continue to advocate for responsible antibiotic use among producers.

2002 Checkoff-funded research examined the effects of on-farm management practices on pathogen shedding.

ConAgra issued a nationwide recall of over 18 million pounds of fresh and frozen ground beef and beef trimmings due to routine microbiological testing.

FSIS published a *Federal Register* notice requiring all manufacturers of beef products to reassess their HACCP plans regarding *E. coli* contamination because evidence showed the prevalence of *E. coli* O157:H7 on live cattle coming to slaughter higher than expected.

2003 The first Annual Beef Industry Safety Summit convened to discuss safety solutions and refine best practices for all industry segments.

Three outbreaks of *E. coli* O157:H7 associated with mechanically tenderized beef products were reported.

2004: The CDC reported a 42% decrease from 1996-1998 baseline data in the number of illnesses caused by *E. coli* O157:H7, thereby exceeding the Healthy People 2010 goal of 1.0 case per 100,000 persons.

A best practice publication, E. coli *O157 Solutions: The Pre-harvest Commitment*, was released by BIFSCo and the beef checkoff program for beef producers.

2005: Checkoff-funded research continued to focus on pre-harvest interventions such as cattle washing, on-farm ecology, sodium chlorate, vaccines, neomycin, and direct-fed microbials.

Checkoff-funded research established baseline data on pathogen prevalence during transportation to a harvest facility and at lairage.

FSIS published a *Federal Register* notice requiring establishments processing mechanically tenderized beef products to account for *E. coli* O157:H7 in their next annual HACCP assessment.

The beef industry hosted a meeting of beef safety experts to improve the safety of non-intact beef products.

BAX, a new screening method, was introduced to reduce the number of screen positives that do not confirm positive.

2005

Protecting the Brand

Mark McCully, director, supply development at Certified Angus Beef (CAB) described the evolving challenges Certified Angus Beef faces in protecting their brand.

CAB is a not-for-profit subsidiary of the American Angus Association, the world's largest beef cattle registry and was formed in 1978.

CAB has annual sales of 800 million pounds, representing about 65,000 head per week or approximately 10 percent of the fed cattle population. CAB doesn't actually own cattle or beef products; rather, the brand is built through licensed partners, including 29 packers, 81 further processors and 288 distributors. Revenue is generated through commissions applied to the brand sales of licensed packers and value-added processors.

To ensure that beef products meet brand specifications, CAB relies on third-party auditing, including quality-grading services provided by the U.S. Department of Agriculture and the Canadian Beef Grading Agency.

CAB has food safety audit requirements for all of its fabricators and processors. "We understand we are at risk every day from a brand standpoint as it relates to food safety," said McCully. "The brand has been involved in some outbreaks and recalls that average about two to three per year, and we work through our licensees to handle those effectively.

"When it comes to food safety issues, we don't consider ourselves the experts," said McCully. "We defer to the expertise in partner organizations and those involved in industry. However, past experience has brought home the critical role CAB plays for our retailers and foodservice outlets that market our product to consumers. When BSE (bovine spongiform encephalopathy) was identified in the United States, we realized we had to be the ones to provide and funnel accurate information to our licensees so they could convey the safety of all beef effectively, not just the CAB brand."

To help address issues as they occur, CAB has developed a very comprehensive crisis management plan with internal and external communication channels and a media response plan. Additionally, staff members have been trained as spokespeople and CAB offers a multitude of support resources to its licensees.

We applaud the efforts of the attendees here at the Beef Industry Safety Summit who help us build our brand on the consumer confidence they helped create by making our country's beef supply the safest in the world.

2006: An official at the United Fresh Produce Association cited the beef industry as a model for other industries to follow during high-profile produce recalls.

2007 Topps Meat Co. recalled 21.7 million pounds of frozen hamburger patties due to *E. coli* O157:H7 contamination.

2008: At the sixth annual Beef Industry Safety Summit, a video on best practices for collecting beef samples for *E. coli* testing was distributed and later sent to 675 processing facilities across the United States.

Westland/Hallmark Meat Company issued the largest beef recall in history, 143 million pounds, due to concerns that non-ambulatory animals may have been harvested at its California facility.

2009: USDA granted conditional license to the first vaccine to reduce *E. coli* O157:H7 in cattle.

"Our food safety efforts are a means of protecting the integrity of our brand," added McCully. "But, we never portray our brand in any way as differentiated from a safety standpoint from the rest of the beef industry. Any brand is built on the foundation of consumer confidence and anything that erodes that is a huge risk. We applaud the efforts of the attendees here at the Beef Industry Safety Summit who help us build our brand on the consumer confidence they helped create by making our country's beef supply the safest in the world."

Julie Neuhalfen, director of supplier quality at ConAgra Foods, Inc. shared with attendees how ConAgra has responded to recent recalls to ensure food safety and protect their brands.

In February 2007, Peter Pan peanut butter, as well as some Great Value peanut butter (Wal-Mart's store brand) was linked to 425 cases of *Salmonella* across the United States. At the time, the Centers for Disease Control and Prevention (CDC) officials believed this was the first *Salmonella* outbreak involving peanut butter to occur in the United States.

That same year, ConAgra Foods issued another recall related to its Banquet Pot Pies and all store brand pot pies that the company manufactured at a specific plant. In 2010 the company was associated with another recall of Cheesy Chicken & Rice single-serve frozen entrées that were at risk for *Salmonella* contamination.

"When the peanut butter recall occurred, I can honestly say it was something we were not prepared for," said Neuhalfen in her presentation. "That is a low-risk product, but that experience taught us that low-risk does not mean no-risk."

The plant where the peanut butter was manufactured was closed for several months and the company spent approximately $33 million in facility upgrades. "It was a huge deal for our company to pull all of our brands off the shelf in all of the stores where it was sold," said Neuhalfen. "We lost shelf space and lost some distributor relationships, but pulling the product was the right thing to do."

That experience with a ready-to-eat (RTE) product, as well as the subsequent recalls with non-RTE products created a "tipping point for ConAgra Foods" according to Neuhalfen. "We realized we needed infrastructure and process improvements across the board when it came to food safety. We hired 140 new quality and food safety experts, and while food safety had always been a priority, the peanut butter recall showed us that even our low-risk products had vulnerabilities that we needed to understand."

Since that time, the company has spent approximately $275 million in facilities upgrades where risks have been identified. ConAgra has established an internal food safety audit team to enhance third-party auditing that was already taking place, and we

2010: FSIS released a guidance document focused on pre-harvest interventions titled *Pre-harvest Management Controls and Intervention Options for Reducing* Escherichia coli *O157:H7 Shedding in Cattle*.

Approximately 8,500 pounds of ground beef products that may have been contaminated with *E. coli* O26 were recalled.

According to the Foodborne Disease Active Surveillence Network (FoodNet) *E. coli* O157:H7 was the only one of the nine infections tracked to reach the 2010 national health objective target.

2011: FSIS identified *E. coli* serogroups O26, O103, O45, O111, O121 and O145 as adulterants.

More than 3,780 people became ill, and 45 died, in Germany due to an outbreak associated with sprouts contaminated with *E. coli* O104:H4.

From 1999 through 2011, cattlemen invested more than $30 million checkoff dollars to beef safety efforts. The beef industry as a whole invests an estimated $550 million-plus each year to implement, maintain, and validate safety controls and conduct product testing.

2012: The 10th annual Beef Industry Safety Summit convened.

emphasize working with suppliers that meet safety specifications. The company has proactively established relationships with regulators, health departments and the Centers for Disease Control. All of these actions have led to a better response when there is a food safety issue.

"One of the key learnings from the pot pie and the Cheesy Chicken and Rice recalls was a better understanding how our customers use our products," added Neuhalfen. "We found people were thawing out the pot pies and eating the crust raw, or they were thawing them, removing the crust and eating the filling raw." Thus the final intervention—cooking by the consumer—was not applied in many instances.

"We found it was so important to understand who is eating our products and how they are actually handling them and preparing them," she said. "Additionally, while we thought our cooking instructions were good, we realized we had only validated them on a certain wattage of microwave. Not everyone has an 1100-watt microwave and we needed to provide cooking instructions that account for those differences. Now we have an entire microwave testing lab and we have worked with microwave manufacturers to make sure that wattage information is more available for consumers."

Neuhalfen concluded by saying, "We want to be a leader in food safety, not lag behind. We continually ask ourselves and our employees, 'Are you going to take that product home and feed it to your family?' That has helped create a shift in our food safety culture we are engaged in every day."

Technical Workshops

Bench Trim

Lynn Delmore, PhD, adjunct professor at California Polytechnic State University, San Luis Obispo and principal at Delmore Consulting led a workshop on bench trim, a term commonly applied to trim sourced from both subprimal fabrication as well as further processing of those subprimals into case-ready products such as steaks.

According to Delmore, BIFSCo best practice documents recommend bench trim should go to cooked product or undergo a "lethality" step to mitigate the risks associated with incorporating bench trim into fresh ground beef. Since those recommendations were made, many establishments, whether further processors, retailers or foodservice operators, continue to incorporate bench trim into ground beef. This workshop was initiated to gather insight into bench trim production and the actual uses occurring within the industry.

Several panelists from all segments of beef processing gave a variety of perspectives on the issue to help provide insight for additional guidance. Currently, approximately 84 percent of retailers are grinding bench trim. Although down from the 90% who were grinding bench trim in 2000, this remains a significant percentage of retailers. As bench trim may represent up to 2% of a retailer's product volume, most do not choose to follow the practice of diverting bench trim to cooked product.

Several issues at the retail level make bench trim challenging from a safety standpoint. For retailers with a large number of outlets, intervention and testing can be a challenge. Most retail locations are not designed to hold product for any significant period of time, which makes the "test and hold" process difficult. In addition, industry practices to improve palatability by aging subprimals for 14 days increases the microbiological challenges when those subprimals are processed. Traceability and commingling of product further complicate bench trim's use at the retail level.

Cooking bench trim is the best practice, but not necessarily the best approach from a business standpoint. A need exists for realistic best practice recommendations for bench trim use that will encourage greater retail adherence. The goal is to identify the best techniques that establishments at all levels can put in place to 1) minimize risk, 2) be economical, and 3) create realistic options besides just cooking bench trim.

According to FSIS, bench trim is beef manufacturing trimming not derived from cattle on site at the establishment, or in other words, trim that was not produced at a slaughter establishment. That definition includes secondary trimmings of primal, subprimals and any other cuts designated for non-intact use. Given this definition, as long as bench trim is associated with an intact product or one that did not undergo any further processing, such as needle tenderization or tumbling, a source product would not be considered "adulterated" in the event of a positive pathogen test result. However, if the source product goes to a "non-intact" use, such as a needle-tenderized steaks, then those products would be implicated in a bench trim sample positive. Understanding this nuance is important for further processors, retailers and foodservice establishments so they can develop lotting procedures that allow them to properly segregate products. Good lotting procedures are critical to managing bench trim and associated products as part of a sampling program.

Although retailers may not have the same level of scrutiny as a federally inspected processing plant, other elements in retail-risk evaluation need to be understood. If a retailer or end user can't effectively manage those risks, then they should be cooking bench trim.

Safety interventions on subprimals represent a historical research gap due to the variety of scenarios in subprimal processing. To date, many of the interventions investigated have been shown to have an effect on pathogens of interest, but more work needs to be done to ensure their effectiveness in industry settings.

Participants in the workshop came to the consensus that a lethality or cooking step is the best way to mitigate pathogen issues associated with bench trim; however, current industry practices make that unrealistic for some establishments. Thus, best practices for all segments that produce bench trim should be developed to address:

1. Raw material supplier assessments
2. Intervention technologies (processing aids)
3. Lotting and segregation systems
4. Robust sampling and testing
5. Traceability

Pre-Harvest Beef Safety

Guy Loneragan, BVSc, PhD, epidemiologist and professor of food safety and public health at Texas Tech University, led a very interactive discussion about the beef industry's efforts to provide effective safety practices for the pre-harvest sector. Begun in 2003, immediately following the first Beef Industry Safety Summit, the effort has been challenged from the onset by the fact that few safety interventions are approved for use in the production sector.

A best practice guidance document for beef producers (E. coli *O157 Solutions: The Pre-harvest Commitment*) was released in 2004. The document focused largely on principle-based animal husbandry practices, such as pen maintenance and water supply quality. "If you want to implement an intervention, you need to have a consistent starting point," said Loneragan. "However these practices, as a prerequisite in the sense of a HACCP plan are very qualitative versus quantitative. As a result, our first attempt at a guidance document included a lot of potential practices, but offered no definitive recommendations as there are so many variables in production scenarios."

When that first document was released, essentially no interventions were approved for use at the production level and very little has changed 10 years later. The document also included a significant discussion of then existing knowledge gaps that are being addressed through ongoing research.

"The Production Practices Working Group formed after the first Beef Industry Safety Summit viewed this as a living document that would need to be updated as more information became available through research," said Loneragan. The session participants agreed the industry is at a crossroad of deciding whether to update or do a complete rewrite.

Loneragan discussed how regulatory officials have for some time been interested in pre-harvest interventions, using a 1994 meeting notice to underscore his point. "Regulatory officials are still interested and are applying a lot more pressure to see action."

Loneragen cited a guidance document released by the Food Safety Inspection Service in May 2010 (*Pre-harvest Management Controls and Intervention Options for Reducing* Escherichia coli *O157:H7 Shedding in Cattle*, May 2010). Subsequently, FSIS, along with the USDA Agricultural Research Service and Animal and Plant Health Inspection Service hosted a meeting in November 2011 that, according to the *Federal Register* notice, had the following goals:

1. Food safety improvement through identification and development of effective pre-harvest practices
2. Creating an increased focus on pre-harvest food safety and the identification and development of incentives for producers and processors to adopt effective pre-harvest practices
3. Increased producer engagement to emphasize their importance in the overall food safety system
4. Finding effective solutions through discrete projects, including demonstration projects of new technologies and implementation of best practices

"We've heard from some that the pre-harvest sector gets a 'pass' on *E. coli* O157 control, and while that's a valid point, emphasis has been placed

on the harvest sector for good reason," said Loneragan. "It was the most effective point to address pathogen contamination, and apart from probiotics, the live side of beef production doesn't gain a similar level of benefit from safety interventions."

Participants discussed concepts that should be addressed in a new production guidance document, including the following:

- Broaden the document to include other pathogens of concern (*Salmonella*, non-O157 STEC, etc.)
- Address readership by production sector as the original document was focused primarily on the feedlot sector
- Establish objective measurement standards for critical control points that can be benchmarked for recommended principle-based husbandry practices (e.g., clean feed, clean water)
- Address gaps between technology development and actual commercial application
- Provide justification for the production segment to implement beef safety interventions
- Address the challenge of a limited number of technologies proven effective in pre-harvest pathogen control

Ground Beef Forum

On Sept. 20, 2011, FSIS published a *Federal Register* notice announcing that raw, non-intact beef products or raw, intact beef products intended for further processing (i.e. ground beef, tenderized steaks) use and contaminated with Shiga toxin-producing *Escherichia coli* (STEC) O26, O45, O103, O111, O121, and O145, will be considered adulterated, as is already the case for *E. coli* O157, and must not be distributed until it has been processed into a ready-to-eat product, i.e., a food that can be consumed safely without further cooking or other preparation.

FSIS will implement a verification sampling and testing program for the six non-O157 STEC, as it already has for *E. coli* O157:H7, beginning in June 2012. Many participants in the U.S. beef industry have expressed concerns about the difficulty in meeting this requirement due to the lack of adequate rapid testing methodologies to accurately identify the presence of non-O157 STEC.

As the new testing program is implemented, it has the potential to have significant impacts on ground beef production in the United States, especially in the near-term.

Mike Miller, senior vice president of global marketing and research for NCBA provided an update on the current ground beef supply, which will be tighter due to several ongoing factors.

"Imported product has experienced a 12 percent reduction and that factor, coupled with small domestic cattle supplies and increasing consumer demand for ground beef due to the poor economy, means a significant price increase in lean trim and ground beef is expected," said Miller.

The decrease in imported lean trim is largely due to the lower value of the U.S. dollar as compared to the value of the currencies of New Zealand and Australia, two sources of significant amounts of lean trim imports in the past.

Additionally, Miller said potential disruptions that may occur with the new testing requirements may be magnified due to the overall tighter ground beef supplies.

In anticipation of the new testing and verification program, countries that commonly export manufacturing beef to the United States are preparing to meet the requirement that FSIS has established for imported products.

Ian Jenson, manager of market access science and technology for Meat and Livestock Australia (MLA), the producer-governed promotion and research arm of the Australian livestock industry, gave a presentation outlining his country's efforts. MLA funded studies to estimate the prevalence of the six most common STEC strains in Australian manufacturing beef and the performance of commercially available screening tests.

Similar to results found in the United States, the Australian research showed a relatively large number of potential positives. "Some of the screening methods gave more positives than others, and unfortunately, confirmation methods are complex and time consuming. Ultimately, very few of the presumptive positive samples were confirmed as positive," he said.

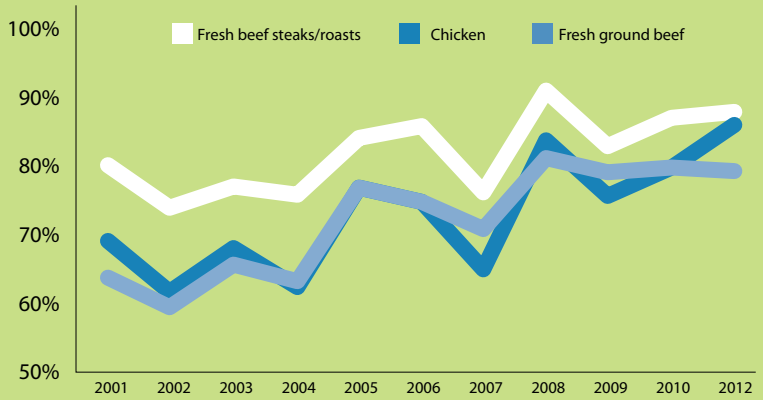
Australia's food inspection agency is currently approving test methods, and laboratories are implementing and gaining accreditation to perform tests. Australian officials have established that control protocols for the non-O157 STEC will be the same as have been in place for *E. coli* O157. Only beef tested and certified negative for STEC will be eligible for export to the United States.

Market Research Forum

John Lundeen, senior executive director of market research, NCBA, joined forces with Rick McCarty, vice president of issue analysis and strategy, NCBA, to present results from a checkoff-funded survey evaluating consumer perceptions about beef safety.

To begin their presentation, McCarty presented results from media tracking surveys that demonstrate the extent of media coverage of beef safety. "In 2011, pathogens in beef was again the leading topic within a broader category of beef safety, with 369 mentions that averaged a slightly unfavorable rating. That rating has stayed fairly consistent for the last decade," said McCarty. "On the social media side, pathogens in beef was the leading topic with story topics that ranged from proper meat cooking temperatures, possible *E. coli* outbreaks, USDA testing initiatives and ground beef recalls."

Safety Grades for Fresh Meat
Year by year % of Americans rating A or B grade for safety.



SOURCE: IPSOS Public Affairs

In spite of the consistent level of media coverage with a frequently unfavorable tone, McCarty reported a positive trend in consumer confidence as it relates to beef safety for ground beef, as well as steaks and roasts.

"The consumer confidence data demonstrate that the work to improve beef safety is also making an impact on consumer opinions, but we wanted to determine just how much," said Lundeen. "We initiated a survey where we asked consumers food- and beef-safety questions, and then also presented those same questions to a panel of experts attending the Beef Industry Safety Summit. Safety experts are in a better position than consumers to understand beef industry progress on the safety front, and attitudes that originate at the 'expert' level should eventually filter through to consumers, creating what we hope will be a new beef safety reality."

In both retail and foodservice settings, consumers were most concerned about the safety of seafood and fish, while the experts assumed beef would be the product of most concern to consumers.

Consumers however have an overly confident opinion of their ability to prepare food safely at home. Sixty-five percent said it was more likely that someone would contract a foodborne illness at a restaurant than at home. Seventy-two percent of the experts said a foodborne illness was more likely to be the result of preparing food at home, which is correct. Surveillance data indicate that approximately 60 to 70 percent of foodborne illness is due to food prepared in a home kitchen.

Based on the survey results, the industry's progress on reducing foodborne illness due to *E. coli* is not well understood by consumers. According to the CDC, *E. coli* O157:H7 is the critical pathogen routinely monitored that met the goal of less than one illness per 100,000 people (Healthy People 2010) prior to 2010. Fifty-eight percent of consumers thought the number of people getting sick from *E. coli* was staying the same and 19 percent thought it was increasing.

Consumers said that *E. coli* O157:H7 was the pathogen they were most concerned about, while only 10 percent were concerned about *Listeria*. This result was especially notable as the recent *Listeria* outbreak associated with cantaloupe (Fall 2011) was the deadliest outbreak of foodborne illness in 25 years.

Unfortunately the majority of the consumers surveyed still did not understand their role in beef safety. When asked if a statement was "true" or "false," 53 percent said that it was true that the proper way to tell if a hamburger patty on the grill is done is if it is no longer pink inside.

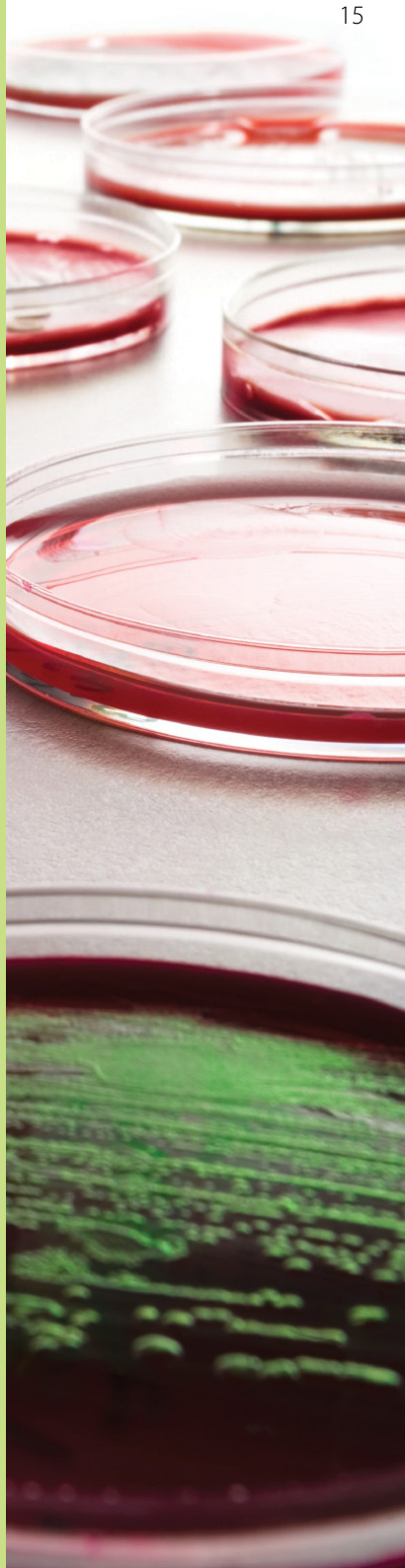
The survey did reveal that 49 percent of consumers believe that the beef industry is doing a good job in reducing the risk of people getting sick from *E. coli* O157:H7, and only 6 percent of respondents thought the industry was doing a "not very good/very poor" job.

Current Issues

Every year, the format of the Beef Industry Safety Summit is modified to best address the most pressing topics related to beef safety. This year was no different. The dynamic nature of the agenda means that the open sharing that has become the hallmark of the Beef Industry Safety Summit can continue.

Sustaining the Food Industry

Cristian Barcan, head of Applied Sustainability at BASF Nutrition & Health updated attendees on sustainability challenges facing the industry. Continued pressure is being placed on the global agriculture industry to produce more food to feed a growing population and do it better (strong pressure on food safety) with less. "If we continue to produce food the way we do today, we will



need 2.5 more planets to provide enough arable soil to feed the world's population in 2050," said Barcan who has extensive sustainability and traceability experience with BASF, the largest diversified chemical company in the world.

"The predicted demand for beef, pork and poultry is increasing at an exponential rate," said Barcan. "Arable land is not increasing and competition from other uses, such as energy and transportation, means it will continue to be more difficult to feed a growing population."

Barcan explained that sustainability is the opportunity of our lifetime but requires a balanced approach with consideration of resource management and environmental stewardship, social responsibility and economic viability. Being a journey, not a destination, agricultural sustainability requires ongoing improvement over time and collaboration along the entire value chain.

The Beef Checkoff Program has contracted BASF Corp. to conduct a comprehensive assessment of the current state of the U.S. beef industry and identify the most important areas of focus for future innovations.

"Sustainability is about ensuring a better quality of life for everyone, now and for generations to come," said Barcan. "Food safety will be a critical component to industry sustainability."

Conclusion

How do you define progress?

Advancing towards a common goal is essential for achieving progress in any endeavor, but when the goal is a moving target with unpredictable complexities, the effort can seem daunting and progress can be difficult.

For the beef industry, one of its most significant goals for the last 20 years has been to reduce, and potentially eliminate, foodborne illness caused by *E. coli* O157:H7. That was why a decade ago, leaders from throughout the industry, including the best and brightest in beef safety research, came together for the *E. coli* O157:H7 Summit, and have convened every year since then for the Beef Industry Safety Summit.

And, in spite of the fact that improving food safety, and specifically the safety of beef, is such a complex goal, the unified effort of participants in the Beef Industry Safety Summits over the years has paid off.

According to the Foodborne Disease Active Surveillance Network (FoodNet) *E. coli* 0157:H7 infections have declined significantly from baseline data, and *E. coli* was the only one of the nine pathogens tracked to reach the 2010 national health objective target of less than one case per 100,000 people.

Considering that *E. coli* O157:H7 was only first associated with a foodborne disease outbreak in 1982, that progress seems almost unimaginable. "Consumers are safer because of what you do," said Dr. Elizabeth Hagen, U.S. Department of Agriculture (USDA) undersecretary for food safety during her keynote address at the 2011 Beef Industry Safety Summit. "When the industry needed a plan to address food safety, it was you who came together to accomplish that goal as you realized that a fragmented approach wasn't working. Thank you for everything you've done and everything you will do in the future."

After a major outbreak of *E. coli* O157:H7 in beef occurred in 1993, the National Livestock and Meat Board appointed a Blue Ribbon Task Force. In the late 1990s, the era of "mega-recalls" began. From 1994 to 2004, beef recalls averaged 1.8 million pounds per year, a figure that excludes an almost 19 million pound recall in 2002. The beef industry responded by continuing to fund research efforts to find effective interventions to improve beef safety.

Since *E. coli* O157:H7 was first identified as a pathogen of concern to food safety, meat inspection and oversight has also undergone significant changes. Hazard Analysis Critical Control Points (HACCP) and risk-based inspection were implemented in the mid-1990s and drastically changed meat inspection.

Foodservice and retail operators have also done their part by implementing supplier controls and microbial testing. End users better understand their role in ensuring food safety, due in large part to educational campaigns for consumers.

But recent events, including the lack of reductions of *Salmonella* foodborne illness across all segments of food production, as well as new understanding about non-O157 STEC, means that the Beef Industry Safety Summit will continue to be a driving factor in making progress in the future. An industry-driven, science-based approach has been extremely effective in the past; however, the work continues.

Funded in part by The Beef Checkoff

For more information on the Beef Industry Food Safety Council (BIFSCo) activities, visit www.bifsco.org