



# **2010 Beef Industry Safety Summit Executive Summary**



**March 3 -5, 2010 • Dallas, Texas**

## Introduction

2010 marked the largest attendance ever at the annual Beef Industry Safety Summit, which was first held in 2003. “For this many stakeholders to attend, it underscores the importance of this event in our industry,” said Bo Reagan, senior vice president of research, education and innovation for the National Cattlemen’s Beef Association (NCBA) during opening remarks. The Beef Industry Safety Summit is coordinated by NCBA on behalf of the Beef Industry Food Safety Council (BIFSCO) and is partially funded by the Beef Checkoff.

“Since 1993, the beef industry has spent \$28 million collected through the Beef Checkoff Program on beef safety research, outreach and BIFSCO efforts,” said J.D. Alexander, NCBA vice president and a cattle producer from Nebraska. “This summit is an example of how our industry rises to the challenges. We have come together as industry partners from the producer to the packer along with our channel partners to find solutions in a non-competitive manner.”

Looking back at past summits, Bo Reagan reminded attendees of the group’s accomplishments, including the development of Best Practices that are used throughout the processing sector to invigorate consumer confidence in beef safety. “In 2003, we were flunking in consumers’ opinions regarding the safety of our ground beef. By 2009, consumers were consistently confident in industry efforts to supply a safer ground product, ranking our efforts at an 80 percent approval level, and whole muscle products scored even higher.”

Reagan continued, “So why should we continue to invest our efforts and producers’ dollars? Because we still have work to do. We’re working on enhancing our Best Practices recommendations, working harder than ever on providing more pre-harvest interventions to our producers, we’re continuing to optimize existing post-harvest interventions for processors and channel partners, and researching emerging issues such as antibiotic resistance. The work must go on.”

## Keynote Address

### Al Almanza, U.S. Department of Agriculture (USDA) Food Safety Inspection Service (FSIS)

During his keynote address to summit attendees, Al Almanza, U.S. Department of Agriculture (USDA) Food Safety Inspection Service (FSIS) offered, “There is a sea change in food safety public policy – it’s a whole new ball game.” The changing environment should be viewed in a positive light. It’s about saving lives and doing what’s right in terms of public health.” “We know the industry wants to protect its reputation and its way of life, and that’s what I try to demonstrate to lawmakers and their staffers – this industry works to exceed requirements,” he added.

Almanza indicated that changes in the administration and new initiatives mean continuing reform of food safety programs. “It doesn’t do any good if only one segment is working towards something unless we do it cooperatively and constructively,” counseled Almanza. “You all need to be part of the process, which has gained so much momentum.”



Held annually, the Beef Industry Safety Summit is the premier forum for all beef industry partners, representing each link in the beef production chain, to share knowledge and discuss issues to ensure continued progress toward meeting the industry’s collective safety goals. Addressing Beef Safety Challenges - Workshops bring the information and activities of the annual Safety Summit to a location near you. Three workshops have been held in Nebraska, Kansas and Pennsylvania. Additional workshops are being planned.

Workshop information is located at [www.bifSCO.org](http://www.bifSCO.org).

## Research Update

Research continues to be the foundation on which food safety advances are made. Every year, during the Beef Industry Safety Summit, research updates are provided to attendees to showcase ongoing efforts to improve beef safety. Presentations by leaders in beef safety research focused on potential applications to the industry.

### *E. coli* O157:H7 in France

#### Patrice Arbault, BioAdvantage

The French beef industry experienced its largest community-wide outbreak of *E. coli* O157:H7 in 2005. Sixty-nine people fell ill and 18 suffered from hemolytic uremic syndrome (HUS). Since then, government and industry have implemented several measures that comply with European Food Law, including Hazard Analysis Critical Control Point (HACCP) plans, microbiological criteria, yearly surveillance programs and pre-harvest policies. Additionally, the European Reference Laboratory has initiated the development of a real-time polymerase chain reaction (PCR) method for the detection of the top five STEC (Shiga toxin producing *E. coli*), including *E. coli* O157:H7. The beef processor implicated in the outbreak has added additional measures to its safety procedures, including the development and use of new tools such as online monitoring to report all events occurring during the harvest process and the integration of a new analytical approach for critical beef products such as steak tartare.

### Effect of wet or dried distiller's grains on fecal prevalence of *E. coli* O157:H7

#### T.G. Nagaraja, Kansas State University

Distiller's grains (DG) are a by-product of ethanol production from cereal grains and are often included in feedlot rations as protein and energy sources. Previous studies documenting the positive association between fecal shedding of *E. coli* O157:H7 and feeding DG differed in the inclusion level (10 to 50% of the diet) and form (dried or wet). In this study, researchers evaluated the prevalence of *E. coli* O157:H7 in cattle fed 0, 20 or 40 percent DDG or WDG and also whether removing DG from the ration four weeks prior to harvest had any effect on prevalence.

The form of DG did not impact prevalence of *E. coli* O157:H7; however, the inclusion level was significantly associated with prevalence. Cattle fed 40 percent DG had a higher prevalence than either 0 or 20 percent DG. The prevalence of "high shedders" was also not affected by type of DG, but was impacted by the inclusion rate. Cattle fed DG at 40 percent of the ration had higher shedding rates than the 0 or 20 percent inclusion rate. The researchers did not identify a difference in prevalence rates for the group that had DG removed during the last four weeks of the feeding period; however, the overall prevalence rate was 3.3 percent, which may have limited the ability to evaluate whether removing DG had any impact.

## Tracing pathogen contamination through the post-harvest environment

#### Ashley Haneklaus, Texas A&M University

Cattle hides containing pathogens such as *E. coli* O157:H7 or *Salmonella* are among the principal sources of carcass contamination. This mechanism is generally considered a "direct" transmission from the hide onto the carcass. However, the plant environment may serve as an "indirect" source of transmission, from the hide to surfaces, which may become niches serving as a source for further transfer onto carcasses. In this project, researchers used novel marker organisms to determine if transfer to carcasses could occur from contaminated hides via environmental routes such as the walls, floors, and equipment of a processing facility.

Hides were inoculated as part of the experimental treatment and the carcasses were sampled at various points throughout the harvest process. The carcass immediately following each of the inoculated carcasses was also tested. Environmental samples were also collected.

Microorganisms were transferred from the inoculated hide onto the carcass and the microorganisms remained on the carcass until the final intervention. Results from this study demonstrated the effectiveness of safety interventions in reducing pathogens on beef carcasses. The presence of pathogens in environmental samples, though sporadic, indicates that pathogens can be transferred from a contaminated animal to the processing environment during hide removal. Sanitary dressing procedures and effective interventions are critical in controlling microbiological contamination.

### Quantitative herd-level evaluation of *Salmonella* shedding on dairies

#### Russell Farrow, USDA Agricultural Research Service (ARS)

Researchers evaluated farm-level variables that can explain a significant amount of variation in *Salmonella* shedding in dairy cattle. Fecal samples were obtained from 22 dairies in the southern Great Plains. *Salmonella* was recovered from 25.8 percent of the samples (n = 568); however, dairy-level prevalence ranged from 0.0 percent to 92 percent. The researchers concluded that *Salmonella* is ubiquitous on dairies in the southern Great Plains, but clustered at the herd level. Typically, *Salmonella* is present at low concentrations and is rarely associated with clinical animal disease.

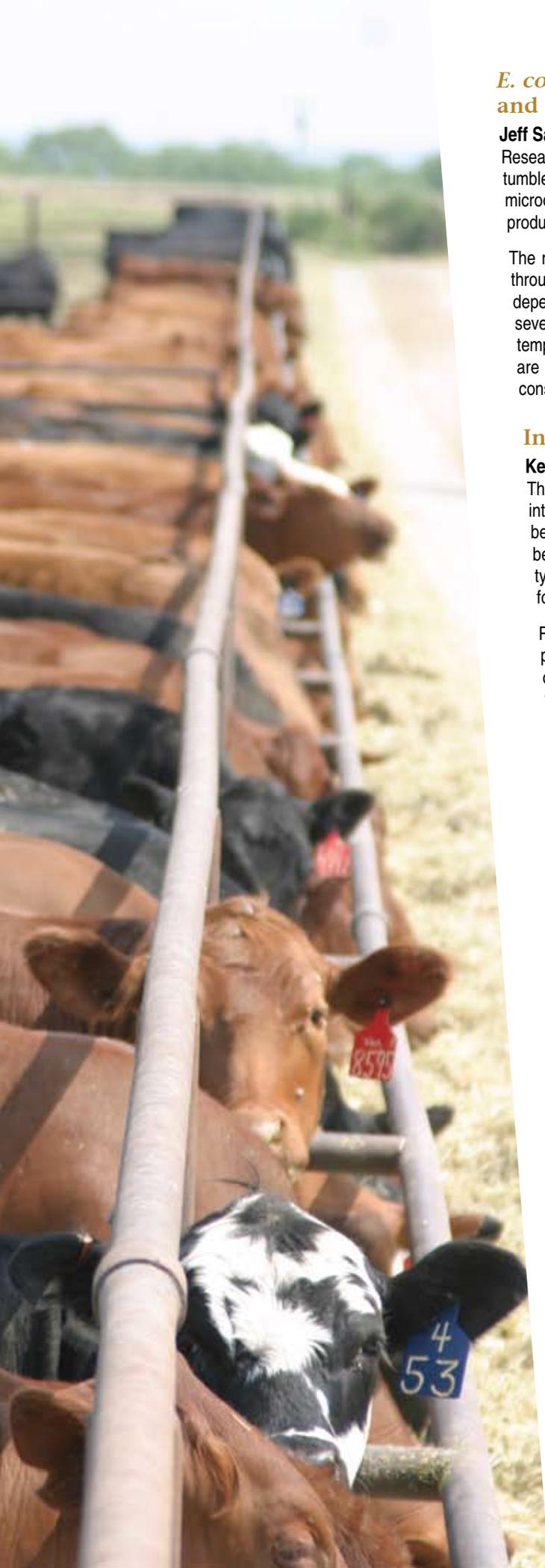
### Evaluation of different temperatures and exposure times of hot water to reduce pathogen levels

#### Gary Acuff, Texas A&M University

Inoculated beef inside rounds (lean surface) and outside rounds (fat surface) were exposed to three different water temperatures (66°C, 74°C and 82°C) and three different exposure times (5 seconds, 10 seconds and 15 seconds). Following treatment, the inoculated and control products were analyzed for pathogen reduction, reduction in naturally-occurring coliforms per *E. coli*, and lean and fat color.

Based on this study, time had a more significant impact on log reduction of *S. Typhimurium* and *E. coli* O157:H7 than temperature for the lean surfaces. For fat surfaces, both time and temperature played an important role in reducing pathogen levels. It is imperative that antimicrobial interventions do not create quality issues, such as discoloration, for beef products that could result in additional costs to the processor in trimming and in lost yields. While some initial discoloration of lean and fat surfaces existed immediately after treatment, at 24 hours after treatment, color was acceptable.





## ***E. coli* O157:H7 and *S. Typhimurium* survival and transfer during marinated beef production**

**Jeff Savell, Texas A&M University**

Researchers inoculated marinades with *E. coli* O157:H7 and *S. Typhimurium* then vacuum tumbled them with beef inside skirts and beef tri-tip roasts. After vacuum tumbling, the microorganism's survival and the depth of penetration was evaluated for individual meat products.

The results showed the *S. Typhimurium* and *E. coli* O157:H7 in the marinades penetrated throughout the skirt meat. The penetration of the pathogens in the tri-tip roast varied depending on the thickness of the roast. The spent marinade tested on day zero, three and seven showed the microorganisms were able to survive in the marinade at refrigerated temperatures. Based on these results, the researchers recommended that if beef processors are recirculating spent marinade or using it on subsequent production days, they should consider using some type of antimicrobial process.

## **Industry practices being used to address *E. coli* O157:H7**

**Kerri Harris, Texas A&M University**

The objective of this project was to survey establishments that harvest beef, produce non-intact beef products or produce ground beef, to determine industry practices currently being applied to reduce *E. coli* O157:H7. The survey focused on pathogen interventions being applied, methods being used to validate these interventions, frequency of validation, types and frequency of pathogen testing conducted, sampling procedures and protocols for pathogen testing, and use and knowledge of industry Best Practices.

Results show a variety of interventions are being applied throughout the different processes, and that some interventions have been validated using in-plant testing while others have no validation data. The written survey results also show many establishments were familiar with the industry Best Practices with varying degrees of knowledge. Overall, the results showed each processing category has developed and implemented food safety systems; however, a need for improvement exists in some areas.

## **Dietary orange peel and pulp can reduce *Salmonella* in sheep**

**Todd Callaway, USDA-ARS**

Fresh citrus peel and dried orange pulp are by-products from citrus juice production that have a relatively high nutritive value, and are often incorporated into least-cost rations for beef and dairy cattle. Orange peel and pulp and other citrus fruits contain essential oils (e.g. limonene, linalool) that are toxic to bacteria and exhibit an antioxidant effect in host animals. Sheep were fed a commercial feedlot ration supplemented with zero, 10 or 20 percent pelleted orange peel for seven days. Following inoculation with *Salmonella typhimurium*, fecal samples were collected. Feeding 10 percent orange peel in the ration reduced ruminal, cecal and rectal populations of *Salmonella Typhimurium* approximately 1, 2 and 0.5 log<sub>10</sub> colony forming units (CFU), respectively.

## **Feeding wet corn distiller's grains does not enhance carriage of *Campylobacter* in fed cattle**

**Nathan Krueger, USDA-ARS**

Unlike most other gut bacteria, *Campylobacter* lack a key enzyme involved in carbohydrate metabolism and thus they metabolize other substrates such as amino acids to conserve energy. Consequently, researchers initiated this project to evaluate the impact of feeding undegradable intake protein (UIP), which increases the availability of amino acids to the lower gut, on intestinal carriage of *Campylobacter* in fed steers. The results from two experiments provided evidence that feeding diets high in UIP does not enhance intestinal carriage of *Campylobacter* in fed cattle.

## Evaluation of an experimental sodium chlorate product with and without nitroethane

**Tom Edrington, USDA-ARS**

An experimental product containing sodium chlorate has been investigated as a pre-harvest food safety strategy to reduce *Salmonella in vitro* and in food-producing animals. The addition of short-chained nitro compounds, like nitroethane, has been shown to enhance the effectiveness of sodium chlorate in laboratory settings as well. The objective of this project was to determine if feeding an experimental chlorate product, with and without nitroethane, would reduce populations of *Salmonella* in naturally infected cull dairy cattle on a commercial dairy prior to slaughter. Results indicate that sodium chlorate effectively reduced natural *Salmonella* populations by up to  $5 \log_{10}$  cfu/gram in shedding animals. Additionally, animal prevalence, regardless of whether they also received nitroethane, was reduced by 58 percent. No observable benefit was noted when co-treating with nitroethane.

## Evaluation of gallium maltolate on fecal shedding of *Salmonella* in experimentally-infected cattle

**Tom Edrington, USDA-ARS**

Previous *in-vitro* research demonstrated the semi-metal gallium exhibits antimicrobial properties against some pathogenic bacteria, including *Salmonella*, by exploiting their requirement for iron to survive and replicate. Researchers hypothesized that oral administration of gallium maltolate (GaM) would reduce gastrointestinal populations and fecal shedding of *Salmonella* in experimentally infected cattle. In this experiment, no differences were recorded between the control and treated animals in the frequency of positive or negative values in enriched feces, luminal contents or tissue samples. Data from this study failed to demonstrate a beneficial effect of GaM administration on reducing *Salmonella* populations or fecal shedding in cattle.

## Effect of vitamin D supplementation on fecal shedding of *E. coli* O157:H7 in naturally colonized cattle

**Tom Edrington, USDA-ARS**

Previous research has demonstrated seasonal shedding patterns of *E. coli* O157:H7 in cattle are related to physiological responses to changing day-length. Serum concentrations of vitamin D, the “sunshine vitamin,” are higher in cattle during the summer months versus during the winter. As a result, researchers speculated that reducing dietary Vitamin D during the summer could theoretically decrease pathogen shedding to a level comparable to what might be observed during the winter. After conducting two experiments evaluating the effect of supplementing vitamin D at various dosage rates, the researchers concluded that Vitamin D may be involved in the seasonal population dynamics of *E. coli* O157:H7 in cattle. However, it appears that the vitamin D dose necessary to affect *E. coli* O157:H7 shedding is different than what can be modified with typical vitamin D supplementation rates.

## Technical Workshops

To make food safety measures effective in a real-world application, it's important to discuss scenarios that impact beef industry partners. Concurrent sessions were held during the Beef Industry Safety Summit to give attendees opportunities to discuss the following topics:

- Lessons Learned from Beef Recalls
- Subprimal Interventions and Validation
- Traceability Initiatives and their Impact on Beef Processors, Retailers and Foodservice Operators
- Hazard Analysis Critical Control Point (HACCP) and Regulatory Update
- Retail Beef Safety Focusing on Bench Trim and Intervention Practices

The Technical Workshops allow Beef Industry Safety Summit attendees an opportunity to focus on specific topics and interact more closely with experts on the various issues. These workshops exemplify the non-competitive spirit that has made the Summit so successful, as they give participants a chance to take part in an open dialogue with their colleagues and discuss the ramifications and potential solutions for current safety issues.



## Antibiotics Forum

Antibiotics are an important tool for preventing, controlling and treating disease in livestock; however, ongoing activist and media reports suggest the use of drugs in animal agriculture is often inappropriate and is poorly controlled. Inaccurate information threatens to undermine the science-based approval process currently in place for livestock antibiotics. Additionally, the increased interest by lawmakers in further restricting antibiotic use in livestock is primarily driven by concerns about antibiotic resistance. A special session was held during this year's summit to address this very timely topic.

### Beef Quality Assurance – The Industry's Answer to Responsible Livestock Production

#### Anne Burkholder, Will Feed, Inc.

In 1982, the U.S. Department of Agriculture and the then National Cattlemen's Association (NCA) began working collaboratively on a voluntary initiative to reduce violative drug residues in beef carcasses. The effort evolved into the now checkoff-funded Beef Quality Assurance (BQA) program. Based on the principles of HACCP, BQA involves identifying areas in beef production that might impact final product quality, determining means to prevent quality defects, and using appropriate records to document preventive practices.

According to Burkholder, who is a national BQA award winner, BQA programs are active in almost every state. USDA Animal Plant Health Inspections Service (APHIS) data indicate that 90 to 95 percent of all U.S. feedlots have a formal training program for quality assurance.

While significant strides have been made in preventing violative residues in beef carcasses, growing concern about antibiotic resistance means that producers must be more vigilant than ever in using antibiotics judiciously. By so doing, farmers, ranchers and veterinarians will ensure continued availability of antibiotics for therapeutic use in livestock.

The NCBA Producer Guidelines for "Judicious Use of Antimicrobials" have been in place since 1987 and specifically outline the appropriate use of these products. "Through our BQA program, we can make claims about beef safety and the integrity with which we raise our products with the validity that consumers are looking for," said Burkholder.

### Current Knowledge on the Impact of Antibiotic Use in Cattle Production on Resistance Development

#### Mike Apley, Kansas State University

Antibiotic resistance continues to be an issue that garners attention from regulators, consumers and the industry. In a presentation during the Beef Industry Safety Summit, Mike Apley, DVM, explained that the issue is complex and no definitive answer exists as to the cause of antibiotic resistance among pathogens. "It is my opinion that while livestock production practices are not the major contributor, I don't believe we can definitively say there is no link."

Whatever the cause, it is critical that regulators and the industry use accurate scientific assessments in evaluating the causes and risks of antibiotic resistance. Apley pointed out several instances where the media and policy makers have made inaccurate statements about antibiotic use in livestock production, thus complicating the issue. "It is important that producers and veterinarians continue to educate lawmakers and the public on how antibiotics are used in livestock production, so we can be assured we have the tools to continue to treat important diseases in our cattle and, moving forward, scientific investigations focus on the real issues," encouraged Apley.

In response to a question from an audience member, Apley also emphasized the importance of collecting appropriate data to evaluate the potential removal of technologies before actually considering

legislation or regulatory action. "For example, is there more risk to human health if we disallow an antibiotic to be used in cattle production versus continuing its use?"

Applying an accurate and proper risk assessment is important in giving credibility to the livestock industry's position. "If something causes harm, we want to know about it, but the assessment must be accurate and balanced," added Apley.

### Educating Policymakers about Antibiotic use in Cattle Production

#### Kristina Butts, NCBA

"I view my job as an educator and advocate for the cattle industry," summarized Butts, who serves as director of legislative affairs for NCBA. "We had 110 new members in the House and 22 new Senators in November of 2008, and none of them had any connection to agriculture. That presented a new challenge for our industry as we have never had that large a knowledge gap about food production among our elected leadership."

Butts discussed initiatives from various interest groups that are promoting inaccurate messages about antibiotic use in livestock production. "It is our job to bring science to the issue. We spend most of our time educating lawmakers and their staffers about who we are and what we do," added Butts.

"Not only are we dealing with lawmakers who lack knowledge about what we do, but we also have to address inaccurate media reports, both on a local and national level, that are many times driven by legislative staffers," added Butts.





## Issues Update Forum

Every year, attendees at the Beef Industry Safety Summit have an opportunity to hear from industry participants about emerging issues that may influence consumer opinions about the safety of beef products.

To illustrate how consumers often don't accurately separate safety from other issues, session moderator, Jacque Matsen, executive director of issues management for NCBA, showed the movie trailer for the docudrama *Food, Inc.* "Consumers don't think about issues like safety, nutrition, environmental sustainability and animal care as separate silos," said Matsen. "They merge together in consumers' minds, and *Food, Inc.* is an example of how consumers' buying decisions are influenced by this convergence of issues."

Attendees then heard comments from several industry experts explaining how these various issues, and their convergence, are affecting consumers' attitudes about beef.

- Rick McCarty, NCBA, presented the results of a recent survey showing how consumers rank various attributes of beef and their perceptions about beef production.
- Tamara McCann Thies, NCBA, provided an outline of proposed environmental policy initiatives and explained how the political and regulatory environment can impact beef production practices.
- Shalene McNeill, NCBA, explained how the "eat less red meat" message, first circulated thirty years ago because of misinformation about beef's fat profile, continues to challenge the industry. In the media, nutrition issues have been connected with food production practices, food policy and subsidies, poverty, and obesity.
- Kay Johnson Smith, Animal Agriculture Alliance, explained how the extreme animal activist organizations are achieving greater political and fundraising success in the current environment.
- Kristina Butts, NCBA, described some of the steps taken by NCBA to provide accurate information about beef production practices to lawmakers, staffers and regulatory-agency employees.

For more information on the topics discussed at the Issues Forum, go to Meetings Summaries under the Events tab at [www.bifSCO.org](http://www.bifSCO.org).

## Conclusion

In a world where consumers are bombarded with conflicting messages, separating the true and the perceived risks surrounding beef safety is presenting a greater challenge.

For the beef industry, the goal continues to be providing the safest beef possible by identifying challenges and creating solutions through continued innovation. Our challenge, as industry stakeholders, is to take that message to consumers and assure them of our never-ending commitment.

### Beef Safety and Production Web Resources

[www.BIFSCO.org](http://www.BIFSCO.org)

[www.SafeandSavory160.com](http://www.SafeandSavory160.com)

[www.BeefRetail.org](http://www.BeefRetail.org)

[www.BeefFoodService.com](http://www.BeefFoodService.com)

[www.BeefResearch.org](http://www.BeefResearch.org)

[www.ExploreBeef.org](http://www.ExploreBeef.org)

[www.BSEInfo.org](http://www.BSEInfo.org) and [www.FMDInfo.org](http://www.FMDInfo.org)



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**2011 Beef Industry Safety Summit**  
in Dallas, Texas.  
March 2-4, 2011  
Plans for next year's Summit  
will be posted on [www.bifsc.org](http://www.bifsc.org).

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