AUTHORIZATION REQUEST FOR FY 2022

CBB Budget Category: **Research**

Name of Contractor: **Foundation for Meat and Poultry Research and Education**

Name of Organization Subcontracting: N/A

Start Date: **10/1/2021**

End Date: **9/30/2024** BPOC Approved AR Extension Date: **9/30/2025**

AR OVERVIEW

AR Purpose and Description:

The strategies and tactics described in this Authorization Request (AR) support the Checkoff program category for Research. Detailed descriptions for post-harvest beef safety and processed beef nutrition research and education and outreach are included in the following sections. Around the world, consumers of U.S. beef demand high quality, safe and nutritious products. Beef safety and nutrition research play key roles in the dialogue with domestic and foreign consumers of U.S. beef as their access to protein choices expands and the demand for product information continuously increases. Effective communications must be based in science. Disseminating science-based information and data to diverse audiences is a fundamental role that will be filled through the programs outlined in this AR. Collaborative efforts will be utilized to ensure broad distribution and effective engagement with all stakeholders.

Funding	Direct Costs	Implementation	Total
CBB/BPOC Funding Request:	$350,000	$150,000	$500,000

Other Potential Funding	Direct Costs	Implementation	Total
Federation of SBCs Pledges: (Informational Only)	$0	$0	$0
Other Funding: (Informational Only)	$0	$0	$0

Beef Industry Long Range Plan (LRP) Core Strategies Addressed by this AR

Drive Growth in Beef Exports	Grow Consumer Trust in Beef Production	Develop & Implement Better Business Models & Value Distribution Across All Segments	Promote & Capitalize on the Multiple Advantage of Beef	Improve the Business & Political Climate of Beef	Safeguard & Cultivate Investment in Beef, Industry Research, Marketing & Innovation
☐	■	☐	■	■	■

PROGRAM INFORMATION FOR THIS AR

Tactic A

Tactic Name: *Post-harvest Beef Safety Research, Knowledge Dissemination and Stakeholder Engagement*

Tactic Description:

Food safety is critical to ensuring consumer confidence in the beef products they choose to buy and feed their families. While current levels of pathogen contamination on beef remain relatively low, there continue to be areas for improvement in its safety profile. Sampling results from the Food Safety and Inspection Service (FSIS) show the prevalence of Shiga toxin-producing *Escherichia coli* (STEC) O157:H7 at 0.30 percent for raw ground beef components and 0.19 percent for ground beef in calendar year (CY) 2020.[1] In June 2020, FSIS announced plans to expand routine verification testing to include the six non-O157 STECs (O26, O45, O103, O111, O121, or O145) in addition to *E. coli* O157:H7, to ground beef, bench trim, and raw ground beef components other than raw beef manufacturing trimmings.[2] The agency also intends to test for these non-O157 STECs in retail ground beef and imported raw beef products. This expansion could have a significant impact on the number of beef samples testing positive for STEC as FSIS estimates that for every one O157:H7 positive there are 2-3 non-O157 positives.[3]

There are additional pathogens of concern on beef products. The prevalence of *Salmonella* spp. on raw ground beef components is 7.14 percent and 2.2 percent in

[1] Sampling Results for FSIS Regulated Products. https://www.fsis.usda.gov/sites/default/files/media_file/2021-04/sampling_project_results_data.pdf. Accessed June 22, 2021.
[2] FSIS Notice and request for comments: Expansion of FSIS Shiga Toxin-Producing *Escherichia coli* (STEC) Testing to Additional Raw Beef Products. 85 *Fed. Reg.* 34397-34402 (June 4, 2020).
[3] Personal Correspondence. KatieRose McCullough, Ph.D., MPH and Paul Kiecker, Administrator, FSIS

raw ground beef in CY 2020.[4] FSIS' "Nationwide Microbiological Baseline Data Collection Program: Beef-Veal Carcass Survey," conducted from August 2014 – December 2015 showed 27 percent of beef carcasses tested positive for *Salmonella* post hide removal.[5] Because of the public health concerns around *Salmonella*, FSIS issued a "Roadmap to Reducing *Salmonella*" as well as held a public meeting on the state of science in 2020.[6,7] Together, these activities outline programs that FSIS and industry can undertake to reduce *Salmonella* on meat products, including performance standards and research among other efforts. Contamination of ready-to-eat meat and poultry, which is not broken out by species, by *Listeria monocytogenes* has remained relatively steady at less than one-half of one percent over the last few years.[8]

Research shows that post-harvest, multiple hurdle beef safety interventions and other process controls are effective in reducing the prevalence of pathogenic bacteria. However, the threat posed by pathogens is not static, rather it is constantly emerging and antimicrobial interventions and other process controls must be constantly upgraded to address these emerging threats. Without these continuous improvements, incidence levels would have most likely increased. Many of the interventions and process controls now used in the beef industry are the result of Checkoff-funded research and continued investment is necessary for further improvement.

According to the Centers for Disease Control and Prevention 2019 FoodNet report, *Salmonella* is the second most common source of infection, and the incidence has not declined compared with the previous three years.[9] The report notes STEC illnesses increased by 34 percent when comparing 2019 to 2016-2018 data, while illnesses attributed to STEC O157:H7 appear to be decreasing.[10] The incidence of illnesses

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[4] Sampling Results for FSIS Regulated Products. https://www.fsis.usda.gov/sites/default/files/media_file/2021-04/sampling_project_results_data.pdf. Accessed June 22, 2021.

[5] Nationwide Microbiological Baseline Data Collection Program: Beef-Veal Carcass Survey. https://www.fsis.usda.gov/node/1968. Accessed June 22, 2021.

[6] FSIS Roadmap to Reducing Salmonella: Driving change through Science Based policy. https://www.fsis.usda.gov/wps/wcm/connect/388d5b27-b821-42ba-a717-526f3bc68b4a/FSISRoadmaptoReducingSalmonella.pdf?MOD=AJPERES. Accessed June 22, 2021.

[7] https://www.federalregister.gov/documents/2020/08/14/2020-17827/salmonella-state-of-the-science. Accessed June 22, 2021.

[8] Tables & Results Microbiological Testing Program for RTE Meat. https://www.fsis.usda.gov/science-data/data-sets-visualizations/microbiology/microbiological-testing-program-rte-meat-and-3. Accessed June 22, 2021.

[9] Tack DM, Ray L, Griffin PM, et al. Preliminary Incidence and Trends of Infections with Pathogens Transmitted Commonly Through Food — Foodborne Diseases Active Surveillance Network, 10 U.S. Sites, 2016–2019. MMWR Morb Mortal Wkly Rep 2020;69:509–514. DOI: http://dx.doi.org/10.15585/mmwr.mm6917a1.

[10] Centers for Disease Control and Prevention. Foodborne Disease Active Surveillance Network (FoodNet) 2019 Preliminary Data: Tables. https://www.cdc.gov/foodnet/reports/prelim-data-intro-2019.html. Accessed June 22, 2021.

attributed to *Listeria* has remained relatively unchanged for the past several years at 0.3 cases per 100,000 population.

The Interagency Food Safety Analytics Collaboration (IFSAC) released foodborne illness attribution estimates for 2018 in late 2020. IFSAC used outbreak data to update previous analyses to estimate which foods are responsible for illness related to *Salmonella*, *Escherichia coli* O157, *Listeria monocytogenes*, and *Campylobacter.* IFSAC considers these priority pathogens because of the frequency (estimated 1.9 million illnesses each year combined) and severity of illness they cause, and because targeted interventions can significantly reduce these illnesses. The report noted that *Salmonella* illnesses came from a wide variety of foods, with more than 75 percent coming from seven food categories, including beef. Also, nearly 75 percent of *E. coli* O157 illnesses were linked to vegetable row crops, *e.g.*, leafy greens, and beef. Specifically, beef is estimated cause 5.7 percent of *Salmonella* illnesses and 25.5 percent of STEC O157 illnesses. [11]

There have been several high profile pathogen outbreaks attributed to ground beef. In 2018, there were 18 illnesses associated with *E. coli* O26 in four states, 33 percent of those infected were hospitalized and there was one death. There was also an outbreak of *Salmonella* Newport beginning in 2018 and ending in 2019 which resulted in over 400 illnesses in 40 states with 34 percent requiring hospitalization. It is clear pathogens in beef remain a critical public health concern and ground beef remains a significant vulnerability. *Healthy People 2030* have set public health goals to reduce illnesses attributed to STEC, *Salmonella* and *Listeria* as well as to reduce outbreaks attributed to STEC, *Campylobacter*, *Listeria*, and *Salmonella* infections linked to beef.[12] It is clear regulatory and public health agencies are committed to reducing foodborne illnesses attributed to beef.

Like pathogens, science and detection technologies have also continued to evolve. Public health officials and regulatory agencies are using whole genome sequencing (WGS) technology for genetic typing of bacteria, including pathogens relevant to food safety. WGS allows for significant improvement in foodborne disease outbreak detection and source traceback compared to earlier technologies. To improve public health, it is important to gain a better understanding of the virulence factors of pathogens found on beef. Learning why and how pathogens cause illness will enable the beef industry to more appropriately target interventions to minimize their presence and make improvements in public health.

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[11] Interagency Food Safety Analytics Collaboration. Foodborne illness source attribution estimates for *2019* for *Salmonella*, *Escherichia coli* O157, *Listeria monocytogenes*, and *Campylobacter* using multi-year outbreak surveillance data, United States. Atlanta, Georgia and Washington, District of Columbia: U.S. Department of Health and Human Services, CDC, FDA, USDA/FSIS. *December 2020.*

[12] https://health.gov/healthypeople/objectives-and-data/browse-objectives/foodborne-illness. Accessed June 22, 2021.

The economic burden of illness is another factor in the costs associated with pathogen contamination. According to the U.S. Department of Agriculture's Economic Research Service, illnesses attributed to *Salmonella* cost $3.6 billion, STEC (non-O157 and O157) cost nearly $300 million, and *Listeria* costs $2.8 billion in the 2013.[13] These costs resulted from medical costs, lost productivity, and death. There are no acceptable levels for pathogenic organisms in beef products as evidenced by the level of foodborne illnesses in the United States. Because *Salmonella* is a significant source of illnesses, hospitalizations, deaths and related costs, research efforts focused on mitigating this threat in the beef supply will continue to be a key priority.

Another beef industry cost associated with pathogen contamination is the reduced value of products testing positive. When a raw material or finished product tests positive for a pathogen, it cannot enter commerce unless it is thermally processed. If the product has already entered commerce, the product is subject to a recall. In both cases, a substantial reduction in value for the pathogen positive product and significant recall costs are incurred by the packer or processor.

The total costs of safety interventions and processes, medical and missed opportunity claims, recalls and reduced value of contaminated products cannot always be passed on to consumers. Most often these costs are borne by the industry and eventually passed on to beef producers through reduced live cattle values. Accordingly, there is a direct economic incentive for beef producers to invest in beef safety research to further reduce pathogenic contamination levels in raw materials and finished products to increase the value of their cattle and their return on investment.

For the foregoing reasons, foundational, applied research is the focus in this program. Integrated communication and educational initiatives will ensure that the data collected are shared with targeted audiences for application across the processing sectors. Outreach with stakeholder groups will inform and impact collaborative research and communication programs addressing the safety of U.S. beef products.

The beef industry must consistently produce products that are safe and wholesome to maintain and bolster consumer trust and grow demand. International and domestic consumers must have confidence that the U.S. beef items they and their families consume are produced using the best processes available, which are supported by science-based research. The threats in the microbial environment are constantly evolving and posing new risks to the safety of the beef supply. These changes can lead to new regulatory initiatives and require adaptations or scientific support for compliance. Yet, not all research is applicable to all facilities as they vary in size, capacity and types of beef products produced. It is imperative that the beef processing industry have access to the most up- to-date science-based research to mitigate both

[13] Hoffmann, Sandra, Bryan Maculloch, and Michael Batz. *Economic Burden of Major Foodborne Illnesses Acquired in the United States,* EIB-140, U.S. Department of Agriculture, Economic Research Service, May 2015. https://www.ers.usda.gov/webdocs/publications/43984/52807_eib140.pdf?v=42136. Accessed June 22, 2021.

current and emerging threats. A one size fits all approach does not work when ensuring safe beef. As a result, while there may be a large body of scientific evidence in the literature, post-harvest beef safety research investments must continue to address these differences and emerging challenges. This tactic provides practical, science-based research that can be used by in-plant personnel and others to ensure the safety of the U.S. beef supply.

A standing advisory committee of industry and academic experts and practitioners will establish research priorities and evaluate proposals. As needed, a select group of beef industry members may be identified to develop and evaluate specific research projects in consultation with the standing advisory committee. Based upon their recommendations, contracts are awarded based on merit and priority need. Funding partners are identified as appropriate. After the award, the research contracts will be closely monitored to ensure timely and complete research work products are available for distribution to the industry.

Research findings will be disseminated to stakeholders and safety professionals through many means. Investigators will present their research at regional, national and international technical conferences as well as publish work in peer-reviewed materials. Research findings will also be shared with regulatory agencies to ensure they have all the evidence when making decisions impacting beef safety. AR activities and related outcomes will be shared during sponsorship events and exhibits. The dissemination of research findings to the food safety community will aid the safety of, and consumer confidence in, beef products.

Measurable Objectives

(For tactics $100,000 or less two measurable objectives are required, and for tactics over $100,000 at least three to five measurable objectives are required by the Checkoff Evaluation Committee):

- Manage the execution of a minimum of three research projects addressing current knowledge gaps. Topics may include but are not limited to: developing rapid methods for quantitative *Salmonella;* determining and evaluating factors that correlate to high event periods; identifying and validating antimicrobial interventions to reduce pathogen contamination of raw ground beef components intended for use in ground products; investigating efficient and sustainable application of antimicrobials to reduce pathogens on beef products; evaluating genetic factors that allow *Salmonella* and *Listeria* to live and thrive in processing environments, on food contact surfaces and on products, including in specific niches (*e.g.* areas with high or low temperatures, *etc*.); developing new and novel environmental monitoring strategies, detection, and/or sampling methods to more effectively identify pathogen harborage sites; identifying methods to detect biofilm formation and removal as affected by different surfaces used in harvesting cattle and processing beef.

- Assess research impact over time by cataloging citations for research funded by the Beef Checkoff and administered by the Foundation. Identify 12 references citing Beef Checkoff funded research used as a foundation for other research projects, to develop regulatory guidelines, standard operating procedures or best practices by the end date of this AR.

- Facilitate the dissemination of research data and knowledge sharing through at least cumulatively four meetings, webinars, documents or other events targeted to safety professionals.
  - Reaching at least 1,000 stakeholders through combined activities
  - Newsletter distribution will achieve at least 28 percent open rate.

Performance Efficiency Measures

Consumer and/or Producer Reach Goal:

Consumer and/or Producer Engagement Goal:

Key Opinion Leader Reach Goal:

Key Opinion Leader Engagement Goal:

LRP Initiatives Addressed by this Tactic

Drive Growth in Beef Exports	Grow Consumer Trust in Beef Production	Develop & Implement Better Business Models & Value Distribution Across All Segments	Promote & Capitalize on the Multiple Advantage of Beef	Improve the Business & Political Climate of Beef	Safeguard & Cultivate Investment in Beef, Industry Research, Marketing & Innovation
☐ Drive adoption of traceability ☐ Identify & address export customer needs and values ☐ Collaborate with targeted partners to promote U.S. beef in foreign markets ☐ Invest in research, marketing & education programs	☐ Measure, document, improve & communicate the net environment impact of beef production ☐ Educate medical, diet & health professionals about beef & beef production ☐ Align and collaborate with traditional & nontraditional partners to tell the positive story of beef production ☐ Engage positively in the sustainable nutrition conversation ☐ Expand efforts in education the general public about BQA program & it's impact on animal well-being ☐ Expand BQA program to include verification ☐ Develop a direct-to-consumer beef safety campaign	☐ Use innovative methods & technologies to value carcasses based on eating satisfaction & red meat yield	☐ Promote the role of beef in a health & sustainable diet ☐ Implement a marketing campaign that communicates beef's advantage compared to alternative proteins ☐ Develop targeted marketing programs focused on the highest opportunity market segments ☐ Cultivate collaborative promotion partnerships ☐ Promote innovative online marketing, packaging & shipping solutions to enable the direct marketing of beef ☐ Engage consumers in a memorable beef eating experience ☐ Develop a more interactive & exciting beef purchasing experience ☐ Promote underutilized beef cuts & new variety meat product	☐ Demonstrate beef's positive sustainability message & key role in regenerative agriculture ☐ Defend beef's product identity ☐ Ensure beef's inclusion in dietary recommendations ■ Drive continuous improvement in food safety ☐ Develop crisis management plans	☐ Attract innovative & intellectual capital into the beef industry ■ Encourage the cooperation & collaboration of existing industry advisory committees to identify & prioritize research efforts

Committee(s) to Score this Tactic

Consumer Trust	Domestic Marketing	International Marketing	Nutrition & Health	Safety & Product Innovation	Stakeholder Engagement
☐	☐	☐	☐	■	☐

SUPPLEMENTAL INFORMATION FOR THIS AR

1. **Please explain changes from FY 2021 approved AR:**

   Potential research topics have been updated in each tactic. Provided additional context on the importance of research topics based on foodborne outbreaks attributed to beef in Tactic A and the potential for additional reports questioning the role of processed beef in healthy dietary patterns in Tactic B.

2. **List any proposed vendors/agencies that will be used to complete the work in this AR.**

   None at this time

3. **Will all work with vendors/agencies be competitively bid?**
   NO
   If not, why not?

   Work will be awarded through an RFP process and evaluation of research proposals by a standing committee comprised of industry and academic food safety and nutrition practitioners.

4. **Please list any relationships between this AR and projects previously funded by the Beef Promotion Operating Committee (BPOC):**

   The Foundation for Meat and Poultry Research and Education and the North American Meat Association previously administered post-harvest beef safety research through ARs # 1405, 1504, 1603, 1705, 1811, 1910 and 2010. FMPRE currently administers post- harvest beef safety and processed beef nutrition research through AR # 2110.

5. **If applicable, explain how this AR can be extended by State Beef Councils.**

   Outcomes and results will be shared with State Beef Councils for further dissemination and use.

DETAILED BUDGET SUMMARY

AR# 2210-R

CBB/BPOC Funding Request:

Committee Name	Tactic	Tactic Name	Funding Source	Direct	Impl.	Total
Safety & Product Innovation	A	Post-Harvest beef safety research, knowledge dissemination and stakeholder engagement	BPOC	$ 350,000	$ 150,000	$ 500,000
AR Totals				$ 350,000	$ 150,000	$ 500,000

Federation of SBCs Pledges/Other Funding: ***(Informational Only)***

Committee Name	Tactic	Tactic Name	Funding Source	Direct	Impl.	Total
Safety & Product Innovation	A	Post-Harvest beef safety research, knowledge dissemination and stakeholder engagement	Federation/ Other			$ -
0	0	0	Federation/ Other			$ -
AR Totals				$ -	$ -	$ -

Summary of Prior Year AR Budgets and Expenses:

FY 2021 Approved Budgets	CBB/BPOC	FSBCs	Other Source(s)	Total	Direct Cost	Impl.	Total
AR Totals	$ 646,144			$ 646,144	$ 425,000	$ 221,144	$ 646,144

FY 2021 Actual Expenses (through June 30, 2021)	CBB/BPOC	FSBCs	Other Source(s)	Total	Direct Cost	Impl.	Total
AR Totals	$ 46,144			$ 46,144	$ -	$ 46,144	$ 46,144

Historical Summary of Budgets and Expense: *(includes all funding sources listed in original AR)*

	Total Approved Budgets			Total Actual Expenses		
	FY 2020	FY 2019	FY 2018	FY 2020	FY 2019	FY 2018
AR Totals	$ 798,057	$ 800,000	$ 500,000	$ 295,723	$ 616,814	$ 378,321

POTENTIAL PARTNERSHIP LIST
FY 2022

Please list all potential partners/collaborators* for the related AR and details including the nature and extent of collaboration: *(include any partnership and/or collaborations with a third party by identifying the third party, the nature of the collaboration and extent of the collaboration.)*

1. **North American Meat Institute –** Collaborations could include in-kind staff support, research co-funding, dissemination of research, outreach and education opportunities.

2. **Foundation for Meat and Poultry Research and Education** – Collaboration could include research co-funding with non-Checkoff funds, dissemination of research, outreach and education opportunities.

3. **National Pork Board -** Collaborations could include co-funding research, dissemination of research, outreach and education opportunities.

4. **U.S. Poultry and Egg Association -** Collaborations could include co-funding research, dissemination of research, outreach and education opportunities.

5. **American Meat Science Association** – Collaborations could include dissemination of research, outreach and education opportunities.

6. **American Association of Meat Processors -** Collaborations could include dissemination of research, outreach and education opportunities.

7. **Eastern Meat Packers Association** - Collaborations could include dissemination of research, outreach and education opportunities.

8. **Southwest Meat Association** - Collaborations could include dissemination of research, outreach and education opportunities.

9. **Food Marketing Institute –** Collaborations could include dissemination of research, outreach and education opportunities.

10. **National Grocers Association –** Collaborations could include dissemination of research, outreach and education opportunities.

11. **International Association for Food Protection** - Collaborations could include dissemination of research, outreach and education opportunities.

12. **Institute of Food Technologists** - Collaborations could include dissemination of research, outreach and education opportunities.

13. **International Food Information Council** - Collaborations could include dissemination of research, outreach and education opportunities.

14. **Niche Meat Processors Assistance Network** - Collaborations could include dissemination of research, outreach and education opportunities.

*Partners/collaborators does NOT include subcontractors