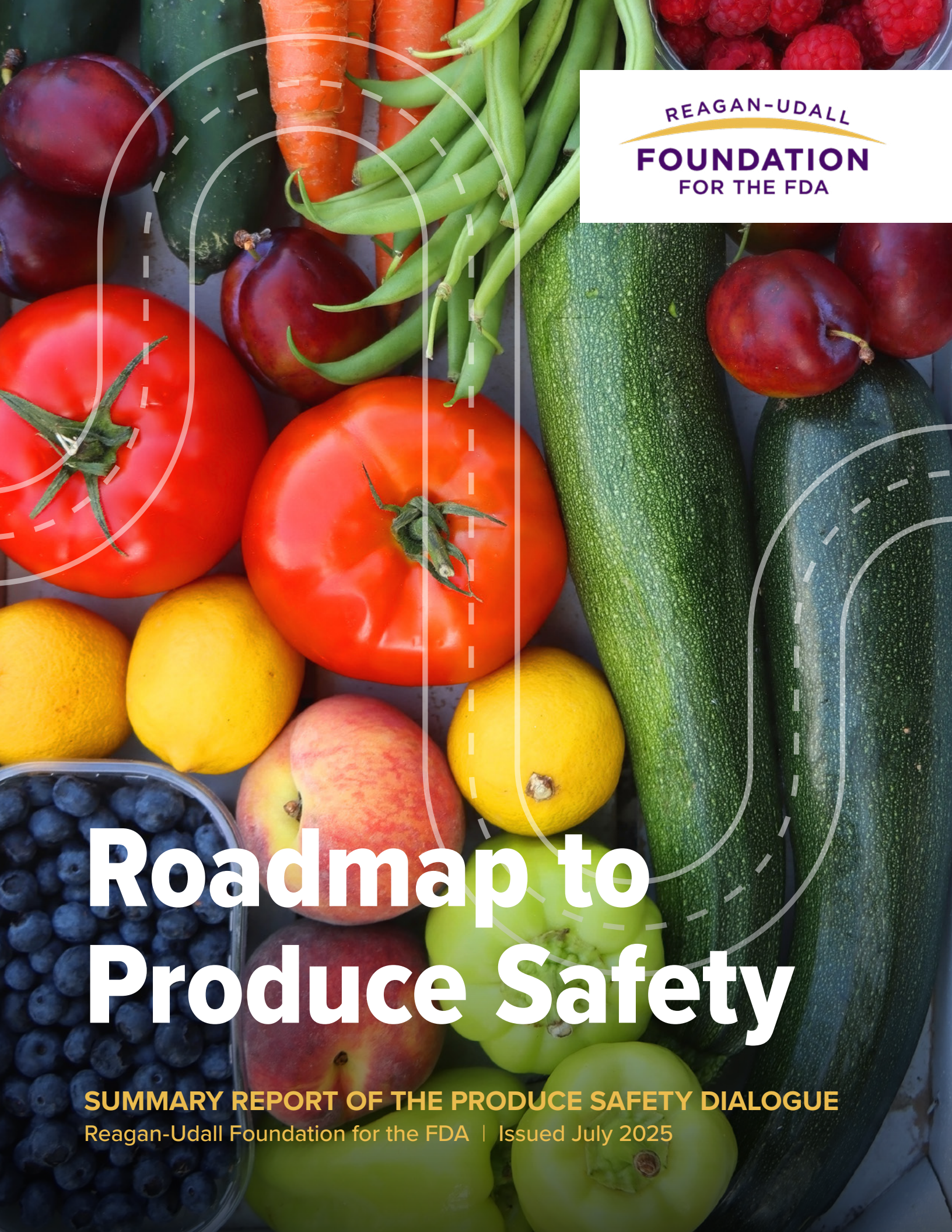

REAGAN-UDALL FOUNDATION FOR THE FDA

Roadmap to Produce Safety

SUMMARY REPORT OF THE PRODUCE SAFETY DIALOGUE

Reagan-Udall Foundation for the FDA | Issued July 2025

REAGAN-UDALL FOUNDATION FOR THE FDA

ABOUT THE REAGAN-UDALL FOUNDATION FOR THE FDA

The Reagan-Udall Foundation for the FDA (the Foundation) is an independent 501(c)(3) created by Congress to advance the mission of the FDA to modernize product development, accelerate innovation, and enhance product safety. The Foundation works to advance regulatory science, support development and dissemination of reliable information, and facilitate engagement and information exchange.

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Under the guidance of the work group leaders listed below, each work group was expertly facilitated to arrive at the key takeaways outlined in the summary document. Special thanks to the work group leaders for their dedication and service to this project:

- **One Health/The Agricultural Ecosystem**
  Joelle Mosso, Western Growers & Natalie Krout-Greenberg, California Department of Food & Agriculture
- **Industry-Regulatory Collaboration**
  Natalie Dyenson, International Fresh Produce Association (former) & Joe Reardon, National Association of State Departments of Agriculture
- **Extension & Outreach**
  Sonia Salas, Western Growers & Dr. Laura Strawn, Virginia Tech
- **Policy & Economic Opportunities**
  Dr. De Ann Davis, Western Growers & Connor Kippe, National Sustainable Agriculture Coalition
- **Produce Imports**
  Dr. Gustavo Reyes, Western Growers
- **Produce Safety Research Needs**
  Dr. Michelle Danyluk, University of Florida & Dr. Don Stoeckel, Cornell University
- **Buyer-Supplier Collaboration for Produce Safety**
  Mike Taylor, STOP Foodborne Illness
- **On-going Government/Private Sector/Non-Profit Collaboration**
  Susan Winckler, Reagan-Udall Foundation for the FDA

Ad-hoc Work Group Leads – Formed Post-April Meeting

- **Produce Safety Data**
  Dr. Barbara Kowalcyk, The George Washington University
- **Resource Reallocation**
  Dr. De Ann Davis, Western Growers and Dr. Phil Tocco, Michigan State University

The effort was supported by a steering committee comprised of the following individuals:

- Mitzi Baum, STOP Foodborne Illness (former)
- Dr. Betsy Bihn, Cornell University
- Dr. De Ann Davis, Western Growers
- Natalie Dyenson, International Fresh Produce Association (former)
- Connor Kippe, National Sustainable Agriculture Coalition
- Dr. Barbara Kowalcyk, The George Washington University
- Joe Reardon, National Association of State Departments of Agriculture
- Brian Ronholm, Consumer Reports
- Mike Taylor, STOP Foodborne Illness
- Dr. Hilary Thesmar, FMI, The Food Industry Association

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  - Lea Ann Browning-McNee, Director of Communications & Stakeholder Engagement
  - Dr. Perpetue Backer, Regulatory Science and Innovation Fellow
  - Hannah Gray, Engagement Associate
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Executive Summary

There is broad recognition that fresh fruits and vegetables are essential to a healthy diet. The safety of fresh produce is a continuing concern because microbiological contamination of these commodities has led to numerous foodborne illness outbreaks. Produce safety is a shared responsibility. However, many stakeholders see a current produce safety system that is fragmented, reactive, and providing too little support to growers—large and small, domestic and foreign—to make produce as safe as reasonably possible. This effort aspired to illustrate what an enhanced produce safety system, with public and private investment, might look like.

The safety of fresh fruits and vegetables presents complex challenges owing to the lack of a "kill step" (e.g., cooking), the difficulty in controlling environmental hazards in an outdoor (and even indoor) environment, extreme weather events, labor changes, and the need for multiple controls across an increasingly complex supply chain. "Produce" is also a fragmented industry: the crop characteristics and growing conditions vary widely throughout the world. At the same time, produce is essential to a healthy diet, making "safe" produce accessibility to consumers a top priority to build consumer confidence and encourage consumption.

Ensuring the safety of fruits and vegetables requires a holistic approach. There have been many efforts to convene stakeholders in an effort to align industry-wide produce safety improvements leading to important, incremental changes. However, incremental changes are not sufficient to address the full complexity of produce safety challenges and realities of the current food system, necessitating transformative change.

To conceptualize a sustainable working model to address this need, the Reagan-Udall Foundation for the FDA, at the request of the FDA, led a stakeholder dialogue process to explore new strategies for produce safety and the development of a collaborative entity to drive progress. The Foundation convened a wide range of stakeholders from agricultural communities, industry, academia, consumer groups and government to develop a shared understanding of the challenges and a vision for better protecting public health.

This facilitated dialogue (conducted from fall 2024 into spring 2025) revealed a willingness of produce system stakeholders to engage in undertaking challenging, big impact issues. Over the course of several months, more than 170 produce safety stakeholders conceptualized and articulated priorities, areas for change, and specific actions that would propel progress in the following eight priority areas.

- On-going Government/ Private Sector/Non-profit Collaboration
- One Health/The Agricultural Ecosystem
- Industry-Regulatory Collaboration
- Policy & Economic Opportunities
- Produce Imports
- Buyer-Supplier Collaboration for Produce Safety
- Produce Safety Extension & Outreach
- Produce Safety Research Needs

This report presents the key opportunities identified by participants to impart meaningful change in how produce safety is fundamentally managed. Contributors recognize that progress requires more than just regulations: it requires leadership from the breadth of the fresh produce supply chain and adjacent sectors. When consumers suffer from foodborne illness due to the contamination of produce, it affects not only them, but also the produce industry, the public health system, and government and other responders. All parts of the fresh produce supply chain have an incentive to avoid future outbreaks, and all must actively participate and share the responsibility to advance risk-based produce safety efforts. Active investment by produce industry leaders, in addition to government engagement and support, is needed to sustain the conversations and develop a mechanism through which change is possible.

This report presents recommendations on how to form and manage such a private-sector[1]-led collaboration, and the strategic priorities that such a collaboration could choose to pursue. This document aspires to lay out a roadmap for improving produce safety via a coordinated set of activities over a multi-year period. The Produce Safety Dialogue process identified several strategic opportunities:

- **Make the case for and develop a strategy to increase public investment in produce safety.**
  An organized effort inclusive of the broadest possible range of public and private stakeholders should promote the need for and seek greater public investment in produce safety to reduce illness and foster greater consumption for healthy diets.
- **Focus on developing and implementing science-based, risk-reducing best practices.**
  Buyers, growers, and other produce safety stakeholders should collaborate with FDA on creating and implementing processes for private sector-led development of best practices that target and reduce significant food safety risks.
- **Expand technical assistance and other resources to support industry implementation of best practices.**
  The produce industry, government agencies, academia, and other stakeholders should collaborate to systematically identify the resource needs and technical support requirements for growers and mobilize extension and other resources to meet them.
- **Increase incentives for growers to implement best practices.**
  Buyers and regulators should create incentives and remove obstacles to implementation of best practices and reward implementation of key best practices.

Most previous short-term efforts did not require a structure to support sustained collaborations. This current effort (i.e., the Produce Safety Dialogue), however, exposed some deeply rooted issues, such as the need to build trust and recalibrate the power and economic differentials in the system, that will take years to address; thus, options for funding and governing a long-term collaborative are needed.

The first needed step is the formation of an organized collaboration led by influential, invested organizations representing the diversity of direct participants in the produce supply chain. Executing the activities and initiatives described in this report will require the participation and engagement of a breadth of produce system players, with a trusted, discrete group that must provide leadership and organizational strategy. Several models of a structured, stand-alone, professionally-supported, sustainably-funded stakeholder collaboration (SSC) are available.

A subset of Produce Safety Dialogue participants representing the produce industry (comprised of the full supply chain), their trade associations, and regulators (at a minimum) should help kick off the SSC. These

1 Throughout this document, the use of “private sector” in the context of a sustainable collaborative effort encompasses the array of potential non-government partners: industry, academia, associations, non-governmental organizations, etc.

individuals (and others committing to active engagement) can develop a request for proposals and select a "home" and/or formally identify a facilitator to maintain momentum.

Regardless of the model pursued, the SSC should begin with the following needs assessment:

*Overall Need: A collaborative organization to provide the **leadership** and **infrastructure**, such as project management, to help collaborators **develop and maintain trust** to then achieve objectives of the Strategic Roadmap and have a mechanism for tracking progress against goals.*

A successful organization will have:

1. ***Transparent governance, funding, and decision-making structure** to help keep partners united as they pursue a unique purpose.*
2. *Structure **aligned** with **stakeholders' mission and goals** and be practical for various participants, including buyers and growers.*
3. *A **flexible and adaptable** infrastructure that evolves with industry, regulatory, and environmental changes, based on candid governance discourse addressing shifting government policies and industry trends.*
4. ***A centralized resource hub to pool resources** (e.g., financial, personnel, and information) and reduce redundancy.*
5. ***A venue to facilitate communication and community development** that allows for candid discussions, the breaking down of silos, especially for stakeholders who do not typically have a forum to talk with each other.*
6. ***Unique and complementary (not duplicative) association efforts** to avoid redundancy by ensuring the structure offers a distinct value proposition compared to existing efforts and coordinates association efforts and brings in other voices and partners.*
7. ***Inclusive representation** that engages participants of all sizes from private sector (e.g., academia, consumer organizations, industry, public health organizations) and all jurisdictions across government (e.g., state, local, territorial, and tribal).*

After determining the specific collaboration model for action, a small multi-stakeholder leadership group will need to take specific steps to develop the entity, including:

1. Following up with Produce Safety Dialogue participants to assess willingness to engage in an ongoing effort and identify committed leaders from each sector.
2. Convene interested parties from each sector to set and secure an initial investment commitment (financial or other) and timing for that commitment, as well as align on a request for proposals for the potential convener, facilitator, or project manager.
3. Issue a request for proposals, review responses, choose a convenor, facilitator, and/or project manager.

After establishing the entity, it should announce this new effort and highlight priority activity for a finite (e.g., 5-year) timeframe. Those priority activities should emerge, at least in part, from the output of the Produce Safety Dialogue work groups and consider the opportunities for greatest impact and those that may require staging from other activities. If the new entity (an alliance or other model that welcomes and engages organizations throughout the produce ecosystem) prioritizes some activities over others, it may be appropriate for other stakeholder groups to invest in moving other ideas forward. However, for transformative change to occur,

involvement of affected companies—those whose business success depends on consumer demand for fresh produce—must take responsibility for leading that change in collaboration with FDA and other produce safety stakeholders.

The priorities identified within the workgroups serve as a useful starting point. Within the Dialogue process, it was proposed that focusing on an important and challenging topic area might be a good place to start. While one example was provided (agricultural water), consensus was not reached on what such an effort would entail, and therefore, further scoping would be needed to agree on a path forward. Deliberating these details, including the engagement of appropriate stakeholders, developing timelines, and identifying measures of success, should be managed within the SSC.

Each workgroup had robust discussions and identified activities that would yield immediate and longer-term benefit. Many referenced the sharing of data, for example to support a 'one health' approach to managing fresh produce production and animal agriculture, and to facilitate knowledge transfer based on learnings from outbreaks. The need for collaboration and dialogue was also evident in several workgroups, be it between industry and regulators to discuss difficult issues, between different parts of the supply chain to align on and share in the implementation of best practices, or to pool resources and identify gaps as in the case of conceptualizing an "extension hub" or developing a strategic plan to fill produce safety research gaps.

While funding for produce safety activities—research, extension, and implementation—has historically never been commensurate with the public health priority of fruit and vegetable consumption, this chasm is only widening with cuts to federal and state funding. This reality requires the private sector (in this report's broad use of that phrase) to rethink how to collaborate with stakeholders, including policymakers, researchers and extension specialists to improve produce safety. The conversations that began within the Produce Safety Dialogue are the first step in building a collaboration that can markedly improve the produce safety system at this pivotal moment.

Introduction

The role of fresh fruits and vegetables in a healthy diet is undisputed. However, outbreaks of food-borne illness associated with fresh produce commodities have presented a conundrum that has lasting impacts on public health and consumer confidence and decision making. In line with longstanding diet and health expert advice, the "Make America Healthy Again" (MAHA) initiative emphasizes the importance of fresh produce in chronic disease prevention. This goal makes it all the more critical for fresh produce to be safe (i.e., free of preventable contamination that can cause foodborne illness). Ensuring the safety of fresh fruits and vegetables presents complex challenges for industry members, researchers, and regulators primarily due to the lack of a "kill step," the difficulty in controlling environmental hazards in an outdoor (and even indoor) environment, extreme weather events, labor changes, and the need for multiple controls throughout an increasingly complex supply chain, among other factors.

"Produce" is a fragmented industry. Prior to the 2015 publication of the Food Safety Modernization Act (FSMA) Produce Safety Rule, market requirements (often established by produce buyers) drove the implementation of food safety practices. These siloed approaches, however, have resulted in significant financial investment, especially for growers (for example, on practices and documentation required by second- and third-party audits, as well as costs associated with the execution of audits) but with overall questions about the actual *return* on that investment in reducing food safety hazards and risks.

Several task forces, work groups, meetings, and other efforts aimed at improving the safety of fresh produce have been organized over the past 20 years. Some have included a wide range of stakeholders (e.g., the 2019 Romaine Task Force), whereas others have focused efforts on the role of supply chain members (e.g., Leafy Greens Marketing Agreements (LGMA) of growers/shippers/handlers, Leafy Green Safety Coalition of buyers) or implementing components of the Food Safety Modernization Act.

THE NEED FOR CHANGE

The burden of illness associated with microbial and chemical contamination of fresh produce is the most significant and disruptive food safety problem still affecting the U.S. food system. Fresh produce is also one food category experts urge consumers to eat more as part of healthy diets that can prevent chronic disease. Beyond the effects (both acute and chronic) of foodborne illness on individuals, the continuing illness outbreaks associated with fresh produce undercut this "eat more" message by reducing consumer confidence and disrupting markets for growers, retailers, and consumers. Much is at stake for consumers and the food system in making fresh produce safer.

Overall, many individuals and organizations work diligently to improve food safety, but change is needed because:

- The produce system is fragmented, uncoordinated, under-resourced, and not aligned around a common strategy for making produce safer.
- Doing more of the same will not suffice to reduce foodborne illness attributed to fresh produce and foster consumer confidence.
- The production, harvest, and handling of fresh produce has become increasingly challenging and complex with extreme weather, advancing technologies, evolving consumer expectations, and globalization of trade.
- Current food safety, conservation, and other regulatory policies do not always incentivize the adoption of new approaches to growing, harvesting, packing, shipping, and storing of fresh produce more safely.

Despite proactive measures, illnesses and outbreaks continue as:

- The FDA's implementation of FSMA's regulatory framework and the national integrated produce safety system that FSMA envisioned are incomplete;
- U.S. Department of Agriculture (USDA) research and technical assistance for farmers falls short of the present needs;
- The private audit system provides little incentive for growers to target and prevent the most significant sources of potential risk in their production systems, and
- Overall, the public and private resources being devoted to produce safety are not commensurate with the public health need for a safe and abundant supply of fresh produce.

These shortcomings are systemic obstacles to progress, and insufficient protection of Americans from foodborne illness. As a result, many growers lack the clarity they need about the best food safety practices for their operations and lack adequate technical support and economic incentives to implement them. In short, growers have borne much of the brunt of market disruptions and ratcheted-up produce safety expectations without the financial and technical support they need. A new holistic strategy must be implemented across the private sector (in its broadest sense) in collaboration with the responsible federal and state agencies. This strategy needs to be holistic in the sense of better integration of efforts of all parties involved in produce safety.

The 2025 Produce Safety Dialogue is unique not only because of the inclusiveness of stakeholder viewpoints and the long-term horizon scanning activities undertaken by each workgroup, but also because this community assembled, worked, and deliberated in a proactive fashion with the hope of having a meaningful impact. Almost every previous produce safety initiative was done in response to an outbreak or other acute issue. Discussing issues outside of a recent outbreak investigation revealed the differences in priorities between different participants. What surfaced was a fundamental lack of trust (between buyers and suppliers; between industry and government; between industry and food safety advocates) and an inclination of each stakeholder group to hold fast to a position rather than explore a collective solution. It is only through continuing conversation, developing relationships, and identifying some small tangible successes that the produce stakeholder community will align to tackle larger, systemic issues. This is not to suggest that incremental change cannot improve food safety. But it is insufficient for achieving the longer-term goal. Instead, parallel paths are needed—continuing to progress on discreet efforts to build a culture of collaboration, while maintaining a focus and moving forward on the systemic change needed to fundamentally shift how produce safety is managed by the breadth of stakeholders and ensuring that investments are commensurate with the role produce plays in the diet.

Many participants noted that the nature and tone of the conversation was impacted by contemporary changes within the federal government, including those that resulted in staffing and funding cuts or uncertainties around research funding, extension services, and state and local inspectional and outbreak response capacity. If federal support (which some would observe was already in need of strengthening) in produce safety diminishes, the need for collaborative private sector efforts must increase.

Although the FDA provided the initial funding to accelerate the conversation, all stakeholders will need to contribute solutions, particularly considering the current move toward a smaller federal government. The proposed roadmap is intended to aid a small, dedicated group of stakeholders (e.g., a self-identified steering committee) in evolving the conversation, building trust among various stakeholder groups, and tackling small and large issues. This report captures these most recent conversations along with the historical context of industry progress. The recommendations within this document incorporate key elements that individual work groups and meeting attendees identified as critical priorities and activities to pursue.

Produce Safety Dialogue Process

The Produce Safety Dialogue grew from the efforts of several organizations, including members of the Fresh Produce Coalition (https://go.wga.com/fresh-produce-coalition), who recognized that, despite many ongoing activities, some fundamental, deeply-rooted obstacles to produce safety needed to be addressed. While there have been numerous efforts to convene and align produce safety improvements in the last decade, few have resulted in practical and actionable solutions with widespread applicability and measurable industry-wide impacts.

To conceptualize a long-standing working model to address this need, the Reagan-Udall Foundation for the FDA, at the FDA's request, engaged with produce system stakeholders including those from agricultural communities, consumer groups, industry, academia, and government beginning in September 2024, culminating in an April 24, 2025 meeting (**Figure 1**). These discussions aimed to develop a shared understanding of the challenges and opportunities in fresh produce safety, while supporting efforts to foster greater consumption and accessibility to safe, wholesome fruits and vegetables.

To capture input from the diversified nature of individuals involved in the fresh produce industry, a public questionnaire on produce safety (See **Appendix B**) was developed and launched in October 2024. The survey was sent through a variety of mechanisms including 70+ personal contacts of the project team members, an e-blast reaching about 23,000 contacts, FSMA Regional Centers and Alliances, associations and grower organizations (e.g., International Fresh Produce Association, Western Growers, Partnership for Food Safety Education, Plain Growers (Amish/Mennonite communities)), and via LinkedIn shares and reshares. The survey was open through November 8, 2024. Eighty-five English and 15 Spanish questionnaires were submitted. The breakdown of questionnaire respondents and the summary of feedback received from the questionnaire is in **Appendix C**.

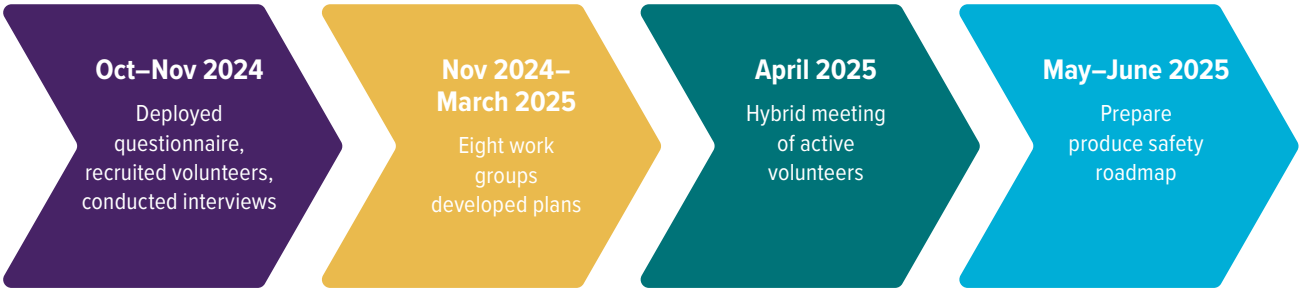

FIGURE 1. PRODUCE SAFETY DIALOGUE PROCESS

The information collected from the questionnaire was used to develop the focal areas of discussion, leading to the development of eight work groups. Work group leaders were identified by their content expertise and leadership in produce safety:

- **One Health/The Agricultural Ecosystem**
  Joelle Mosso, Western Growers & Natalie Krout-Greenberg, California Department of Food & Agriculture
- **Industry-Regulatory Collaboration**
  Natalie Dyenson, International Fresh Produce Association (former) & Joe Reardon, National Association of State Departments of Agriculture

- **Extension & Outreach**
  Sonia Salas, Western Growers & Dr. Laura Strawn, Virginia Tech
- **Policy & Economic Opportunities**
  Dr. De Ann Davis, Western Growers & Connor Kippe, National Sustainable Agriculture Coalition
- **Produce Imports**
  Dr. Gustavo Reyes, Western Growers
- **Produce Safety Research Needs**
  Dr. Michelle Danyluk, University of Florida & Dr. Don Stoeckel, Cornell University
- **Buyer-Supplier Collaboration for Produce Safety**
  Mike Taylor, STOP Foodborne Illness
- **Ongoing Government/Private Sector/Non-Profit Collaboration**
  Susan Winckler, Reagan-Udall Foundation for the FDA

Initially, two other work groups were proposed (creating a talent pipeline and describing core competencies for produce safety), but these were deprioritized due to insufficient volunteer interest. Work groups began recruiting members in November–December 2024, with most convening their first meeting by January 2025. All work groups were provided with a framing document to help guide the discussion and collect consistent information (See **Appendix D**) and were asked to respond to the following prompts:

Problem Statement

[What is the big picture problem that needs to be "solved"?]

Work Group Purpose

[How would progress in this area improve produce safety? How does solving the problem above protect public health?]

Key Participants

[Who/what groups need to participate and/or be reached? Who needs to take action in order to "solve the problem"? Who needs to buy into the process? Who has the expertise to develop solutions? Who has funding to support this?]

What are 3 steps that can be taken by the end of 2025 and 2026 that will result in progress?

Three Key Performance Indicators of Success

[How will we measure progress?]

How might a public-private partnership support these efforts?

[Would public-private partnerships collect, leverage, and/or allocate funding? Would they drive/facilitate stakeholder engagement questions? Would they drive necessary research? Something else?]

Each work group leader had varying approaches to facilitating their discussions; some chose to convene their discussions online as a group (e.g., on Zoom), while others chose to first interview key stakeholders privately before bringing the entire group together for discussion. These insights were shared, discussed, and prioritized at a hybrid (in-person and online) meeting hosted in Washington, D.C., on April 24, 2025 (Agenda provided as **Appendix E**). In addition to the Foundation's team, 80 individuals attended the meeting with 46 joining in-person and 34 online. The meeting participants' affiliations are noted in **Figure 2**.

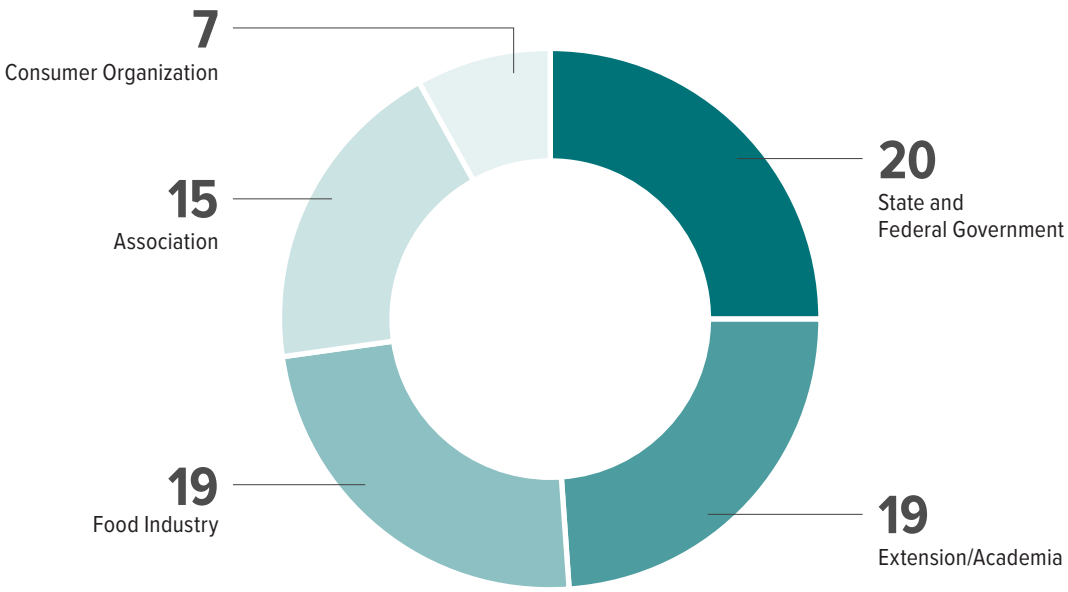

FIGURE 2. PARTICIPANT AFFILIATIONS IN THE PRODUCE SAFETY DIALOGUE MEETING – APRIL 2025

As the work group leads shared the essence of their discussions and proposed priorities, the topic of data was commonly referenced. An ad hoc subgroup, led by Dr. Barbara Kowalcyk (George Washington University), was formed to recommend how to categorize and organize efforts related to data, and these are included in this report, in addition to those of the original workgroups. A separate ad hoc group led by Dr. De Ann Davis (Western Growers) and Dr. Phil Tocco (Michigan State University) was also formed to explore reallocation of produce safety resources.

Produce Safety Dialogue Strategic Priorities

The Produce Safety Dialogue process identified several strategic opportunities, which are detailed below. These overarching priorities are supported by the concepts described by the work groups, and the priorities each work group proposed for consideration by a sustained entity.

- **Make the case for and develop a strategy to increase public investment in produce safety.**

  An organized effort inclusive of the broadest possible range of public and private stakeholders should promote the need for and seek greater public investment in produce safety to reduce illness and foster greater consumption for healthy diets.

- **Focus on developing and implementing science-based, risk-reducing best practices.**

  Buyers, growers, and other produce safety stakeholders should collaborate with FDA and independent experts on creating and implementing processes for private sector-led development of best practices that target and reduce significant food safety risks.

- **Expand technical assistance and other resources to support industry implementation of best practices.**

  The produce industry, the FDA, USDA, the states government agencies, academia and other stakeholders should collaborate to systematically identify the resource needs and technical support requirements for growers and mobilize extension and other resources to meet them.

- **Increase incentives for growers to implement best practices.**

  Buyers and regulators should create incentives and remove obstacles to implementation of best practices and reward implementation of key best practices.

Using a Sustainably-Funded Stakeholder Collaboration to Advance Work Group Strategic Priorities

ROADMAP STEP 1. FORMALIZE A CONTINUING COLLABORATION

Most previous short-term efforts did not require a structure to support sustained collaborations. This current effort (i.e., the Produce Safety Dialogue), however, exposed some deeply rooted issues, such as the need to build trust and recalibrate the power and economic differentials in the system, that will take years to address; thus, options for funding and governing a long-term collaborative are needed.

One work group explored several models of a structured, stand-alone, professionally-supported, sustainably-funded stakeholder collaboration (SSC). The group identified three potential models for consideration in structuring the SSC: an Alliance, a Build-Own-Operate, and a Joint Venture (See **Appendix F** for comparison of those models), each of which has their own strengths. A Build-Own-Operate or Joint Venture model may yield results more quickly because of clear investment and ownership of the effort. An Alliance may require an expert facilitator/convener to yield the same effect. Because of the inclusiveness in an Alliance, this is the structure recommended by the work group.

The work group further recommended that a subset of Produce Safety Dialogue participants representing the produce industry (comprised of the full supply chain), their trade associations, and regulators (at a minimum) help kick off the SSC. These individuals (and others committing to active engagement) can develop a request for proposals and select a "home" and/or formally identify a facilitator to maintain momentum.

Regardless of the model pursued, the SSC should begin with the following needs assessment:

*Overall Need: A collaborative organization to provide the **leadership** and **infrastructure**, such as project management, to help collaborators **develop and maintain trust** to then achieve objectives of the Strategic Roadmap and have a mechanism for tracking progress against goals.*

A successful organization will have:

1. ***Transparent governance, funding, and decision-making structure** to help keep partners united as they pursue a unique purpose.*
2. *Structure **aligned** with **stakeholders' mission and goals** and be practical for various participants, including buyers and growers.*
3. *A **flexible and adaptable** infrastructure that evolves with industry, regulatory, and environmental changes, based on candid governance discourse addressing shifting government policies and industry trends.*
4. ***A centralized resource hub** to **pool resources** (e.g., financial, personnel, and information) and reduce redundancy.*
5. ***A venue to facilitate communication and community development** that allows for candid discussions, the breaking down of silos, especially for stakeholders who do not typically have a forum to talk with each other.*
6. ***Unique and complementary (not duplicative) association efforts** to avoid redundancy by ensuring the structure offers a distinct value proposition compared to existing efforts and coordinates association efforts and brings in other voices and partners.*
7. ***Inclusive representation** that engages participants of all sizes from private sector (e.g., academia, consumer organizations, industry, public health organizations) and all jurisdictions across government (e.g., state, local, territorial, and tribal).*

The professional facilitator supporting the SSC could provide functions such as project management, legal advice, and financial management. To facilitate an enduring, but not necessarily permanent, collaboration, participants should commit to an initial 5-year period, with annual checkpoints on the process to ensure progress against the objectives articulated by the Produce Safety Dialogue work groups. One existing and successful model (albeit with a more narrow membership scope) is the Food and Beverage Issues Alliance (FBIA; https://www.feedingus.org/about). With 48 allied members, FBIA advances the food and beverage industry through reasonable and scalable member dues, plus in-kind services offered by members to support the FBIA's goals. A governance structure is in place, and the dues supports professional management. This type of structural model can be considered. A produce safety effort should, however, engage a wide range of interested organizations (including academia and public health groups) in a multi-stakeholder public/private sector effort.

After determining the specific collaboration model for action, a small multi-stakeholder leadership group will need to take specific steps to develop the entity, including:

1. Following up with Produce Safety Dialogue participants to assess willingness to engage in an ongoing effort and identify committed leaders from each sector.
2. Convene interested parties from each sector to set and secure an initial investment commitment (financial or other) and timing for that commitment, as well as align on a request for proposals for the potential convener, facilitator, or project manager.
3. Issue a request for proposals, review responses, choose a convenor, facilitator, and/or project manager.

After establishing the entity, it should announce this new effort and highlight priority activity for the proposed 5-year or other agreed upon timeframe. Those priority activities should emerge, at least in part, from the output of the Produce Safety Dialogue work groups and consider the opportunities for greatest impact and those that may require staging from other activities (see **Step 2**). To continue to build on the momentum of the Produce Safety Dialogue, the entity may retain work group structures as discrete workstreams and combine others to facilitate efficiency. Additional overarching activities include aligning metrics to assess progress, beginning progress measurement, and establishing a structure and cadence to publicly report progress against the metrics.

Each of the Dialogue workgroups described the role that a collaboration could play in supporting the strategic priorities and specific activities proposed by each group.

To highlight the value of an SSC, a few examples based on work group discussions are provided below:

- Reviewing the FDA Produce Safety State Cooperative Program (CAP) to assure focus and best resource management at the federal and state levels. This may include examples of "lessons learned" and/or areas of overlapping authority that can be streamlined.
- Convening a work group to review cost/benefit food safety risk management opportunities throughout the supply chain. The intent would be to review the risk profile of each step in the supply chain versus costs to improve (and how much it can be improved at what cost). This would provide a better understanding of where money should be applied in the most cost-effective manner to reduce food safety risk.
- Working with the buyer/supplier (grower) stakeholders to consider the holistic risk profile of the commodity/product before setting or requiring a supplier to meet a standard. In other words, when harmonizing food safety standards, one size does not fit all risk conditions. Rather, considerations within the oversight of the grower (audit performance, under marketing agreement or order), where the commodity is grown (including domestic versus foreign) seasonality, variety, crop characteristics, irrigation technique, etc., all affect the risk management strategies that should be applied to growing, harvesting, packing, and shipping of fresh produce. Setting a single standard without providing a range responsive to these considerations would not be successful.

AD-HOC GROUP
PRODUCE SAFETY DATA

A critical way to improve produce safety is to leverage the power of data collected across the farm to fork continuum—this includes both scientific and operational data. Insights gained from analyzing these data can inform decision-making across the system. Identifying trends, patterns, and relationships in data will help us detect food safety problems, identify root causes, develop targeted interventions, assess the impact of risk mitigation efforts, and ultimately, prevent illness and protect public health. Given this importance, most work groups involved in the Produce Safety Dialogue process commented on the role of data in improving food safety in their summary reports.

In reviewing these recommendations, several themes emerged that can be organized into three key recommendations for an SSC:

- Build consensus on what data is needed
- Promote and expand data sharing and dissemination
- Develop the infrastructure needed to effectively leverage data for decision-making

The work group also identified two overarching themes. First, understanding the context under which an endpoint of interest (e.g., a test result) was generated is critical; in this context, data refers to both the endpoint of interest and related metadata. Second, implementing these recommendations will require the engagement of all stakeholders in the process—policymakers, government agencies, food industry, industry and professional associations, importers, allied industries (e.g., testing labs, certifying bodies, auditors, equipment manufacturers), academia, and consumer groups, underscoring the importance of an SSC that spans multiple sectors of the produce industry.

WORK GROUP
ONE HEALTH/THE AGRICULTURAL ECOSYSTEM

In recent years, concerns have emerged surrounding the interaction within food ecosystems and the potential for environmental pathogen transport. The “One Health/ Agricultural Ecosystem” workgroup focused specifically on these complexities, recognizing that there are several research and collaboration efforts underway. These efforts include produce growers, livestock, poultry and other animal operations, compost operations, plant protection providers (e.g. pesticide applicators, consultants) and related industry/adjacent land operations, and from the regulatory side include FDA, USDA, EPA, State Departments of Agriculture, State Health Departments and others. Specific examples of ongoing efforts that can be augmented and amplified through a sustained collaboration are described in more detail in **Appendix G**.

The agricultural ecosystem is complex, encompassing natural, man-made, biotic (i.e., plants, animals, microorganisms), and abiotic (i.e., sunlight, temperature, water, soil) elements that introduce risks that cannot be wholly identified or controlled directly by producers or growers. The U.S. regulatory, legal, and economic framework does not naturally reward proactive holistic food safety management across sectors and federal agencies, and instead, unintentionally optimizes industry segment risk and finances instead of managing the overall system for improved food safety and health outcomes. The agricultural ecosystem/One Health system, if monitored, balanced, and managed as a system could optimize food safety outcomes for consumers and create successful business, regulatory, and economic outcomes for companies.

A Sustainably-funded Stakeholder Collaboration (SSC) can play a crucial role in strengthening collective food safety efforts and driving important stakeholder engagement at a local, state, or national level by leveraging the strengths and organization of expertise, leadership, and funding. Depending on the nature of the topic, it may be more appropriately suited to be led at a local level versus a national level, but there are times when a local level issue may need greater national level engagement because limitations of progress have been reached—whether that is by nature of confines in policy, funding, or expertise. In these instances, it may require advanced strategies and a new level of organization and leadership to ensure alignment, progress and/or greatest value. Additionally, for these efforts to begin and remain successful, continuous leadership and visibility will be important. Given a topic as large as One Health, the recommendation for an organized steering committee lends itself to a place where these topics of broader engagement could be organized and remain visible to measurable collective progress.

Some examples of where an SSC could be effective for One Health/Ag Ecosystems work include: driving stakeholder engagement and public awareness; enhancing food safety standards and compliance; and through expanding resources, improving data sharing; encouraging innovation; and continuous improvement.

WORK GROUP
INDUSTRY-REGULATORY COLLABORATION

Currently, there is a lack of transparency, accountability, and trust between industry and regulatory agencies. Lines of communication are either deficient, with slowly-shared information, or with insufficient detail bidirectionally to help develop prevention and mitigation strategies to prevent future issues. Historically, industry and regulators most often engage in times of crisis. The lack of strong relationships can create tension, suspicion, and animosity—and often leads to companies' reticence to share data for fear it will be used punitively.

Improving the level of collaboration between industry and regulators, as well as between states and federal authorities, could lead to several improvements. First, by working collaboratively toward a common goal of protecting public health, trust will be built and that trust will foster more collaboration. Second, the cadence and amount of communication can be improved, allowing all parties to share information and work together to come to collective conclusions and align future actions. Finally, openly sharing data and information helps break down silos of misperception, action, and communication (or miscommunication) as all parties would work from the same version of the truth. However, this can only be achieved if agencies cease using data against the industry *punitively*. Lack of data sharing is a direct result of lack of trust on both sides.

WORK GROUP
POLICY & ECONOMIC OPPORTUNITIES

To support the safety, accessibility, and affordability of fresh produce, critical and urgent changes are necessary in both federal policy and funding for fresh produce food safety resources, research and outreach programs, particularly as administered by the FDA and the USDA. Efficient use of government funding to improve the safety of fresh produce would strengthen societal health and provide economic gains of increased consumption.

Domestic production of these important crops is decreasing, due in large part to increasing costs of production (e.g., water, labor, inputs, transportation) and local, state, and federal policies that hinder economic development. Increases in imported fresh produce are replacing domestic production. Domestic production lost to foreign farms will not return to the United States because of the cost advantages gained by moving to international

locations. Food safety for fresh produce is challenged by climate changes, pest pressures, limited scientifically-trained resources, absence of pragmatic, cost-effective tools, and non-value added buyer and regulatory requirements.

An SSC is necessary to support the outcome of these efforts for the following reasons:

- The recommendations put forth by this work group seek to change the status quo of government support for fresh produce, both for food safety and protections for domestic production (because of the importance of accessibility and affordability to consumption). Changing the status quo requires significant engagement from a broad group of stakeholders. The fresh produce industry alone cannot advocate for or achieve these changes.
- The recommendations of this work group include efforts for government agencies to lead.
- There is a need for a broad cross section of stakeholders to advocate for recommendations that will require Congressional support for funding.

WORK GROUP PRODUCE IMPORTS

Approximately 59% of fruits and 35% vegetables (excluding potatoes, sweet potatoes, and mushrooms) consumed in the United States are imported according to data analyzed between 1981–2023 (Zahniser, 2025). Although the FDA Produce Safety and Preventive Controls Rules apply to produce that is grown or processed outside the U.S. that will ultimately be consumed by Americans, FDA's ability to enforce these rules outside U.S. borders is questionable. The following challenges should be addressed to achieve food safety for imported produce:

- Inconsistencies in the interpretation and implementation of regulatory requirement verification activities, varying by industry and importers of record. The group must define gaps that make execution against requirements (such as the PSR) variable (e.g., lacks understanding, importer verification practices, buyer requirements) and defines who the gaps affect (importers, producers, regulatory bodies—U.S. and foreign) to better align on what and how these should be verified.
- Limited resources, technical expertise, and awareness of food safety regulations and best practices for medium and small foreign producers/suppliers. This includes developing guidance to help importers and buyers have consistent interpretation, implementation, and verification of requirements for foreign growers and developing/making educational resources available for small and medium growers.
- Limitations with data collection platforms—including limited interoperability of data that is being collected (such as data collected by auditing bodies), accessibility and usability of data platforms for foreign producers/suppliers where technological resources are limited, and limited availability of publicly accessible data. Through the broader collaborative effort, exploration of how data is collected and made available for effective decision-making must be pursued.

Addressing these challenges requires:

- Aligning the way parties (producers/suppliers, buyers, and importers of record) verify food safety practices and requirements by:
  - Developing guidance with prioritized food safety information that should be verified by importers and buyers,
  - Establishing minimum food safety verification standards for Imports, and
  - Engaging third party certification bodies to ensure that standardized verification parties are followed through their audits.

- Developing and improving access to training and resources for foreign producers/suppliers.
- Making resources related to food safety available through a third-party partnerships (government, trade associations, university extension, training consultants) and ensuring these are delivered in the correct format (e.g., on demand for areas where internet access is not available) and language.
- Developing standardized data-sharing systems to access immutable information, which includes harmonization and interoperability of data that is already being collected by auditing bodies, fostering accessible data submission mechanisms for foreign growers, enabling data to be publicly available for importers, and developing data standards that align with verification activities.

An SSC could play a crucial role in securing and managing funding while aligning stakeholders across industry, regulatory bodies (domestic and international), and buyers to ensure a unified approach to food safety, including imports. An SSC should focus on the following areas to support improved food safety for imported fruits and vegetables:

- Funding & Resource Allocation: Identify and secure financial resources through private funding such as importers and suppliers, domestic and foreign government support, and international opportunities while ensuring funding stability and allocation.
- Stakeholder Coordination: Align industry, regulatory bodies (domestic and international), and buyers, fostering collaboration and ensuring shared food safety priorities identified earlier in this document are accomplished.
- International Feasibility and Collaboration: Ensure foreign suppliers are involved in solution development (this would involve working groups for the three problems identified in the earlier section) to confirm practical implementation, but also to incorporate solutions as part of the food safety system.
- Identification of Needs: Help identify additional needs and gaps from the findings of the working group potentially leading to additional research in areas where there is not enough scientific information to drive science-based change.

WORK GROUP
BUYER-SUPPLIER COLLABORATION FOR PRODUCE SAFETY

A collaborative buyer-grower best practices initiative needs encouragement from government and engagement of a range of stakeholders, but to succeed it needs to be a private sector-led initiative able to operate with streamlined decision processes and predictable private funding.

For decades, produce buyers and suppliers have operated in a culture in which price, supply, and quality have been at the center of their relationship. FSMA's enactment and the persistence of outbreaks have elevated awareness of the importance of produce safety in the buyer-supplier relationship. Food safety concerns have also given rise to today's system of conflicting purchase specifications and a multiplicity of private audits largely focused on compliance with the FDA's requirements rather than risk-reducing growing practices.

To protect consumers and provide the safety assurances needed to support increased consumption, the Buyer-Supplier Work Group focused on the possibility of building a new culture of collaboration among buyers and growers based on a sense of mutual ownership and responsibility for the safety of fresh produce. The group's dialogue centered specifically on the idea of buyer-grower collaboration to develop, harmonize, and support implementation of risk-reducing growing practices and audits that can help prevent illnesses and outbreaks. The work group found substantial alignment among buyer companies for pursuing such collaboration. It also

identified challenges that need to be overcome through broader dialogue, especially with growers, to establish and operationalize a new culture of collaboration that better supports growers in making produce safer.

WORK GROUP
EXTENSION & OUTREACH

Producers rely on the best research and scientific understanding to make informed decisions on their farms, with Extension professionals serving as their most trusted source of information for more than a century. Cooperative Extension is a trusted partner that has provided unbiased, research-based solutions for farmers since 1914, and it is currently facing a critical shortage of technical expertise and limited food safety support due to funding cuts, staff shortages, and declining extension programs. Systemic changes are needed to strengthen extension programs, including long-term funding for extension positions to develop necessary expertise, sustain relationships within the grower community, provide critical technical support to enhance the safety of fresh produce, ensure regulatory and buyer compliance, and ultimately strengthen the supply chain to maintain access to safe and healthy fresh produce.

Without strong Extension support, many growers are left without affordable access to technical assistance and food safety knowledge to avoid threatening their long-term business sustainability. Systemic change is necessary to support domestic production and safeguard national food security and safety. A sustainable framework must be developed to support Extension's critical role in the U.S. food system and create strong Extension programs. Sustainable funding frameworks should include consistent federal funding, as well as state, industry, and public-private contributions, that ensure public access to technical experts and resources that support all farmers as they implement food safety practices to ensure consumer health and safety.

An SSC could play a critical role in strengthening Extension programs and advocating for Extension funding. Consistent, dedicated funding is necessary to ensure its continued impact on fresh produce safety and farm viability. Food safety is a matter of national security, and the effectiveness of Extension programs depends on maintaining trained and qualified "boots on the ground." To strengthen Extension's role, an SSC can serve as a bridge between food safety professionals, industry stakeholders, and policymakers. Advocacy efforts should focus on securing long-term investment to ensure that food safety education and technical assistance remain accessible to all growers—especially to small and mid-sized farmers who may lack independent resources. Educating producers on the importance of advocating for these programs with elected officials is crucial. Their support—beyond just financial contributions—can help sustain Extension efforts and reinforce its critical role in ensuring a resilient and secure food supply.

WORK GROUP
PRODUCE SAFETY RESEARCH NEEDS

(*See **Appendix H** for additional work group output.*)

The existing produce safety research ecosystem lacks overall unified direction; continuity and coordination among funders, leaders, and implementers of research programs; and connection between researchers and end users. The current ecosystem is fragmented, with multiple platforms and stakeholders that largely rely on unidirectional communication that can result in unsupported or unintended application of research results as metrics. Coordination, bidirectional communication, and collaborative leadership for establishing goals are needed to improve effectiveness and impacts of produce safety research endeavors, as well as enhance strategies to effectively achieve produce safety goals, by:

- Increasing cross-disciplinary interactions among the research community;
- Supporting a culture within the research system that ensures identification, design, delivery, translation, and application of actionable science; and
- Cultivating champions and leaders to enhance understanding of the diversity of produce systems, define crucial research objectives, and translate the outcomes of new science into application.

The outputs of this work group are intended to support an efficient and pragmatic produce safety research system that continues to rely upon government agencies and to enhance productive interactions among stakeholders across the produce-based food system. The work group focused their efforts on microbiological hazards but acknowledges that research challenges associated with chemical hazards (e.g. heavy metals, pesticides, PFAS), industry- and individual-level behavior change, and epidemiology (i.e., traceback, and attribution to produce commodities, including genomics-based approaches) also exist and can benefit from the suggested approach.

An SSC is seen as crucial to the progress of an enhanced produce safety research system. A partnership of this sort is envisioned to establish research priorities, work to generate, and ultimately distribute, research support, and actively participate in a fully interconnected produce safety research ecosystem which includes industry members, researchers, regulators, and other funders (e.g., philanthropy).

Establishing a Process for Collaboration

The following visual was drafted in response to challenges, opportunities, and priorities identified throughout the Produce Safety Dialogue process. There may be additional "stops" within this process or even reroutes that are mutually agreed upon by those that carry this work forward. It serves as a conceptualized starting place to begin imparting transformative improvement in the safety of fresh produce. The components below provide contextual examples for key discussions, decisions, and actions that might be taken, though they are certainly not all inclusive of the breadth of ideas and solutions discussed.

Note: Items in italics below represent those where workgroups devoted time and effort to begin thinking through these concepts. The collaboration entity is encouraged to review and build off the details of the work group efforts.

STEP 01

Form a collaboration.

- *Select from alliance, pay-to-own, joint venture or other model*
- Select and fund project management and administrative expenses

STEP 02

Identify priorities (examples are provided to demonstrate that there are many large, complex possibilities, the number and scope of which depends on the organization, funding and other resources available to the collaboration). Prioritization should include consideration of the ability to complement or leverage related efforts or fill needed gaps. Possible topics to deliberate include:

- *Funding and Resourcing:*
  - *Should advocating for federal or state funding be prioritized?*
  - Should a check-off model be explored to fund produce safety?
- *Data and Transparency:*
  - *Should parameters around sharing data and trade secrets be explored?*
- *Improving Practices:*
  - *Should a national strategy for agricultural water be developed?*
  - *Should "go teams" be established to aid in root cause analysis investigations?*
  - *Should an outreach and extension arm of the Center for Produce Safety (CPS) be proposed?*
- *Or should any of the other worthy activities identified through the dialogue be explored in more detail?*

STEP 03

Further define and scope each priority and engage stakeholders.

- For each selected initiative, identify a core group of champions within the collaboration to develop a "project charter" that identifies the bounds of the effort
  - Even a topic like agricultural water needs further definition. How would regional differences and concerns be addressed? Would the topic engage a global audience? Would testing and data sharing be a component?
- Existing, related, and/or complementary activities should be identified

STEP 04

Establish targets and milestones

- *The Produce Safety Dialogue suggests that the collaboration itself re-evaluate the overall effort after 5 years*
- For initiatives, when should efforts begin, and how will the collaborative body know when the effort will end? What measurements will be used to assess progress and success?

STEP 05

Gather information and identify critical practices

- This may apply to technical food safety priorities or policy related activities
- *Data sharing agreements should be developed, and policies and procedures that limit the sharing of information must be addressed*
- Root cause analysis should inform prevention efforts

STEP 06

Sunset less impactful efforts

- As ongoing activities and practices are identified and evaluated– inclusive of technical food safety practices, efforts, and initiatives–those that are no longer providing meaningful returns on investment or that are duplicative should be reconsidered

STEP 07

Achieve a shared understanding

- *Buyers should align on best practices, and audits should be updated to reflect these*
- *Buyers and suppliers should share responsibility and costs associated with produce safety*

STEP 08

Communicate

- *Mechanisms to share information in the U.S. and globally must be further developed*
  - *The roles extension can play, and the role and responsibilities of others in the private sector (including industry, academia, associations, etc.) should be evaluated*

STEP 09

Support Implementation

- *New and existing means to share technical resources* (e.g., extension, Produce Safety Alliance, Center for Produce Safety) should be leveraged
- Developing talent and capacity was outside the scope of the dialogue but was identified as an area for future discussion to aid in implementation
- Funding opportunities must be evaluated, and perhaps created

ROADMAP STEP 2: IDENTIFY PRIORITIES OF THE COLLABORATION

Pursuing systemic change in produce safety aims to address root causes through broad reforms, such as reshaping industry best practices. Systemic change can yield long-term, sustainable impacts. However, tackling such comprehensive problems requires significant time investment, extensive coordination, funding, and consensus on issues endemic to the realities of growing, harvesting, and handling fresh produce.

In contrast, focusing on tangible, incremental steps like improving sanitation practices or enhancing agricultural water quality may offer quicker, more measurable progress and can build momentum for larger change. There are benefits and downsides to a more focused approach; while it may provide a concrete "thing" to work on, a specific topic may not be inclusive of all stakeholders. While systemic change provides a visionary foundation, incremental action ensures continuous improvement; ideally, both approaches work in tandem to drive comprehensive and lasting positive public health outcomes.

Each work group in the Produce Safety Dialogue developed a set of potential actions for the coming years. These were evaluated during the April 2025 meeting, and additional activities were proposed. Collectively, these actions create a potential roadmap for future activity in each of the relevant areas.

If an SSC is established, this report can serve as the basis for the work that would be coordinated by that entity. The intent is to better coordinate existing and focused activities and to maximize efficiency and build networks needed to effect long-term change.

If the new entity prioritizes some activities over others, it may be appropriate for other stakeholder groups to pick up the other ideas. However, for transformative change to occur, involvement of companies whose existence depends on consumer demand for fresh produce must affect change.

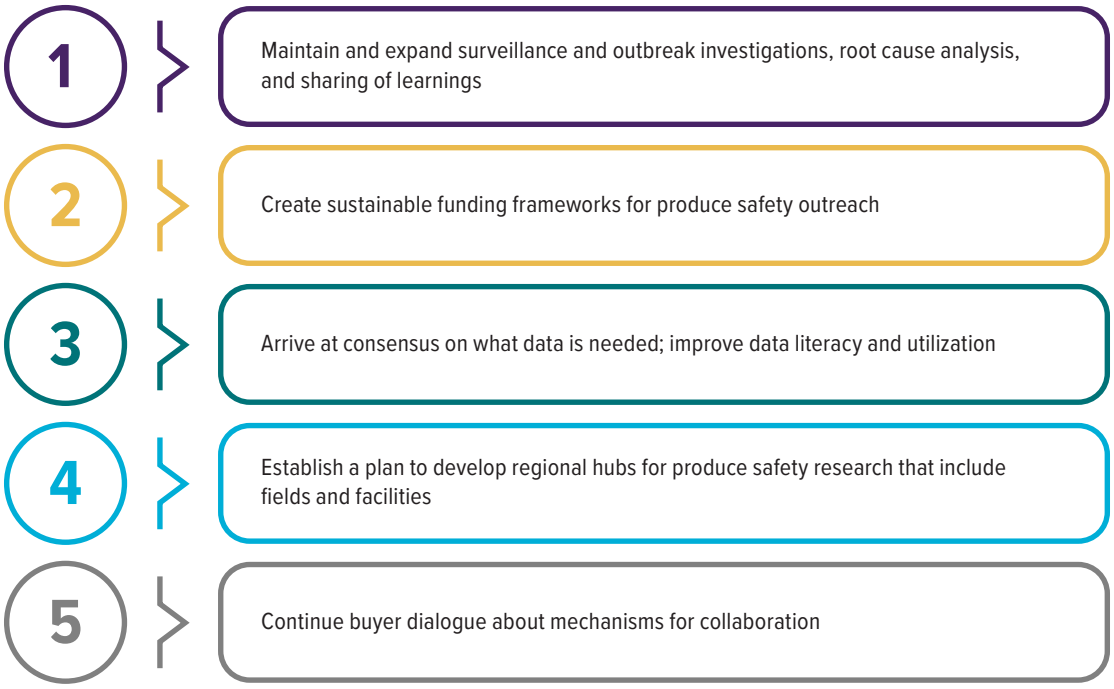

FIGURE 3. PRELIMINARY RANKING OF PRIORITIES EXPRESSED AT APRIL 24 MEETING

The priorities identified within the work group, and the preliminary ranking done within this effort serve as a useful starting point. **Figure 3** shows the priorities expressed at the meeting, although it must be noted that there was *not* extensive discussion about what each area would entail or consensus around how these should be approached. The subsequent steps on the roadmap need to evolve from conversations and concepts into action with measurable change.

Further discussion revealed interest in prioritizing the most impactful areas for produce safety and identifying those activities that may be less impactful, which are discussed in a later step. There was also an interest in piloting a collaboration around a specific issue such as agricultural water, to explore how a collaboration could function. During the April 2025 meeting, some participants suggested that agricultural water be selected as a 'proof of concept' to test the ways in which diverse stakeholders can reach consensus and ultimately develop a framework for approaches to tackle other produce safety challenges. There was not consensus on this, but if an SSC is established, this concept can be further evaluated, with careful consideration from individuals involved to select meaningful topic areas, data collection efforts, education, and outreach activities that may provide the greatest impact. Finally, the group recognized that advocating to maintain (and preferentially grow) the current produce safety infrastructure (e.g., public health systems, ability to respond to outbreaks, funding for research and extension) would require a diverse stakeholder group to align around messaging.

A process-oriented approach to making meaningful change involves focusing on the underlying processes and systems that drive behavior and outcomes, rather than just addressing the symptoms of the problem. This approach emphasizes creating a collaborative environment, developing a shared vision, and making incremental changes that build toward a more sustainable transformation. A continuing collaboration in produce safety will need to identify and engage the right groups of stakeholders to advance each of the following proposed elements.

Maintaining What Works Well

While this effort focused mainly on what is needed to *improve* produce safety, it is important to recognize the tremendous effort that goes into maintaining a safe supply of fresh produce today. Stakeholders, via a questionnaire distributed in the fall of 2024, identified many efforts and activities that serve to advance produce safety. From a total of 100 responses (85 English, 15 Spanish), the following were the most commonly mentioned efforts, programs, and resources that benefit produce safety and should presumably continue or be enhanced and further supported:

- Education and Outreach, including Produce Safety Alliance (PSA) trainings (50 Mentions)
- On-Farm Readiness Reviews (OFRRs) (15 Mentions)
- State-led inspection programs (20 Mentions)
- Collaboration across state, federal, and industry (20 Mentions)
- Research support (especially CPS-funded research projects) (15 Mentions)
- Improved awareness and communication (15 Mentions)
- Flexibility in regulations (educate while regulate) (10 Mentions)
- Traceability initiatives and Good Agricultural Practices (GAP) audits (10 Mentions)
- Improved sanitation and environmental monitoring focus (5 Mentions)
- Remote training (e.g., webinars, podcasts) (5 Mentions)

Evaluation of efforts, programs, and resources must be conducted on a frequent basis to ensure they remain effective and are a useful investment of time and money towards overall risk reduction efforts.

PRIORITIES BY WORK GROUP

Specific activities are presented below, organized roughly by the seven work group topic areas. These include additional items raised during the April 2025 meeting.

Produce Safety Data

NEAR TERM	LONGER TERM
1. Engage stakeholders to identify and prioritize data analysis goals and objectives; select relevant metrics and KPIs; and assess potential data sources, their limitations, and gaps. 2. Establish a stakeholder task force to conduct a SOAR (Strengths, Opportunities, Aspirations, Results) analysis to develop a strategic plan for data sharing and identify potential pilot projects. 3. Develop a plan for improving data literacy among all food safety stakeholders (e.g., industry, government, allied industries) so that there is a universal language around data analytics.	1. Develop a strategic plan for leveraging existing data sources and filling data gaps. 2. Develop a data governance model(s) and identify curator(s). 3. Secure funding for data analysis training and extension efforts. 4. Conduct intentionally-selected pilot project(s) to demonstrate the use of data to improve processes around food safety.

One Health/The Agricultural Ecosystem

Prioritized activities include those that span legal, regulatory, economic, communication/ collaboration, and education areas.

NEAR TERM

1. Establish group of food legal experts to determine the feasibility and design of Safe Harbor Policy for food safety data [Legal]. This would be followed by establishing a draft Safe Harbor Policy for food safety data.
   - Formalize draft policies that allow/encourage food safety data collection (pathogens, WGS, strain tracking)
   - Develop implementation path and timeline
2. Create formal collaboration and synchronization between the USDA and FDA efforts [Regulatory].
   - Establish a federal workgroup and steering committee that is inclusive of individuals identified in the "key participants" named.
     - Bolster USDA authority/activity to promote prevention activities
     - Inform USDA activities based on learnings from FDA outbreak data investigations
     - Develop actionable guidance for co-management solutions to address regulatory requirements and answer regulatory questions overlapping across multiple agencies.
3. Create data-sharing pilot [Regulatory].
   - Create a pilot program with industry participants in produce, animal industries, processing industries
     - Incentivize participation by/with regulators, focusing investigation and inspection efforts on characterizing the data gap
   - Identify data curator (non-government entity) to pilot management of data.
     - Ensure structure, data elements, security, and accessibility
     - Develop data guardrails/policies to ensure data quality and value
     - Work to ensure consistencies on reporting, harmonization of structure, data elements

LONGER TERM

1. Establish a draft Safe Harbor Policy for food safety data [Legal].
   - Formalize draft policies that allow/encourage food safety data collection (pathogens, WGS, strain tracking)
   - Develop implementation path and timeline
2. Incentivize growers to invest in improved food safety practices at the entities in the agricultural ecosystem level [Economic].
   - Grants/economic funding for food safety (e.g., Organic Market Development Grants, NRCS)
   - Economic/trade opportunities for those with evidence of food safety systems
3. Establish transparency on buyer/retailer purchases [Economic].
   - Develop means to make transparent if and how buyers/ retailers adhere to purchasing policies (e.g., favoring supply chain that contributes to data-sharing and increased efforts for improved food safety practices)
   - Food safety should not be a competitive advantage. This point is intended to provide visibility on whether buyers adhere to stated food safety policies.
   - Data-sharing participation by industry could help identify for buyers what suppliers to source from.

Industry-Regulatory

NEAR TERM	LONGER TERM
1. To promote trust and transparency with all stakeholders working to improve the safety of produce, align industry and all levels of regulatory around communication principles for two-way sharing of information, especially when the sharing of such information will lead to stronger prevention strategies to protect public health. 2. Initiate a review of the reasons regulators request data across all jurisdictions to specifically identify what is being requested, why it is being requested, how the data is being used, and what data protections exist to inform the development of an incentive-based strategy around data collection and bidirectional sharing to protect against punitive use of data against cooperating companies. 3. Establish an industry—regulatory work group to identify how the FDA can leverage data (e.g., testing data, third party audit data) in a way that will incentivize industry to capture and share data (vs the current approach in which data can be used against them in punitive ways).	1. Establish a regular meeting of industry and regulatory officials during times of "peace" (the cooling off period) when no outbreaks or issues are going on to provide a forum for improving communication, conducting a post-event assessment to determine where there are information and/or communication gaps, and using this to improve the current system. 2. Evaluate how USDA FSIS defines trade secrets and information sharing with the industry and consumers versus how the FDA does. Compare equivalent regulation under this to Trade Secrets Act 21 CFR 20.61c and make recommendations for Congress to update the legislation to improve information sharing between federal, state, local, and tribal authorities and with industry and consumers. 3. Standardize communication of data requests and data formats used across agencies to facilitate collection of information and sharing of information back to industry.

Policy & Economic Opportunities

(*The work group prepared a detailed list of potential policies or action that was provided in an addendum to the submitted* ***Appendix I***.)

This work group considered, reviewed, and recommended public policies and development ideas that can be emphasized, adapted, or created to support, incentivize, or establish systematic solutions for continuous improvement in fresh produce food safety while also addressing the following needs:

- Leveraging the states as intended under FSMA (integrated food safety system) as key partners for educational outreach, technical assistance, and compliance verification.
- Promoting and supporting domestic production of fresh produce
  - Projecting long-term needs to support productivity of current growing regions
  - Assuring an even "playing field" for domestic and foreign grown fresh produce.
- Ensuring regulatory requirements do not cause undue burdens to entry across scale or product diversification
- Addressing the complex food safety challenges of mixed and complex (animal/plant) farming ecosystems and their wildlife borders
- Fostering the development and application of data science and artificial intelligence in food safety and integration of such tools across agricultural operational systems

NEAR TERM	LONGER TERM
1. Digital Infrastructure: Convene a broad stakeholder task force to provide recommendations regarding the needs and funding requirements for a digital infrastructure federal agencies that support fresh produce 2. FDA Public Health Advocacy: • Invest in cross-agency foodborne illness outbreak investigations to achieve rapid identification of the outbreak source, resolution of the outbreak, and dissemination of lessons learned and associated data • Ensure effective education and outreach programs through strong and consistent state CAP programs. (*Requires Congressional Funding and FDA Budget Allocation.*) 3. Agricultural Water: Convene a stakeholder task force to address a national strategy regarding the microbiological quality of agricultural water before the farm gate or to assist the grower in improved management on the farm.	1. Digital Infrastructure: Initiate action on recommendations from the task force (per projected timeline and funding availability). 2. FDA Public Health Advocacy: Address next priority recommendation 3. Agricultural Water: Initiate action on a national strategy (per priorities and projected timeline) 4. Food Safety Infrastructure: Congressional appropriations language/earmarks ready for the 2028 budget (pilot or full programs, as negotiated).

Produce Imports

NEAR TERM	LONGER TERM
1. Identify gaps in the outline inconsistencies in execution against regulatory requirements, buyer expectations, and practices between domestically and internationally grown produce. Additionally, develop a data map to identify compliance requirements that will inform data collection strategies, resource development, and standardization efforts to support regulatory alignment. 2. Utilizing a science-based approach (e.g., expert elicitation, analysis of data) to categorize and prioritize the gaps identified in Step 1 by product, producer, and country, and assess which gaps present the greatest opportunity for improving the current import system. 3. Establish a collective public-private partnership representing all stakeholders: International Partners (regulatory and industry) and domestic to: • Secure buy-in from the identified parties to work on solutions and create work groups for the three problem areas. • Secure funding to support the identified solutions for the three problem areas identified in the problem statement. • Align the identification and development of incentives for foreign producers/suppliers, importers of record. • Acquire support from auditing companies and data service providers to align verification requirements, and data sharing efforts.	1. Establish a construct for a data collection platform to collect food safety verification and traceability data from foreign suppliers and importers. Developing this construct includes mapping the data to be collected, data governance, and identifying who and how the data will be hosted and shared. In addition, identify the legalities and liabilities associated with sharing data. • Establishing alignment with other work groups' data projects is crucial to ensure consistency and efficiency. Additionally, securing funding is a key consideration, as these programs are costly to operate and sustain. 2. Develop guidance with standardized food safety information that should be verified by importers and buyers. Establish minimum food safety verification standards for imports that can be used for data standardization and interoperability and reducing inconsistencies in food safety verification between domestically and internationally grown produce. 3. Develop a comprehensive framework for creating and addressing critical resources needed to fill the gaps identified in Steps 1 and 2. This framework should outline the specific types of resources required, their intended audience, and the appropriate formats for delivery (e.g., written guides, training videos, webinars, workshops). Additionally, define language accessibility requirements to ensure materials are available in multiple languages, as needed. In parallel, design a strategic plan for establishing a user-friendly platform to effectively distribute these resources, particularly to small- and medium-sized growers, including those in non-English-speaking countries.

Buyer-Supplier Collaboration for Produce Safety

To protect consumers and provide the safety assurances needed to support increased consumption, the Buyer-Supplier Work Group has focused on the possibility of building a new culture of collaboration among buyers and growers based on a sense of mutual ownership and responsibility for the safety of produce. The work group's dialogue centered specifically on the idea of buyer-grower collaboration to develop, harmonize, and support implementation of risk-reducing growing practices and audits that can help prevent illnesses and outbreaks. The work group has found substantial alignment among buyer companies for pursuing such collaboration. It has also identified challenges that need to be overcome through broader dialogue, especially with growers, to establish and operationalize a new culture of collaboration that better supports growers in making produce safer.

The process revealed a broad alignment on the need for new forms of buyer-supplier collaboration to better support growers in providing safe produce, including collaboration on the development and implementation of best practices for reducing key risks. The discussions also considered the need for "safe space" venues and mechanisms for such collaboration between buyers and growers and surfaced interest in continuing dialogue on ways to move forward on buyer-grower collaboration beyond the Produce Safety Dialogue process.

SHORT TERM	LONGER TERM
1. Crystalizing business leader sponsorship of new mechanisms for buyer-grower collaboration, including a collaborative program to develop and implement harmonized best practices for reducing risk. 2. Pursuing buyer dialogue with growers and other stakeholders and experts on objectives and possible governance mechanisms for ongoing collaboration, including on best practices. 3. Finding or creating a venue and defining organizational needs and mechanisms for buyer-grower collaboration.	If buyer community business leaders decide to proceed with new mechanisms for collaboration, additional steps include: 1. Establishing a diversely representative steering committee as the body responsible for strategically planning, prioritizing, and overseeing collaborative best practice initiatives. 2. Determining staffing and resources needs to support a sustained best practices program. 3. Identifying initial priorities for commodities and/or hazards for which new harmonized practices are needed and initiating one or more targeted pilot projects to demonstrate how a collaborative best practice program could work.

Extension and Outreach

NEAR TERM

1. Develop a framework to address funding challenges—Engage funders to discuss high administrative costs, short-term grant limitations, and reporting expectations. Advocate for long-term funding that supports multistate and university collaboration, while reserving short-term grants for rapid response projects. Maintain funding for sustaining programs that are critical to supporting producers to ensure consistency.
2. Develop and manage an "Extension Hub"—A collaborative platform for land grant universities, the Produce Safety Alliance, trade associations, and non-profits to share training opportunities, technical assistance, and outreach efforts, enhancing coordination and maximizing impact. For example, maximize the use of existing training materials for various audiences by collaborating with trade associations and other relevant entities to increase reach/impact to a wider audience.
3. Elevate the profile of Extension work —Establish recognition programs and industry-backed awards highlighting Extension professionals' contributions to public health and agriculture. Although extension is part of the land-grant mission (i.e., extension, research, teaching), it is often deprioritized at universities with Extension efforts undervalued. Effort needs to be placed in raising the profile of Extension so that motivated, high-achieving professionals continue to be attracted to extension and to ensure their promotion and sustainability within the profession.

LONGER TERM

1. Create a sustainable funding framework for produce safety outreach integrating multiple sources:

   Federal Funding (the FDA and other agencies)—Consistent federal support for produce safety education and technical assistance, filling gaps, and making information public. For example, recent federal funding cuts have forced prior collaborative partnerships with university Extension professionals and state departments of agriculture for education, outreach, and extension of the Food Safety Modernization Act's Produce Safety Rule to be severely crippled.

   - 16 of 24 land grant universities indicated that State Cooperative Agreement Program (CAP) funds to support extension activities related to the produce safety rule had been decreased to zero (personal communication, Dr. Keith Schneider, FSMA Lead Regional Communication Center)
   - State Funding—Flexible state-level funding supporting Extension and outreach without being tied to inspection quotas, allowing resources to be allocated based on industry needs.
   - Private Funding (Checkoff Program)—A small per-unit fee at the point of sale ensuring all buyers contribute to produce safety outreach (i.e., distributing costs more equitably across the supply chain).
2. Recruit and train Extension professionals through active and retired experts and provide professional development and mentorship. Engage with university leadership to address the prioritization of extension positions for new hires and maintaining full-time employees in Extension.

   Establish a dedicated "Outreach and Education" division within the CPS or other entities such as trade associations—Secure funding to ensure research findings are effectively communicated to Extension professionals and industry stakeholders. Additionally, if trade associations work on industry-sweeping food safety guidance documents, Extension could be engaged through this division of CPS to partner on dissemination efforts to the produce industry.

Research

The Produce Safety Research Needs Work Group discussed characteristics of a dynamic and productive produce safety research system, including establishing priority research areas with stable support, organizing a regional network for produce safety research plots and facilities, and developing goals and measures of success for produce safety research programs that extend beyond typical academic metrics. Identifying target outcomes (listed below) was essential to the arc of discussions leading to key steps.

Funding Produce Safety Research & Extension

There is a critical need to initiate a unified strategy on produce safety research funding, coordinating the fragmented efforts that currently exist. While there may be opportunities to gain efficiency, funding for produce safety pales in comparison to other health-oriented programs.

Despite the consensus that a diet rich in fruits and vegetables is foundational to health, the public investment is not proportional to the societal value of the health benefits. A collaboration should consider exploring what can be gleaned from other successful funding models—such as National Institutes of Health or National Science Foundation grants which are often millions of dollars for drugs and medical devices.

However, it is not simply a matter of grant dollars. Without stable, predictable funding streams both for research and the extension services that support their implementation, there is risk that efforts that require long term efforts will not be seen through to fruition.

1) **Continuous and Stable Support Structure**—Creation or enhancement of a public-private partnership, including federal, industry, and philanthropic dollars, that directly establishes research priorities and supports projects
   - Create and fulfill a produce safety research agenda
   - Provide oversight of funded research and resource allocation
   - Support information transfer to end users
     - Moving research from hyper-local or regionalized to replicated/cross-region
   - Mediate information exchange across silos/firewalls to address current issues
     - Federal investigations, audits, industry monitoring, research applications
   - Build a dynamic community that attracts new members and provides mentorship to individuals in key functions like outreach/Extension
2) **Continuity Between Priority Setting, Data Creation, and Data Use**—Enhance the bidirectional connection between researchers (data creators) and industry (data users) such as by creating a network of regional hubs.
   - Enhanced evolution of research products via a feedback loop with industry to help ensure relevance and usefulness
   - Improve, update, and/or create:
     - Extension publications
     - Industry guidance
     - Field days at demonstration plots; including units capable of using a diversity of pathogens and other model organisms in research settings
     - Engaging, responsible, and actionable outreach via social media
     - Curated library of research reports, annotated bibliographies, decision matrices or other tools
3) **Integrated Data System**—Develop an integrated data system to track, analyze, and utilize produce safety data across the supply chain
   - Produce-safety relevant data that are generated every day, but currently not mined and utilized adequately
   - A process to track and analyze produce safety data to encourage development of a data depository that would make ‘hidden data’ available for use by other researchers
   - Develop, or prioritize and standardize, methodologies and field sites for research that is developed from data-driven hypotheses
   - Systems-based development of research objectives

SHORT TERM	LONGER TERM
1. Identify an independent and driving stakeholder relevancy and leadership entity or organization a. Goal: Create a mechanism for gathering, vetting, and prioritizing input for research priorities b. Model: Past commodity-specific efforts (tomato, leafy greens) 2. Host a "think tank" meeting a. Goal: chart a path forward for regional hubs that coordinate research and outreach across produce safety stakeholders b. Support and oversight by public-private partnership 3. Use a work group for data and new hypothesis-generation mechanisms a. Goal 1: 'Go teams' that mobilize in response to time-sensitive learning opportunities and root cause evaluations, collect relevant data • Coordinated at a national level to triage and define the opportunity. • Supported across regional hubs, primed and ready to respond • Science-oriented, reduced direct regulatory or industry involvement 2. Goal 2: Leverage accessibility to routine/internal or firewalled data • Examples of data are audit findings and inspectional observations, routine industry data, unpublished research including routine monitoring at public health laboratories • Build on efforts by Western Growers, IFPA, CPS, others in the field; government agencies, NASDA, ComBase, NCBI data standards and ontologies, etc. • Must consider legalities, liabilities, incentive and confidentiality assurance hurdles to data sharing	1. Create a public-private partnership structure to develop a produce safety research agenda • Comprised of stakeholders (including regional hubs) • Charged with "lobbying" sources of research funding to obtain a participatory role in establishment of research priorities • Looking forward, anticipated role identifying sources of support and, ultimately, distributing research support 2. Establish a framework of regional hubs • Advisory/steering committee of stakeholders that includes public-private partnership • Consistent operational support mechanism • Determine mechanism. Check-off program? Federal line item? Other? • Regionally located near significant commodity growing areas • Determine hosting strategy. Land Grant research stations? Other comparable sites? Permanent? • Residencies/stipend program to bring in outside or cross-disciplinary expertise • Demonstration field plots, pilot processing plants, and other research facilities to repeat and confirm the effectiveness of data-driven best practices (return on investment) • Serve as a physical host structure for organized go teams – Stockpiled resources, mobile labs enable rapid response – Collaboration with regulatory and industry partners to pursue testing positives or situational risk potential vs risk exposure. 3. Build an integrated data system for information sharing and dissemination • Compilation of research results – Goal: Host and pre-digest primary research data that are relevant to best practices and other operational decisions – Model: Library of Congress archives • Accessibility for end users – Approach: Integrate with Extension Dialogue Work Group • Server for existing data – Goal: Enhanced data sharing across firewalls – Model: Bounded trolling AI, other approaches

Collaborations Built on Trust

In addition to the specific priorities for new activity and maintaining some existing practices, the trust deficit within the fresh produce ecosystem must be addressed. Through feedback from work group members and discussion amongst the April 2025 meeting participants, clearly trust is lacking. Trust and transparency are not just buzzwords—they are essential components of resilience and long-term success. Trust and transparency rarely emerge organically; these qualities must be built through sustained efforts that span all aspects and responsible parties within the food system. Trust is essential in building collaborative relationships to address complex challenges in the safety of fresh fruits and vegetables. When growers, regulators, public health agencies, scientists, educators, and industry leaders trust one another, they are more likely to share critical

information, align on best practices, and support unified produce safety standards. This collective confidence enables faster problem-solving, greater transparency, and more effective implementation of food safety measures, ultimately protecting public health and strengthening the entire produce supply chain. The collaboration should also identify additional stakeholders to engage, particularly in building trust. These may include individuals outside of the "typical" produce safety sphere; including social scientists with expertise in public health, change management, psychology and behavioral science, and those working in animal agriculture, just to name a few. **A prerequisite to an effective collaboration in produce safety is to identify shared goals and and concrete items that lead to collectively pursuing solution-oriented outcomes.**

Change theory suggests that taking a series of steps, utilizing both relational and trust building strategies (See **Figure 4**), can yield increased trust among implementation stakeholders, leading to positive and sustainable implementation outcomes (Metz et al., 2022). Envisioning what success looks like through the lens of each stakeholder—growers, processors, shippers, retailers, foodservice members, public health professionals, educators, and regulators—will likely yield disparate results but is a critical part of addressing existing power differentials. The April 2025 meeting suggests that different stakeholder groups have different definitions of success.

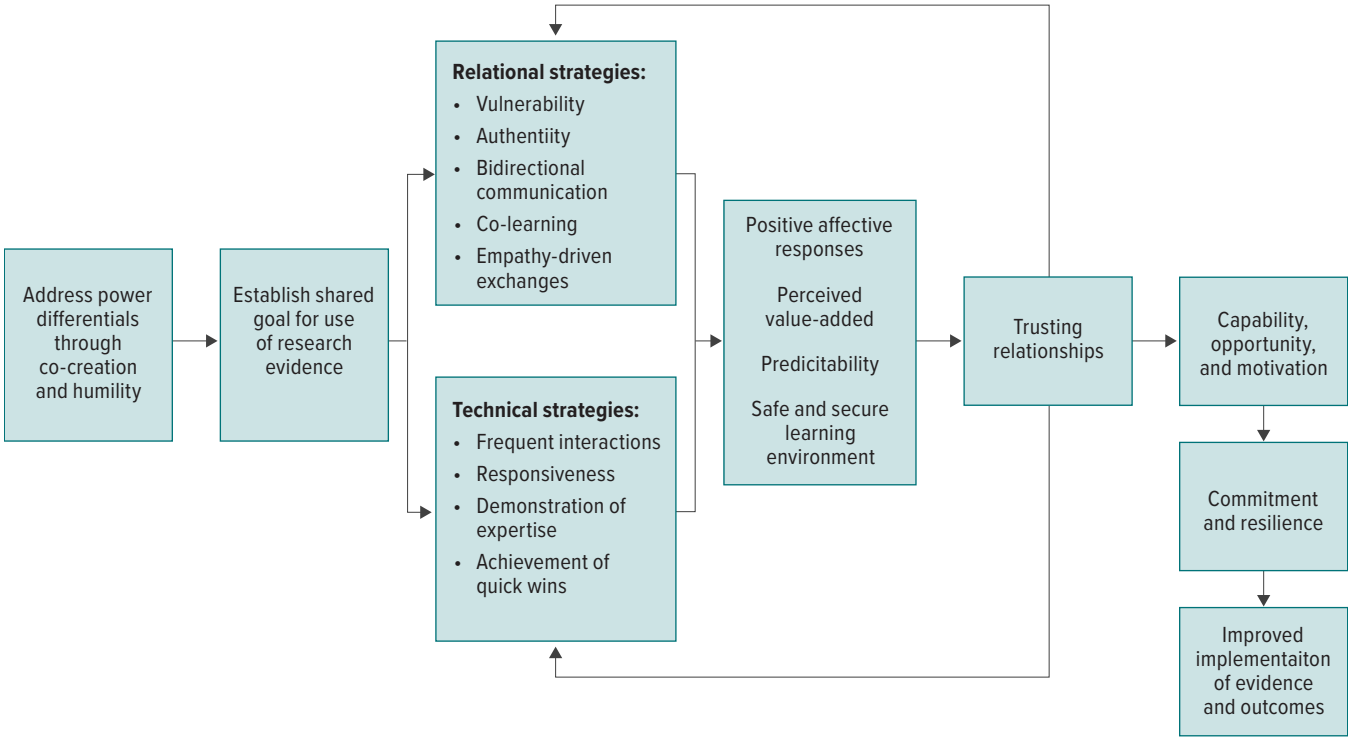

FIGURE 4. THEORETICAL MODEL FOR TRUSTING RELATIONSHIPS AND IMPLEMENTATION (METZ ET AL., 2022).

While there may be a perception that responsibility for produce safety lies more heavily on certain members within the food system, all stakeholders are part of a larger agricultural and economic ecosystem that makes it challenging for one player alone to find solutions and bear the costs for improvement. This underscores the importance of identifying a shared goal so that a variety of strategies can be employed to build trusting relationships which result in the intended public health outcomes.

ROADMAP: STEP 3. ENGAGE STAKEHOLDERS AND SCOPE PRIORITIES

Participants in the collaboration should engage the following groups, with essential participants identified as industry, government, and trade associations (noted in purple) in **Figure 5**. While this graphic is not an exhaustive list of individuals and organizations working in the produce safety space, it is a starting point for engagement with known entities and individuals.

FIGURE 5. NON-EXHAUSTIVE LIST OF PRODUCE SAFETY COLLABORATORS.

ACADEMIA/RESEARCH	ALLIED INDUSTRY	CONSUMER ADVOCATES	ALLIANCES/COALITIONS
• Center for Produce Safety • Extension • FSMA Regional Centers • International Association for Food Protection • Institute for the Advancement of Food & Nutrition Science • Institute of Food Technologists • Joint Institute for Food & Applied Nutrition • USDA: Agricultural Research Service, National Institute for Food & Agriculture	• Auditing bodies • Consultants/experts • Equipment manufacturers • Insurance providers • Lab services • Law • Sanitation/chemical suppliers • Traceability/AI solutions	• Consumer Reports • Center for Science in the Public Interest • Food security advocates • Nutrition focused groups • Public health organizations • STOP Foodborne Illness	• Agriculture & Land-based Training Association • Community Alliance with Family Farmers • Controlled Environment Agriculture Alliance • Food Safety Education Team (Plain Growers) • Food Safety Preventive Controls Alliance • Fresh Produce Coalition • Indigenous Food & Agriculture Initiative • Inter-American Institute for Cooperation on Agriculture • National Farmers Union • National Sustainable Agriculture Coalition • Produce Safety Alliance • Sprout Safety Alliance

GOVERNMENT	FOOD INDUSTRY	TRADE ASSOCIATIONS
• Inter-American Institute for Cooperation on Agriculture Bureau of Indian Affairs (Tribal Food Safety) • Centers for Disease Control & Prevention • Environmental Protection Agency • FDA: Human Foods Program, Coordinated Outbreak Responses & Evaluation, Office of Inspections & Investigations • Office of the Assistant Secretary for Health • State Departments of Agriculture & Health • USDA: Agricultural Marketing Service, Economic Research Service	• Growers • Harvest crews • Packers/re-packers • Processors • Restaurants/food service • Retailers • Distributors/transportation	• American Farm Bureau Federation • American Meat Institute • Association of Food & Drug Officials • Carolina Farm Stewardship Association • Colorado Fruit & Vegetable Growers Assn. • Florida Fruit & Vegetable Association • Fresh Produce Assn. of the Americas • Food Marketing Institute • Georgia Fruit & Vegetable Growers Assn. • Grower-Shipper Association • International Fresh Produce Association • International Food Service Distributors • Leafy Greens Marketing Agreement • National Association of State Departments of Agriculture • National Grocers Association • National Onion Association • National Watermelon Association • Northwest Horticultural Council • Texas International Produce Association • Western Growers

The Dialogue process yielded numerous concepts, many of which are complex, multifaceted, multiyear initiatives. There are myriad produce safety efforts: research, training and Extension programs, and industry activities. Although there is a "common cast of characters," some efforts may be duplicative or at least could be more effective if aligned. The benefit of developing trusting relationships is that open communication channels can foster opportunities to leverage existing work and reduce duplicative efforts. And in an era of constrained resources, reducing redundancy can create opportunities for new activity. The collaboration should compile efforts (and/or utilize existing knowledge, such as those mentioned on **page 26**) and review them critically to set priorities and to identify areas of overlap.

Discussions around funding produce safety are a centerpiece of effort alignment. Interest and efforts to reduce the size of the federal government further heighten funding concerns. Several participants noted that funding frameworks need to be reenvisioned since traditional federal and state funding sources have been significantly reduced or outright eliminated. This prompted discussions around the need to critically evaluate the value of current efforts and practices in order to identify opportunities to reallocate or leverage existing resources.

Although a review of public funding (e.g., grants) focused on research and/or extension was not conducted as part of the Produce Safety Dialogue, a "Resource Reallocation" ad hoc group formed during the April 2025 meeting concluded that funding could be more efficiently utilized. **Plotting resources against a defined produce safety strategy may be more fruitful than the shotgun approach to today's myriad overlapping and seemingly disparate efforts.** The Produce Safety Research Work Group suggested that the research community convene to compile the various produce safety projects and assess how to "divide and conquer," and more clearly envision their role and the continuity of funding necessary to advance produce safety research as part of a larger initiative.

To return to the example of agricultural water as proof of concept, an SSC could serve as a connector to ensure that everyone is headed in the same direction on the roadmap. This requires an environmental scan to identify existing initiatives and stakeholders. Today, there are many agricultural water-related efforts—and rightly so, because agricultural water has remained one of the most difficult challenges to overcome in fresh produce safety since all fruits and vegetables require the application of water. Assessing the quality and safety of water requires knowledge of how microbiology, environmental conditions, source type, distribution systems, and application methods and timing can influence one another and the overall risk profile. Exploration and implementation of these efforts consume resources, whether those are financial resources (e.g., research supplies, student funding, travel) or time (e.g., worker time to test or treat water, or attend training). Quantifying the total resources currently expended toward a topic, such as agricultural water, may reveal opportunities to reallocate those resources in a way that will have a more meaningful impact and help achieve the defined risk targets previously discussed.

ROADMAP: STEP 4. SETTING TARGETS FOR PROGRESS AND MEASURES OF SUCCESS

There is a need to establish metrics for success for the collaborative entity as a whole, as well as for each activity that the entity undertakes.

Many stakeholders believe that improved produce safety should be quantitatively defined, in order to more effectively target and measure progress toward "better." Within the produce industry, there is a high level of risk aversion and a desirable but likely unrealistic definition of success as achieving "zero risk." Despite

the numerous actions taken today in the name of produce safety, it is not always clear what quantitative risk reduction is associated with the activity. The outcome needs to be defined, governed by a framework, and continually refined as more is learned from research, root cause analysis, and historical trends. Said more plainly, how can these measurements inform our decisions on what matters most? What activities provide the greatest protection to public health?

Unfortunately, major gaps exist in risk literacy, and until these gaps are closed, achieving a more realistic view of risk tolerance is challenging. Consumer groups and the public health community must be engaged in this discussion, and they must incorporate data regarding consumer confidence and the health benefits of increased produce consumption, such as a resulting decrease in chronic diseases. The Policy and Economic Opportunities Work Group emphasized the importance of public health advocacy, specifically through establishing risk tolerance levels.

If risk tolerance tension can be navigated, this opens the conversation to explore different ways that the level of risk can be met. Science and data (and risk assessments based on useful, standardized, quality data) can help compare options, but ultimately, agreement is needed on which efforts should be prioritized to achieve the target risk reduction.

As noted earlier in this report, some Dialogue participants advocated to prioritize agricultural water as a potential pilot of how an SSC might tackle a specific issue. Using this as an example (solely for potential proof of concept), a continuing collaboration in this instance must decide whether level of risk is:

- Defined as the overall public health outcome, which is inclusive of all steps and variables in the supply chain;
- Based on likelihood of crop contamination; and/or
- Contingent upon pathogen levels or indicator organisms in the water itself.

Support to make these decisions will rely heavily upon trust, specifically in the collection and transparent sharing of data. For example, participation in testing programs will likely diminish if finding pathogens results in regulatory or market penalties. Creating an environment focused on assessing and mitigating risk, while ensuring compliance with laws and regulations, is essential.

ROADMAP: STEP 5. GATHER INFORMATION AND IDENTIFY CRITICAL PRACTICES

What *must* be done to achieve defined risk targets or outcomes? Collaborative efforts must focus on the areas that will provide the most return on investment. Assuming a state of limited funding opportunity for the foreseeable future, from a risk perspective, what practices must be prioritized to provide the biggest public health benefit? Future efforts of an SSC should expand on this discussion overall. Because root cause analysis was identified as the top priority during the Produce Safety Dialogue, this report utilizes it as an example of both the challenges identified and potential solutions that may be beneficial to pursue in SSC.

As part of the Produce Safety Dialogue Process, critical practices/activities were discussed by work groups and further prioritized during the April 2025 meeting. Maintaining and expanding surveillance and outbreak investigations, root cause analysis activities, and sharing of learnings landed at the top of the priority list of newly identified priorities (See **Figure 3**). These all contribute to identifying the practices and failures that have the greatest influence on produce safety. In addition to using data learned from surveillance to direct where

preventive measures are needed, there is an additional opportunity for the collaboration to advocate for the expansion and continued improvement of surveillance efforts.

A thorough understanding of food safety failures may provide the best evidence for identifying critical practices and, during the April 2025 meeting, participants expressed the importance of learning from outbreaks and "near misses", including what information might be gleaned from these incidents and how that information might be used. However, a shortcoming is that very few outbreaks have resulted in the necessary resolution to expose a precise cause. The 2011 outbreak of *Listeria monocytogenes* in cantaloupe was a concrete example where a root cause could be identified. There are other outbreaks where contributing factors could or should trigger changes in behavior. Companies may discern solutions through their internal investigations. Unfortunately, those solutions are rarely more broadly applied due to legal and reputational concerns of sharing learnings.

Further, conducting a root cause analysis is not universally adopted or recognized. Currently, not all identified or suspected outbreak events are thoroughly investigated by regulators, leaving significant opportunities for knowledge gain on the table. Concerns about cost and lack of industry expertise to conduct root cause analysis are understandable, but ultimately manageable. The greater challenge is that of culture: a posture of "be careful what you look for because you might find something you don't want" is particularly threatening towards progress on incentivizing finding the cause of the problem, along with fears of liability and legal ramifications. To be more successful at learning from food safety failures, all players in the production, harvest, handling, and distribution of produce must embrace and support the benefits of root cause analysis, with full support from regulatory policy and officials coupled with effective communication so all industry members can learn from experiences.

Fresh fruits and vegetables pose different challenges to the investigative process than other types of foods (e.g., processed or shelf stable). Short product shelf life, quickly changing environmental conditions, and a complex network for distribution contribute to the lack of insight typically gained when food safety outbreaks occur. If product and contamination sources are known sooner, the knowledge can lessen both the public health and business liability impacts to all involved. **A continuing collaboration in produce safety can help further develop mechanisms to expeditiously and exhaustively mobilize to gather insights quickly to assure learning from food safety failures.**

Key Approaches to Support Root Cause Analysis

COLLABORATION ON PRODUCE SAFETY DATA

A first step of a continuing collaboration to advance progress in root cause analysis is identifying both a mechanism for determining what data are needed and improving actual data and metadata collection and communication. This includes how input of high-quality data can be achieved (avoiding "garbage in, garbage out"), clear boundaries on how such data might be utilized and shared, and when it might have legal or regulatory implication. Identifying trends, patterns, and relationships in data will help detect food safety problems, identify root causes, develop targeted interventions, assess the impact of risk mitigation efforts, and, ultimately, prevent illness and protect public health. Given this importance, most work groups involved in the Produce Safety Dialogue included the role of data in improving food safety in their summary reports. Data was also a consistent theme during the April 2025 meeting, resulting in 16 data-related recommendations, 14 of which were identified by at least one stakeholder as a priority.

FORMATION OF RAPID RESPONSE TEAMS

Another potential role is forming a "Go Team" (or regional Go Teams) of trusted, capable researchers to quickly reach a location and evaluate suspected sources and pathways of contamination before circumstances change. This is supported by the priorities proposed by the Produce Safety Research Work Group on **pages 32–34**. These rapid response teams could include academic, government, and private sector scientists, and require sustainable funding already in place for immediate response. Prior efforts to establish rapid response teams were thwarted by high overhead costs, resulting in diminished funding and resources to allocate to this type of effort. Reputational sensitivities and liability exposure also need to be addressed for rapid response teams to be successful.

ROADMAP: STEP 6. SUNSET LESS IMPACTFUL EFFORTS, ACTIVITIES, AND PRACTICES

Recognizing that new financial resources to support implementation or augmentation of critical produce safety practices are unlikely to emerge, the group suggested that, concurrently with the identification of critical practices, a parallel effort that identifies practices of less effect (and thus less return on investment) is necessary. Sunsetting less useful practices can also allow for increased bandwidth to adopt more beneficial practices that provide greater reduction of food safety risk As noted on **page 26**. 'Maintaining What Works Well', continuous evaluation of program and practice effectiveness is a critical component to ensure effective utilization of resources. This reallocation of resources will be critical in the coming years as elements of the food safety funding stream become increasingly smaller for all sectors—research, extension, and regulatory.

Strategic sunsetting should be part of the continuous cycle of evaluating current best practices in light of new science, technology, market, and agricultural production realities. Bringing the often emotionally charged task of sunsetting into strategic conversations can be difficult for any group of collaborators to confront. Sunsetting takes time, changes in culture, and careful consideration of its benefits and risks.

There are many reasons to consider sunsetting certain practices including:

- Changes in environment (e.g., newly identified pathogens of concern that shift how hazards might be managed)
- Impacts from market influences (e.g., for third-party audits or other verification of practices)
- Limited resources, funding cuts, and lack of sustainable funding opportunities

Additionally, activities and efforts that are duplicative or that no longer are achieving their intended purpose should also be reviewed for sunsetting or consolidation.

ROADMAP: STEP 7. ACHIEVE A SHARED UNDERSTANDING

Broad agreement on appropriate, effective produce safety practices by all parties (e.g., producers, buyers, regulators) does not yet exist. Part of the disconnect can be linked to the lack of knowledge and data sharing. Another part is the complexity of the system—determining what constitutes best practices for a given situation (e.g., tailored for commodity, region) requires the analysis of data and the utilization of research, including laboratory research, information gleaned from outbreak investigations, and knowledge obtained through industry efforts. This has previously been discussed in the "Identify Critical Practices" section. While research can reveal the impact of different practices, the decision of what action should be taken is a risk management

decision. Today's economic model of produce safety places the financial and legal burden on the grower/supplier side. A shared understanding—and responsibility—is necessary.

By prioritizing the broad sharing of science and data to support best practices, stakeholders can move beyond individual biases and competing interests. Ultimately, buyers and suppliers must agree upon the required practices and then move forward to ensure they are implemented—moving competition to the results of interventions rather than the interventions themselves. This approach helps improve food safety overall, which decreases the broad negative economic impact of an outbreak of foodborne illness.

Achieving a shared understanding will require incorporation of scientific, legal, and interpersonal and business relationship contexts as described below.

- Create a shared understanding by acknowledging and agreeing on specific facts and principles.
  - Support from the research community and entities such as CPS can be leveraged to provide a platform for generating, sharing, and agreeing upon the evidence available.
  - There is a need to engage stakeholders at all sizes and scales to spur conversations throughout the entire supply chain. This means stepping outside the FSMA framework which provides some farms and food producers with exemptions. The Extension Work Group highlights the value of Extension in these particular roles, especially when it comes to engaging with all stakeholders.
- Acknowledge that the process involves being vulnerable and a level of honesty and openness that may be uncomfortable.
  - The ramifications to a company from a product positive or association with illness must be discussed, as well as the cost ramifications to the public from illness. Shared acknowledgement from the regulatory community must also be achieved to avoid repercussions and disincentives towards openly sharing information.
  - The **One Health/The Agricultural Ecosystem Work Group** specifically identified several steps toward identifying and convening a group of legal experts to determine the feasibility of drafting a Safe Harbor Policy for food safety data.

ROADMAP: STEP 8. COMMUNICATION AND SOCIALIZATION

Regardless of the activity, the collaboration must identify effective ways to raise visibility about efforts to improve produce safety, and the effect of such efforts. There are many mechanisms through which produce safety information is shared: webinars, articles (from peer reviewed research to popular press and social media), and online and in-person workshops. Communication efforts must be consistent: buyers and suppliers must align around a common goal and provide clear consistent information regarding practices necessary to advance produce safety. Otherwise, trust is eroded, and a tangled web of messaging impedes progress.

The continuing collaboration should evaluate how to provide growers (as the implementers), buyers and regulators (as the verifiers), and consumers (as the ultimate beneficiaries and stakeholders) with meaningful, tailored, actionable information supported by sound science and policy. The Extension system is one primary and trusted mechanism across the U.S. to disseminate produce safety information and is a likely stakeholder within the collaboration. The collaborative entity should explore both novel means to raise awareness along with leveraging the networks already in place within the industry. Global communication strategies geared

toward foreign producers and exporters of fresh produce are currently lacking. The priorities discussed in the Produce Imports work group on **page 30**. outlines the basic framework for opportunities to engage international audiences. Broader discussions with produce safety standards setting initiatives that do have global presence, such as the Global Food Safety Initiative (GFSI) and Consumer Goods Forum, can help socialize these concepts and also determine whether they fit into currently established produce safety requirements.

From an advocacy standpoint, a greater diversity of voices is needed to make recommendations and generate Congressional support for funding. The SSC should address both the best practices component and the policy/advocacy component, but through different workstreams—allowing government employees to participate in the best practices work but separating them from advocacy activities.

ROADMAP STEP 9. SUPPORT IMPLEMENTATION

Once the practices and priorities are identified, agreed upon, and socialized, they need to be implemented. Technical support networks are one way to aid in implementation. Implementation can also be accelerated by building capacity within the workforce, and through other funding opportunities that the collaboration could advocate for.

Create a Technical Support Network to Support Implementation

A continuing collaboration should conceptualize and advocate for the establishment of a technical support system that can be responsive to industry needs with the agility and expertise to serve local communities. For over a decade CPS has both funded and leveraged existing produce safety research funds to further science. Their motto has been "fund the science, find the solutions, fuel the change." Historically, they have executed against the first two to a greater extent than the third, and there may be an opportunity to leverage their network of industry and research scientists to invest more heavily in the "fuel the change."

Academia, particularly its Extension resources, is a major source of technical assistance. Today, Extension work is often funded through "soft money," such as through government grants like the USDA National Institute of Food Agriculture's Food Safety Outreach Programs and lacks stability. When the work groups convened in April 2025 to identify priorities, the need for a sustainable funding model for produce safety Extension resonated with the participants (see **Figure 3**). While Extension professionals were well-represented at the meeting, the diversity of stakeholder participation (see **Figure 2**) and the nature of the discussion make clear that this priority was not driven solely by Extension voices. Instead, it reflects a widespread recognition across sectors that Extension plays a critical role in translating produce safety science into practice, particularly for small- and mid-sized operations with limited access to technical resources.

In addition to funding uncertainties, Extension services are not generally acknowledged or rewarded the same way as research scientists within the academic model. The academic reward system heavily weighs peer reviewed publications—and these are less accessible to growers, processors, and others in the produce industry. The Policy & Economic Opportunities Work Group recommended funding effective education and outreach programs through strong and consistent CAP support. This recommendation comes at a crucial time when many of these same programs have experienced significant funding and staff cuts. In the absence of government funding, or with reduced funding, private sector investments must be sought.

In addition, produce safety efforts must be enhanced outside the U.S. border as roughly half of the fresh produce consumed by Americans is imported. Overseas producers may not have access to Extension services

comparable to those in the U.S. Buyers may support implementation, perhaps by connecting Extension professionals and other subject matter experts with their overseas supply chains. The Produce Imports Work Group identified the opportunity to work with governments outside the U.S. to support their domestic industry

Build Capacity in the Workforce

Stakeholder responses to the questionnaire that informed the Produce Safety Dialogue work groups suggested that more qualified, trained produce safety professionals were needed. In addition to the eight workgroups that supported this effort, two other workgroups were initially proposed: one to think through ways to recruit individuals to pursue careers in produce safety and another to identify the key knowledge, skills, and abilities associated with a produce safety professional. These were ultimately deprioritized relative to the other eight topical areas due to lack of individuals willing to lead and engage in the conversation. **The SSC may need to revisit and develop a strategy around building a qualified produce safety workforce, including having adequate expertise within the industry, research, produce safety extension, and regulatory communities, along with the industries that support produce safety (e.g., auditors, software providers, labs).**

Invest in Changes to Produce Safety Systems

Despite the resources already used to support produce safety efforts in the industry (e.g., sanitation chemicals, testing, more hygienically designed equipment and facilities, audits), improving produce safety may require additional resources beyond what is currently available. The SSC can play a substantial role in gaining agreement on the practices required to improve produce safety and can also facilitate discussions around appropriate cost sharing models. No single stakeholder should bear the financial burden of improvements that will benefit all supply chain members through the avoidance of recalls and outbreaks and ultimately provide consumers with a greater level of public health protection. Rather, the financial support should be a collective effort.

Both public and private investment are necessary. Investments in produce safety must be strategic and align with businesses that qualify and need assistance. Accurately assessing statewide needs along with identifying constituencies who may benefit the most from grant funding (e.g., underserved or limited resource growers/ food producers) is critical to ensuring investments are allocated appropriately.

Funding must also account for efficiency of scale. While larger growers may be able to implement produce safety practices more easily, returns on food safety investments benefit all scales of growers. When broader financial support for produce safety stakeholders is secured, achieving public health goals could be attained more easily because everyone within the food system would be pursuing a common goal using identified best practices rather than being subject to exemptions or exclusions from implementing produce safety practices based on market or business size. However, it is important to note that achieving public health goals should not come at the increased expense of increasing barriers to market entry for any particular subset of food producers.

Verify Food Safety Practices

Verification systems should be updated to reflect consensus practices and prioritization. Such systems should verify that the critical practices are appropriately implemented; the verification system should not be the entity that specifies the critical practices. This approach must be agreed upon by buyers and suppliers, based on the scientific data and evidence available from the research community, and include lessons learned through outbreak investigations.

In addition, the use of regulatory inspections to verify practice implementation falls short of truly assessing a farm or packinghouses' food safety competency. To use parallel terms identified in the Preventive Controls Rule for Human Food that could be applied to produce, inspections should place more emphasis on evaluating an operation's hazard analysis and effectiveness of their preventive controls.

There was strong sentiment that audits, including buyer addenda, require growers and others in the supply chain to take actions that, in a given situation, may require more resources than the value generated towards risk reduction. The multitude of audits (both second and third party) that some operations are subject to consumes resources that may be better spent on making improvements to food safety systems. **Once there is identification of and alignment around best practices, whether across the board or specific to commodities, audits should be streamlined to focus on priority areas agreed upon by the produce community.** Relatedly, buyers would need to resist the urge to unilaterally add new food safety verification requirements. If new verification efforts are truly important, these ideas should be raised within the collaboration (including sign-off from affected stakeholders) and be used to update critical practices and the common goal.

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Appendices

APPENDIX A: WORK GROUP MEMBER PARTICIPATION

We appreciate the contributions of the individuals below to the Produce Safety Dialogue. This list reflects those who participated in one or more workgroups and/or joined the April 24, 2025 meeting. While all had the opportunity to review the draft report, their inclusion does not represent their endorsement of nor agreement with the content of this report, either individually or on behalf of their organization. The Reagan-Udall Foundation for the FDA retains sole responsibility for this report.

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APPENDIX B: PRODUCE SAFETY DIALOGUE QUESTIONNAIRE

Background

The Reagan-Udall Foundation for the FDA is leading a stakeholder dialogue process to explore new strategies for produce safety and the development of a collaborative public-private partnership (PPP). Ensuring the safety of fruits and vegetables requires a holistic approach. To aid in the goal of improved protection of public health and establishing a PPP, the Foundation is collaborating with stakeholders from agricultural communities, industry, academia, and government to develop a shared understanding of the challenges and a vision for protecting public health.

The Reagan-Udall Foundation for the FDA (the Foundation) has developed this questionnaire to obtain a breadth of perspectives as we work toward facilitating a dialogue to advance produce safety. Other than the first question, all other questions are optional. Please scan the questions and respond to those of greatest interest.

This questionnaire is aimed at gathering input on existing produce safety efforts, gauging priority areas for future discussion (especially from stakeholders who represent diverse views), and seeking contributors to future dialogue.

QUESTION TITLE

*1. Which stakeholder group best describes you/your organization? (select up to three)

- ☐ Academia
- ☐ Audit organization
- ☐ Consumer advocacy group
- ☐ Consultant
- ☐ Educator (K–12)
- ☐ Extension educator
- ☐ Federal regulator
- ☐ Food animal producer (cattle, poultry, swine, etc.)
- ☐ Food distributor
- ☐ Food industry member (non-produce, non-food animal)
- ☐ Government, non-regulatory
- ☐ Importer
- ☐ Nutritionist/registered dietician
- ☐ Produce grower/shipper/packer
- ☐ Produce processor
- ☐ Public health professional
- ☐ Researcher
- ☐ Retail/foodservice/institution operator
- ☐ State/local/tribal/territorial regulator
- ☐ Scientific/professional association professional
- ☐ Service provider (laboratory, software, sanitation, etc.)
- ☐ Trade assn. (animal agriculture) professional
- ☐ Trade assn. (produce) professional
- ☐ Trade assn. (other) professional
- ☐ Other (please enter):

GENERAL PRODUCE SAFETY

2. What groups/organizations are you aware of that have produce safety (e.g., extension, education, research, policy, etc.) as one of its focal areas?
3. What stakeholders have not been sufficiently engaged in current and prior produce safety conversations?
4. What is working well for produce safety programs?
5. What can help improve produce safety?
6. What do you believe is a major obstacle to produce safety progress?
7. What major policy changes might improve produce safety?
8. What do you see as your organization's role in produce safety?
9. What do you see as your personal role in produce safety?
10. What is one thing that stakeholders can do to increase the safety of fresh produce?
11. With our goal of exploring new strategies for produce safety and the development of a collaborative public-private partnership, are the any additional comments you would like to share as we embark on this effort?

Your Interest

12. If you are interested in engaging in further dialogue, please share your contact information and select your priority interests. (optional)

    First & Last Name:

    Organization:

    Email/Phone:

13. I'm most interested in participating in further dialogue on the following priority areas (check all that apply): Workgroups will be formed around areas of priority interest.
    - ☐ Buyer (including audit) specifications for produce safety
    - ☐ Education and Training: Efforts and outreach to the produce industry on best practices
    - ☐ Imports: Assessing the needs of a global produce supply chain
    - ☐ Industry-Regulatory collaboration
    - ☐ One Health: The intersection between produce production, agriculture, and public health
    - ☐ Policy and economic opportunities to improve produce safety
    - ☐ Public-Private Partnership: Developing the structure and governance of a Public-Private Partnership around produce safety
    - ☐ Research: Brainstorming and prioritizing produce safety research needs
    - ☐ Other (please describe): _____

APPENDIX C: STAKEHOLDER REPRESENTATION AND SURVEY RESPONSES

Respondents to the questionnaire were able to select up to three categories to identify themselves. The table below shows how each of the 100 respondents identified themselves. Each respondent was allowed to select up to three choices. Eighty-five English- and 15 Spanish-language questionnaires were completed. The responses are summarized below.

WHICH STAKEHOLDER GROUP BEST DESCRIBES YOU/YOUR ORGANIZATION? (SELECT UP TO THREE)	NUMBER SELECTING
Produce grower/shipper/packer	30
State/local/tribal/territorial regulator	30
Consultant	27
Extension educator	22
Academia	20
Other	18
Researcher	16
Trade association (produce) professional	14
Federal regulator	13
Produce processor	11
Government, non-regulatory	10
Retail/foodservice/institution operator	10
Food distributor	7
Consumer advocacy group	6
Audit organization	5
Public health professional	5
Scientific/professional association professional	5
Educator (K–12)	4
Importer	3
Trade association (other) professional	3
Nutritionist/registered dietician	2
Service provider (laboratory, software, sanitation, etc.)	2
Food animal producer (cattle, poultry, swine, etc.)	1
Food industry member (non-produce, non-food animal)	0
Trade association (animal agriculture) professional	0

Questionnaire Responses: Key Themes

What Is Working Well for Produce Safety Programs?

1. **Training and Education:** The Produce Safety Alliance (PSA) provides training, including hands-on demonstrations, webinars, and Spanish-language resources. Outreach programs, on-farm visits, and educational efforts from extension advisors are valuable tools.
2. **Partnerships:** Strong partnerships among federal, state, and industry stakeholders, including the FDA, CDC, USDA, and academia, support research and education. Cooperative agreements allow state departments to lead most inspections and provide local support.
3. **Regulations:** FSMA has helped growers implement food safety controls, providing a clear framework. Programs like GAP, GFSI, and traceability systems improve safety practices and supply chain consistency.
4. **Research and Innovation:** Research organizations, like the Center for Produce Safety, offer critical insights, though better industry application is needed. Advanced tools like Whole Genome Sequencing (WGS) and risk assessments to detect contamination sources and improve outbreak prevention.
5. **Growing Awareness:** Increased recognition of food safety is driving organizational buy-in and cultural changes, supported by visible recalls and better tools.
6. **Practical Solutions:** Hygienic practices, enhanced water risk assessments, and tailored training address real-world challenges. Focused, scenario-specific risk assessments are helping mitigate hazards effectively.
7. **Improved Traceability:** Programs like PTI and the Foreign Supplier Verification Program (FSVP) have strengthened tracking systems, especially for imports.

What Can Help Improve Produce Safety?

1. **Increased Resources and Funding:** Expanding funding for small farms, research, and training programs is essential to support food safety efforts across the industry. Investments in public health systems, inspections, and risk management strategies can enhance overall safety. Resources must be designed to address the specific needs of small-scale growers and regional operations, ensuring that safety measures are accessible and effective for all stakeholders.
2. **Collaboration:** Food safety requires shared accountability among growers, regulators, and retailers, along with equitable distribution of costs. Collaboration must extend to smaller growers, retailers, and international suppliers to create a unified safety framework. A multidisciplinary approach, including expertise from fields like water quality and microbial research, is crucial to address diverse challenges within the supply chain.
3. **Improved Education and Outreach:** Providing hands-on, scenario-based training for growers, especially underserved groups, is vital for effective implementation of safety measures. Transparent communication and clear guidance from regulatory agencies, such as the FDA, can enhance compliance. Sharing research findings and lessons learned from past failures will foster a culture of continuous improvement and innovation in food safety practices.
4. **Standardization and Policy Improvements:** Harmonizing audit schemes can simplify compliance processes and reduce inefficiencies. Clear, phased regulations with practical examples can help stakeholders understand and implement requirements more effectively. Addressing policy gaps, such as those concerning animal agriculture and brokerage firms, will ensure a more comprehensive and equitable approach to food safety across all sectors.

5. **Risk Management:** Research into contamination pathways and mitigation strategies is essential for identifying and reducing risks in produce safety. Targeted interventions, informed by risk profiling, can enhance safety efforts. Advanced tools like traceability systems and Whole Genome Sequencing (WGS) can improve monitoring and response capabilities. A proactive focus on risk management, rather than mere compliance, will drive long-term improvements.
6. **Consumer and Retail Engagement:** Public education on safe handling practices and awareness of the food system's complexities are critical for improving produce safety. Retailers and consumers must adopt better handling practices to minimize risks at the point of sale and in homes. Awareness campaigns can play a key role in highlighting the importance of produce safety and encouraging shared responsibility across the supply chain.

What do you believe is a major obstacle to produce safety progress?

1. **Resource and Funding Limitations:** Both time and money are recurring barriers. Small farms especially face resource constraints, with limited access to necessary infrastructure, training, and support. Additionally, low congressional funding and the cost of compliance further exacerbate the challenge.
2. **Regulatory Challenges:** The complexity of regulations, the lack of clarity in FDA guidance, and conflicting industry requirements hinder progress. Producers often face burdensome and inconsistent rules that don't align with actual risks. The focus on "zero tolerance" standards and audits without a risk-based approach may be counterproductive.
3. **Communication and Education Gaps:** There is a need for better communication within the industry and across borders. Producers, especially smaller ones, lack access to critical food safety resources and education, while the regulatory environment remains fragmented. Efforts to improve education and best practice dissemination often fail to reach all stakeholders, especially those in non-English speaking communities.
4. **Industry and Stakeholder Engagement:** Engaging growers, especially small or foreign producers, and getting buy-in from all stakeholders remains a challenge. There is a need for more effective collaboration between industry, regulators, and growers. The regulatory focus on enforcement, rather than prevention, creates a culture of mistrust.
5. **Systemic Inefficiencies:** A "check-the-box" approach to food safety audits and the lack of tailored food safety systems for different types of production systems or crops have resulted in ineffective practices. This, along with inadequate research, prevents the development of practical tools for real-world applications.
6. **Economic Pressures and Market Dynamics:** Profit-driven motives and lobbying power often overshadow food safety concerns. Smaller farms are disproportionately affected by the cost of implementing safety measures and may be pushed out of the system. Meanwhile, larger corporations may impose requirements without fully understanding their impact on the supply chain.
7. **Political and Bureaucratic Challenges:** The complex political landscape, including bureaucracy and varying stakeholder agendas, slows down the necessary changes in food safety regulations and practices. There is also a lack of coordination between agencies and industry groups.
8. **Overarching Cultural and Knowledge Barriers:** The food safety culture in the industry often prioritizes compliance over understanding actual food safety risks. This, coupled with a lack of adequate knowledge among workers and inspectors, contributes to inefficiencies and suboptimal practices.

What major policy changes might improve produce safety?

1. **Simplification of Regulations:** The current regulatory framework is seen as complex and difficult to navigate. A more streamlined approach would benefit growers and food safety efforts.
2. **One Health Approach:** Policies should adopt a One Health approach, recognizing the interconnectedness of human, animal, and environmental health in food safety.
3. **Alignment of Regulatory Agencies:** Improved collaboration between the CDC, FDA, and USDA is necessary to create a more cohesive approach to produce safety.
4. **Focus on Prevention:** Policies should prioritize prevention over reaction, including better risk management, clearer expectations for growers, and incentives for small and medium-sized farms.
5. **Improved Data Sharing and Transparency:** Creating a safer environment for sharing data between industry and regulatory bodies (e.g., the FDA) without the fear of penalties could lead to more proactive safety measures and collaboration.
6. **Support for Research and Education:** Increasing funding for research and educational outreach programs will help small farms implement best practices and adhere to safety standards.
7. **Enhanced Traceability and Testing:** The introduction of blockchain technology and better systems for tracing produce and conducting testing could improve safety and accountability throughout the supply chain.
8. **Engagement with Industry Stakeholders:** Engaging directly with growers, packers, and other industry stakeholders before, during, and after regulatory activities will ensure that policies are practical and grounded in real-world challenges.
9. **Improved Standards for Foreign Imports:** Ensuring that foreign farms meet high food safety standards is crucial for maintaining the safety of imported produce.
10. **Clarification and Flexibility in Regulations:** Clearer definitions and more flexibility in testing for foodborne pathogens, along with allowing farms to share positive test results without penalties, could help improve safety practices.
11. **Incentives and Funding:** Providing financial support, grants, and incentives for farms to adopt food safety standards, along with funding for research and outreach, will be crucial for fostering widespread adoption of best practices.
12. **Increased Collaboration with Regulatory Bodies:** Closer alignment and communication between regulatory bodies and the farming community can improve understanding and enforcement of food safety standards, benefiting both sides.
13. **Focus on Sustainable and Local Food Systems:** Policies should prioritize supporting local farms and sustainable agricultural practices, addressing inequities in food access, and promoting healthy eating.
14. **Food Safety Program Evaluations:** There is a need for continuous reviews of food safety programs to ensure they align with the latest scientific research and industry needs, and for more support to enforce compliance.
15. **Inclusive and Multilingual Resources:** Ensuring that resources and policies are accessible in multiple languages will help support a diverse farming community.

APPENDIX D: PRODUCE SAFETY WORK GROUP FRAMING DOCUMENT

Goals

The dialogue, facilitated by the Reagan-Udall Foundation for the FDA, is intended to build awareness and identify strategic opportunities to improve the safety of fresh produce and encourage greater consumption of fruits and vegetables. While the convenors propose an understanding of the problem and a theory of change, the goal is to elicit diverse views and identify common ground on fundamental changes and ongoing collaborations to better serve consumers and the produce sector.

Need for Change

Many individuals and organizations are working hard and in good faith to improve produce safety, but change is needed because:

- The nation's system as a whole is fragmented, uncoordinated, under-resourced, under-funded, and not aligned around a central strategy for making produce safer.
- Doing more of the same may not suffice to reduce foodborne illness attributed to fresh produce and foster consumer confidence unless these efforts are better coordinated and resourced.
- The production, harvest, and handling of fresh produce has become increasingly complex with extreme weather, advancing technologies, evolving consumer expectations, and globalization of trade.
- Current food safety, conservation, and other regulatory policies do not always incentivize the adoption of new approaches to growing, harvesting, packing, shipping, and storing fresh produce.

While this dialogue process will focus primarily on improving safety, a secondary benefit of this work will be to encourage greater consumption of produce as having a safe and abundant supply of produce can help increase consumer confidence and drive interest in seeking out the nutrition and health benefits of produce as part of a healthy diet.

Theory of Change

Produce safety starts on the farm, which means growers have a major role and responsibility, but growers are part of an agricultural and economic ecosystem that makes it unreasonable for growers alone to find solutions and bear costs for improvement. The lack of a "kill step" makes produce vulnerable at each supply chain point, necessitating protection at each step

In addition to regulation, progress on produce safety requires supporting growers—domestic and foreig—in the implementation of best practices by providing them:

- Clarity about best practices for minimizing, managing and verifying reduction of significant risks,
- Needed technical assistance and cultural change/mindset,
- Shared accountability and responsibility, and
- Economic incentives and support to implement science-based risk management practices.

Looking for Opportunities

The dialogue will be organized around work groups charged with addressing questions aimed at identifying opportunities for change. This is envisaged as a 3-step process:

1. **The focus of the dialogue is on Step 1—what are we trying to accomplish?**
2. Workgroups will begin to frame out **Step 2**—a strategic roadmap, which can be continued and refined through an ongoing, collaborative partnership.
3. Step 3 relates to implementation. While implementation will occur after the conclusion of the dialogue, we hope that current efforts can be connected and amplified through the dialogue process.

The three steps, in more detail are:

- What does success look like? Each workgroup will be asked to paint a picture of the ideal future related to the workgroup topic area.
- Identify the major steps, activities, resources, and changes needed to achieve success. Major changes are unlikely to happen quickly or easily, but if there is alignment on the objectives, groups should begin to frame out what it would take to reach the objectives—or develop a "roadmap".
- Develop an implementation strategy of the roadmap outlined in **Step 2**.

Produce Safety Dialogue Areas of Interest

1. Education & Training: Building technical capacity
Overarching: How can a pipeline of educated and trained individuals (at all skill levels and roles) be created to support and fulfill produce food safety needs? How many are needed? What are the most important things they need to know?

a. **Extension & Training** industry members on implementation of best practices and regulations
   i. **Lead:** Sonia Salas, Western Growers; Dr. Laura Strawn, Virginia Tech
   ii. What are current extension frameworks? What does a sufficiently funded produce safety extension system look like?
   iii. Of the multiple efforts that support training, which are most effective and is there benefit to coordination?
   iv. What depth of knowledge is needed for owners/executives, vs. those with produce safety responsibilities, vs. workers?
   v. What are the best ways to convey and implement this information? What are current negative behaviors? How can behavior change be assessed? What is the most important behavior change that is needed?
   vi. What are the key misconceptions that need to be corrected?
   vii. What role does Extension play. What role should Extension play?
   viii. How can ALL growers (including those exempt from the PSR, traditionally underserved, etc.) be motivated to implement practices, regardless of size?
   ix. What is the appropriate balance of effort/ resources between growers, processors, and others in the supply chain when it comes to technical assistance and training?

2. **Ongoing Govt/Private Sector/Non-Profit collaboration**
    a. **Overarching:** What would be the goals of a collaboration and what would need to be accomplished to determine that it was no longer needed?
    b. **Lead:** Susan Winckler, Reagan-Udall Foundation
    c. Is there a need for sustained, managed collaboration body?
    d. What should be its goals? Who should be involved in determining them?
    e. What form should it take?
    f. How should it be funded?
    g. Who should be involved? How formal is the process?
    h. What are some examples of effective collaborations?
3. **Produce Safety Research Needs: Solving problems**
    a. **Overarching:** What does an adequately funded produce safety research program look like and how is success measured?
    b. **Lead:** Dr. Michelle Danyluk, University of Florida; Dr. Don Stoeckel, Cornell University
    c. How and who should determine research priorities?
    d. How can research priorities remain nimble and responsive to changing industry needs and evolving science?
    e. How should produce safety research inform best practices? How can a prevention-focused research agenda impact produce safety?
    f. How can we ensure that research dollars are available for regional and local food safety challenges?
    g. How can we assure that research activities address priority produce safety knowledge gaps, support the improvement of science-based standards, and/or provide pragmatic prevention solutions for use by the fresh produce supply chain?
    h. What role should USDA play in research vs. other federal agencies?
    i. What's the appropriate balance between publicly vs. privately (industry) funded research?
    j. How do we encourage researchers, scientists, and industry members to be involved in produce safety research (including new professionals, multi-disciplinary scientists, researchers at state and federal agencies, etc.)?
    k. How can existing resources be better utilized?
    l. How can we stimulate "out-of-the-box" approaches to innovative research and development in the produce safety space. How can we better understand the economic incentives of innovation in the produce safety space and thus the ROI of innovation?
4. **Industry-Regulatory Collaboration**
    a. **Overarching:** What does a productive, collaborative relationship between regulators and industry look like?
    b. **Lead:** Natalie Dyenson, International Fresh Produce Association & Joe Reardon, National Association of State Departments of Agriculture
    c. What produce safety progress is possible through implementation of FSMA rules that are applicable to the produce industry?
    d. How can the FDA improve use of its regulatory tools?
    e. How can the FDA contribute to prevention of illness beyond use of its regulatory tools?

f. How should the FDA use its expertise and standing to support voluntary grower adoption of best practices?

g. What opportunities exist for the FDA to improve collaboration with growers? Processors? Retailers? Others?

h. What data should be collected and shared to improve produce safety? What barriers exist to data sharing and other forms of the FDA collaboration with industry?

i. What proactive and transparent policies and processes might enable and incentivize data sharing collaborative forums?

j. What roles should states play in produce safety? Local, tribal, territorial? What resources do they need?

k. How can states be best positioned as the front-line resource for prevention?

l. How should the state roles be meshed with the FDA's role?

5. Policy & Economic Opportunities

a. **Overarching:** If improved safety of fresh produce is good for public health (lack of illness, and promotion of health resulting from increased consumption), what public policy mechanisms exist, could be adapted, or need to be created that support, incentivize, and motivate improvements to produce safety?

b. **Lead:** Dr. De Ann Davis, Western Growers, Connor Kippe, National Sustainable Agriculture Coalition

c. What would it take to fund produce safety initiatives through the Farm Bill?

   i. What key diet and health related issues (talking points) support this?

   ii. What alliances are needed to support this?

   iii. What Farm Bill programs are desirable?

      1. Subsidies?

      2. Reimbursement for infrastructure upgrades (equipment, location/land use, buildings, etc.)?

      3. Training and extension?

d. What public health leadership role can the FDA play within the federal government?

e. How should the FDA link its nutrition and produce safety roles?

f. Should the USDA play a role in subsidizing or incentivizing One Health solutions related to animal proximity, investment in water technology and infrastructure, or other risk prevention interventions?

g. What are the state funding needs and what are they needed for?

h. How can the FDA funding be made sustainable?

i. What other policies changes/advances are needed to support fresh produce safety at the federal level, such as under One Health? Water Resource Management?

6. One Health/The Agricultural Ecosystem

a. **Overarching:** Produce is not grown in isolation; environmental factors sometimes outside a growers control influence the risk to the product. The interrelationship between different forms of agriculture are increasingly recognized; how can they coexist in a way that is fair and enables all forms of agriculture to thrive?

b. **Lead:** Joelle Mosso, Western Growers, Natalie Krout-Greenberg, CDFA, Connor Kippe, NSAC

c. What existing efforts have been successful in focusing on One Health and its impact on produce safety? How can these successful programs be sustained or improved?

d. Of the key areas addressed by the One Health approach [i.) prevention of zoonotic diseases in animals and people, ii.) improvement of food safety and security, iii.) reduction of antimicrobial-resistant infections,

iv.) protection of global health, and v.) protecting biodiversity and conversation], which approaches might show the greatest promise for addressing produce safety risks?

e. Once these approaches are proposed, what is needed to support both their immediate and sustained implementation?

7. Buyer-Supplier Collaboration for Produce Safety

a. **Overarching:** How can the influence of buyers be used to drive the adoption of produce safety best practices in a way that is based on science, grounded in practicality, and financially equitable?

b. **Lead:** Mike Taylor, STOP Foodborne Illness

c. What responsibility do buyers have for the safety of fresh produce beyond management of their own supply chains?

d. What role can buyers play in promoting best practices through harmonization of purchase specifications?

e. What change is needed to enhance the effectiveness of audits in verifying implementation of risk-based best practices? How can audit fatigue be minimized?

f. Who should pay for private audits? Who should conduct them?

g. How can the data collected by buyers be applied to help to understand priorities for produce safety?

h. How do we assure that buyers have a sustained stake in continuous improvement?

8. **Imports**

a. **Overarching:** what are the key components in effecting a safe global produce supply chain and how is this verified?

b. **Lead:** Dr. Gustavo Reyes, Western Growers

c. How can imported produce be held to the same produce standards as domestic produce to ensure consistency and safety? What is the current process in place to achieve this?

d. How do we assure foreign growers/packers/processors adopt and implement best practices?

   i. How can these be developed to consider regional and cultural differences?

e. Are there any challenges or limitations in these standards that could hinder their application both overseas and domestically?

f. What structures already exist for food safety training and outreach outside the US, and how effective are they? Are there successful models that could be replicated?

g. What is the role of foreign governments and how can they best be engaged?

Overarching Questions

Each work group should consider the following questions as they develop a vision for the ideal state relative to their issue area.

WHY are produce related foodborne illness outbreaks and recalls occurring?

Context: Produce is often eaten raw with no kill step to eliminate harmful human pathogens. Fruits and vegetables are also grown in the environment (whether indoor or outdoor) and exposed to a number of biological, physical, and chemical hazards which can present food safety risks.

Work Group Charge: Discuss the following in context of your work group's focus area:

- Are there fundamental food safety failures that exist which have not been fully addressed? If so, what might be needed to overcome the challenge(s) (e.g., additional research, capital to invest in food safety improvements, education, etc.)?
- Is current policy and process contributing to outbreaks and/or reducing the industry's ability to address food safety failures?
- Are current investigative processes (by industry and/or regulatory agencies) helping to identify the root cause of produce safety outbreaks? What is working well and what can be improved?
- What role does root cause analysis play in making produce safer and reducing future foodborne illness outbreaks? How can root cause analysis be improved or better leveraged by government (investigators), researchers, and industry?

WHO has a responsibility for produce safety?

Context: There are many individuals throughout the supply chain who have varying levels (direct or indirect) of responsibility for keeping produce safe. Examples include growers, processors, packers, retailers, food service, distributors, importers, state and federal regulators, government professionals (non-regulatory), researchers, educators, consultants, auditors, compost/fertilizer producers, chemical suppliers, technology providers, laboratories, animal ranchers/producers, nutritionists/dieticians, consumers, and others.

Work Group Charge: For the responsible individuals/organizations relevant to your work group, discuss the following:

- Have the individuals responsible for produce safety been sufficiently engaged? If not, how can they be engaged?
- Are there current barriers or knowledge gaps for those responsible for produce safety to do their jobs well?
- Is there an imbalance of responsibility? If so, is there opportunity to rebalance the spectrum of responsibility?

WHAT are the best practices?

Context: In fresh produce, there is no one size fits all approach to food safety. There's also an assumption that steps to make produce safer are known—but are they? How can a public-private partnership strengthen and/or develop practical and effective best practices that are supported by science?

Work Group Charge: Discuss the following in context of your work group's focus area:

- What best practices are practical? Are they economical? Are they effective? Are they adaptable (for various regions and environments)?
- Are the risks fully understood? Who gets to decide on the best practices? What are the tradeoffs?
- What does the research say (if it exists)? What research is still needed to develop and implement best practices?
  - How much money has been invested in produce safety over the last 5, 10, 15 years across the industry? Have the outcomes matched the investment? What additional funding might be necessary to achieve produce safety goals? Are current funding streams and mechanisms working? If not, how can they be improved?
- How do we keep the best practices current and relevant?
  - What is the relationship between established best practices and safe harbors (e.g., the canal water in Yuma where the outbreak strain was found passed generic E. coli tests outlined in the PSR at the time)?
- What funding might be necessary to support their development and keeping them up-to-date?

HOW can we get people to implement the best practices?

Context: There are several motivators for implementing produce safety practices including regulations, personal commitment to safer produce, market access, reduction of liability, receiving higher prices, among other considerations. These may be influenced by intrinsic and extrinsic factors.

Work Group Charge: Discuss the following within context of your work group's focus area:

- What funding might be necessary to support implementation?
- What education might be necessary to support implementation?
  - How do we reach the people who need it?
  - How do we recognize if something isn't working or if something changes, and what to do about it?
- How do buyer requirements influence implementation?
- What other motivators influence implementation? (personal, legal, reputational, consumer pressure)
  - How can these be leveraged or challenges overcome?
- How is implementation verified?
  - Regulation, audits, other? Are these mechanisms of verification working?
- If practices are implemented and an outbreak/recall still occurs, then what?
  - Are there safe harbors? What is the view on residual risk? Penalties?
  - Revise best practices?
  - More/better outreach and education?
  - How can key learnings/data/information be synthesized and shared without repercussions (non-punitive actions)?

WHEN will we achieve safer produce and what does that look like in 2, 5, 10, or 20 years?

Context: The field of produce safety is relatively new and continually evolving. Science, policy, and communication have shaped where the industry is now—but that has evolved over several decades.

Work Group Charge: Discuss the following in context of your work group's focus:

- What major produce safety challenges/priorities need addressed in the next 2, 5, 10, and 20 years?
- What does a successful public-private partnership look like at its' inception and at its' fully functional capacity? How can it be sustained in a way that supports industry in perpetuity?
- What future technologies and scientific applications are on the horizon that show promise to improving the safety of fresh produce?

APPENDIX E: APRIL 24, 2025 MEETING AGENDA

9:30 AM	**Welcome** Susan C. Winckler, RPh, Esq., Chief Executive Officer, Reagan-Udall Foundation for the FDA
9:35 AM	**Opening Remarks** Erik Mettler, MPA, MPH, Assistant Commissioner, Office of Integrated Food Safety Systems Partnerships
9:45 AM	**Building a Roadmap to Success in Produce Safety** Jennifer McEntire, PhD, Reagan-Udall Foundation; Founder, Food Safety Strategy, LLC
10:00 AM	**Our Produce Dialogue Process** Gretchen Wall, MS, Reagan-Udall Foundation for the FDA; Sr. Director, Food Safety Strategy, LLC Perpetue Backer, PhD, Reagan-Udall Foundation for the FDA; Regulatory Sci. & Innovation Fellow
10:20 AM	**Work Group Key Take-Aways**
11:15 AM	**Discussion & Q&A**
11:50 AM	**Afternoon Workplan & Breakout Assignments**
12:00 PM	**LUNCH**
1:00 PM	**Breakout Sessions: Identification of Additional Activities**
1:45 PM	**Report Out of Breakout Sessions**
2:15 PM	**Selecting Priorities – Voting Exercise**
2:30 PM	**BREAK**
2:45 PM	**Group Discussion**
4:30 PM	**Next Steps and Adjourn**

APPENDIX F: ALLIANCE, BUILD-OWN-OPERATE, AND JOINT VENTURE MODELS

	ALLIANCE	BOO (BUILD-OWN-OPERATE)	JOINT VENTURE (JV)
Definition	A collaborative framework where stakeholders share risks, rewards, and decision-making without forming a new legal entity. The key to the alliance model is the sharing among the parties, rather than the division between them, of the risks and responsibilities connected to the execution of the project.	A private entity finances, builds, owns, and operates an asset indefinitely.	A business arrangement in which two or more parties agree to pool their resources for the purpose of accomplishing a specific task. Each of the participants in a joint venture is responsible for profits, losses, and costs associated with it. However, the venture is its own entity, separate from the participants' other business interests.
How It Is Activated	1. **Need Identification and Assessment:** Governments/organizations identify complex challenges with a shared goal. 2. **Stakeholder Engagement:** Collaborative discussions to define objectives and partner roles. 3. **Framework Development and Formalize partnership:** Define goals, governance, and risk-sharing. Outline partnership responsibilities. 4. **Funding & Resource Allocation:** Budget contributions from multiple stakeholders are determined. 5. **Execution & Continuous Monitoring:** Partners work collaboratively on project objectives. Project reviewed periodically, with flexibility for adjustment.	1. **Need Identification and Assessment:** Government or private sector identifies service needs. 2. **Regulatory Review:** Ensure alignment with local laws and policies. 3. **Bidding Process:** Private firms submit proposals and secure financing and investment. 4. **Contract Signing:** Risk allocation, funding, and revenue model defined. 5. **Implementation & Operation:** Private entity builds and manages the asset. 6. **Revenue Generation & Monitoring:** Funds recovered via fees or contracts.	1. **Need Identification and Assessment:** Two or more parties identify a joint business goal for mutual growth. 2. **Stakeholder Selection:** Potential partners assess each other's capabilities, risks, and goals. Define roles, decision-making processes, and governance. 3. **Legal & Financial Structuring:** Create a separate entity with shared equity. 4. **Funding & Resource Allocation:** Partners provide funds, expertise, or assets.
Governance Body	A designated group of representatives from each partner company responsible for overseeing the alliance, making key decisions, and resolving disputes. A three-layer system, where each of the partners is represented on the executive steering committee, governance board and in the project teams.	Private sector-led governance with regulatory oversight from the government. Typically managed by a board of directors appointed by the private entity. Independent auditors and compliance teams ensure regulatory adherence.	Managed by a board of directors representing all partners. Typically established through a detailed legal contract and involving a board of directors with representatives from each partner, where decision-making power is distributed based on their ownership stake in the venture.

	ALLIANCE	BOO (BUILD-OWN-OPERATE)	JOINT VENTURE (JV)
Ecosystem: Who is Involved?	• Government agencies • Private sector partners • Academic institution • Non-government organizations & civil society groups • Multilateral organizations	• Government (as regulator/contract provider) • Private sector investors • Financial institutions (lenders or investors) • End-users (who pay fees for services)	• Corporate entities or businesses • Investors provide capital. • Industry specialists providing expertise • Government (if public-private joint venture)
Key Characteristics for Success	1. **Common Vision with Alignment:** Shared objectives with clear stakeholder roles. 2. **Flexible Governance Model:** Adaptability to changing circumstances. 3. **Transparent Risk & Reward Sharing:** Collaborative management approach. 4. **Stakeholder Engagement:** Inclusive decision-making. 5. **Long-term Performance Monitoring:** Data-driven evaluation. 6. **Risk Allocation:** Risks are shared and managed collaboratively.	1. **Clear Contractual Agreements:** Well-defined ownership, risks, and revenue mechanisms. 2. **Financial Sustainability:** Long-term funding and revenue model. 3. **Risk Allocation:** Private entity assumes most risks (e.g., construction, financing, operation) 4. **Regulatory Compliance:** Adherence to public policies. 5. **Operational Efficiency:** Performance-based monitoring. 6. **Public Acceptance:** Ensuring affordability and accessibility.	1. **Clear Governance Structure:** Defined roles, responsibilities, and control mechanisms. 2. **Equal Financial & Risk Sharing:** Investment proportional to equity stakes. 3. **Efficient Decision-Making:** Transparent and agile management. 4. **Defined Exit Strategy:** Clear dissolution or expansion plans. 5. **Risk Allocation:** Risk allocation is based on the ownership and agreement structure.

APPENDIX G: ONE HEALTH/THE AGRICULTURAL ECOSYSTEM ADDENDUM

Examples of where a private-public partnership could be effective for One Health/Ag Ecosystems work include:

1. **Driving Stakeholder Engagement and Public Awareness**
    - Industry, Government, and Consumer Engagement and Trust Building: When entities work together transparently, it fosters trust and accountability in food safety measures. Examples of current efforts that foster advancing produce safety through a One Health lens include:
        - Healthy People 2030—The Healthy People initiative is designed to guide national health promotion and disease prevention efforts to improve the health of the nation. Released by HHS every decade since 1980, Healthy People identifies science-based objectives with targets to monitor progress and motivate and focus action. In 2023, Healthy People 2030 members indicated the desire to create a new work group focused on One Health and its impact on food safety through the interaction of plants, animals, and humans. As such, the One Health Work Group made its own independent effort to broaden its scope, while still focusing on areas of importance such as produce and *Escherichia coli* (*E. coli*) O157:H7.
        - USDA and FDA Farm to Fork meeting—The first Farm to Fork meeting was held in May 2024 near Washington, D.C., during which the USDA and FDA brought together academic, industry, and agency individuals working on multiple food safety research projects, including potential food safety innovations for poultry, cattle, and leafy greens. The conference focused on several studies already in progress, the outcome of the meeting was that much more research is needed to understand Shiga toxin-producing *E. coli* (STEC) transference and survivability in the environment.
        - California Agricultural Neighbors—California Agricultural Neighbors was established in 2021 in response to continued outbreaks of pathogenic *E. coli* O157:H7 associated with leafy greens in the California coastal region. The California Department of Food and Agriculture and the Monterey County Farm Bureau have led efforts to foster collaboration and discussion to protect public health through efforts shared among the production, processing, retail industry, agricultural industry, and regulatory entities.
        - Desert Food Safety Coalition—The purpose of the Desert Food Safety Coalition is to bring together area agricultural industry groups to further collaborate on the subject of food safety in the desert southwest.
        - Other examples include: Imperial Valley Collaboration, and the Sustainable Alliance for Food Ecosystems (SAFE) Think Tank, discussed in greater detail below.
- Consumer Education Campaigns: Partnerships can promote food safety awareness through public service announcements, digital platforms, and community outreach.

2. **Enhancing Food Safety Standards and Compliance**
    - Collaboration on Regulations: Governments can work with private sector stakeholders to develop and refine food safety regulations (and non-regulatory standards), ensuring they are practical, science-based, and enforceable.
    - Standardized Best Practices: Industry leaders can contribute expertise in food safety protocols, while public agencies ensure compliance and accountability. Examples of current efforts that foster advancing produce safety include:

  - California and Arizona Leafy Greens Marketing Agreement—California and Arizona farmers made an unprecedented commitment to protecting public health through the creation of the California and Arizona Leafy Green Products Handler Marketing Agreement (LGMA). The program's goal is to assure safe leafy greens and confidence in our food safety programs. At the heart of LGMA is a set of food safety practices that are implemented on leafy greens farms throughout the states. Working collaboratively with university and industry scientists, food safety experts, government officials, farmers, shippers and processors, the LGMA created this unique and rigorous science-based food safety system that protects public health by reducing potential sources of contamination and establishes a culture of food safety on the farm.
  - LGMA Test and Learn program—The CA LGMA has initiated a two-year food safety study called "Romaine Test & Learn." This program aims to gather and analyze pathogen test data for romaine lettuce, including both pre-harvest and post-harvest testing. The study was approved unanimously by the CA LGMA Advisory Board and is designed to enhance food safety practices within the CA LGMA.

3. **Expanding Resources, Data Sharing, and Encouraging Innovation and Continuous Improvement**
   - Investment in Technology and Training: Public-private partnerships can fund food safety research, inspection technologies, and workforce training programs.
   - Improved Data Sharing: Private sector data aggregation and sharing can enhance a greater understanding of the current state of an operation and improve future progress. The future vision being that predictive analytics can help prevent food safety incidents before they occur.
   - Supporting Research & Development: Public-private partnerships, through funding, research, innovation, and expertise, can drive advancements in food safety, contamination detection, and future sustainability).
   - Adopting One Health/Agriculture Ecosystem Best Practices: Diverse partnerships and scientific expertise can help align food safety standards that have long-term benefits for public health and agriculture economics (sustainability of a domestic food supply). Examples of current efforts that foster advancing produce safety include:
     - Western Growers GreenLink® Data-Sharing Platform: A confidential platform developed to support food safety by streamlining data collection and sharing among growers and industry stakeholders. It transforms raw data into visual dashboards, facilitating risk-based decision-making and fostering collaboration within the industry. There are two programs functioning on the platform, including CA LGMA's Romaine Test & Learn Program, and additional programs in development.
     - Data Standardization Efforts: Recognizing the challenges posed by inconsistent data formats, Western Growers established the Data Standardization Work Group. This group comprises academic experts and data scientists working to harmonize data across the fresh produce industry, ensuring more accurate analytics and insights.
     - Center for Produce Safety (CPS)—CPS brings together diverse leaders to work collectively toward the common goal of enhancing fresh produce food safety. The many and varied organizations that fund CPS are leaders in fresh produce food safety. These include: the fresh produce supply chain, including growers, packers, processors, retailers, food service, and industry suppliers and service providers and governments of major specialty crop-producing states who supply Specialty Crop Block Grant funds, including California, Washington, Florida, and Texas.
     - Longitudinal Studies—Delmarva, Southwest Longitudinal Study (SWLS), and California Longitudinal Study (CALS): Understanding which environmental factors are favorable to the presence or spread of foodborne pathogens in growing areas is important to achieving food safety. These studies enable regulatory officials and industry groups to refine guidance on best practices for growers, so they may

continually improve the safety of their products. These three studies were designed to improve understanding of the environmental factors that may impact the presence of foodborne pathogens in the agricultural region.

– Sustainable Alliance for Food Ecosystems: The SAFE Think Tank serves as a collaborative group of experts focused on One Health solutions for agriculture. In recent years, concerns have emerged surrounding the interactions within food ecosystems and the potential for environmental pathogen transport. The mission of SAFE is to develop helpful, sustainable solutions and resources for food producers that work across the spectrum of agricultural ecosystems. Thus, the objective for SAFE is to bring together subject matter experts in government, industry, and academia as a collaborative think tank to help identify research gaps, develop project approaches, and ideate potential partnerships and funding opportunities that respect agricultural production and public health.

APPENDIX H: PRODUCE SAFETY RESEARCH ADDENDUM

Responses from 10 one-on-one interviews and one written response were summarized to capture areas of consensus as well as differing opinions among participants. Work group outputs in this document were based on the discussion summarized in this Appendix, as well as follow-up meetings and interactions with work group members.

How and who should determine research priorities?	
Consensus	• Collaborative effort by industry representatives, researchers, trade associations, and government agencies • Balance practical needs and scientific advancements
Differing Opinions	• Strong role for industry-established priorities – Direct involvement in day-to-day operations • Alternate view: Equal input from academia and government – Avoid bias and ensure comprehensive coverage of issues
How can research priorities remain nimble and responsive to changing industry needs and evolving science?	
Consensus	• Flexibility in research funding and project scopes during execution of funded research • Mechanisms, such as rapid response grants and rolling submissions, for emerging issues
Differing Opinions	• Broad priority areas allow researchers freedom • Alternate view: Specific scope with stable long-term support – Research program evolution and freedom to explore
How should produce safety research inform best practices? How can a prevention focused research agenda impact produce safety?	
Consensus	• Provide actionable insights, translate into best practices • Ability to identify and mitigate risks before issues emerge
Differing Opinions	• Not all research needs to directly inform best practices – Fundamental research is also essential • Complementary view: Some research must have clear, practical applications for adoption

How can we ensure that research dollars are available for regional and local food safety challenges?	
Consensus	• Diversification of funding sources: State and local government support, industry initiatives, and federal grants
Differing Opinions	• Federal funding promotes consistency • Alternate view: Industry investment can prioritize local needs
How can we assure that research activities address priority produce safety knowledge gaps, support the improvement of science-based standards, and/or provide pragmatic prevention solutions for use by the fresh produce supply chain?	
Consensus	• Communication and collaboration is key • Reviews and updates of research priorities for relevance – Based on current/emerging data and industry feedback
Differing Opinions	• Pro and con: Structured oversight and accountability to an umbrella/governing organization – Alignment of funded research with knowledge gaps – Incentivization for delivery of practical solutions
What role should USDA play in research compared to other federal agencies?	
Consensus	• USDA should play a leading role – Leveraging its expertise and resources in agricultural research • Other federal agencies collaborations to cover all aspects of produce safety – CDC and the FDA, along with the National Oceanic and Atmospheric Administration, Department of Defense, National Institute of Health, and others
Differing Opinions	• USDA research focus on longer-term basic research challenges • Alternate view: USDA should promote applied research that supports industry directly
What's the appropriate balance between publicly versus privately (industry) funded research?	
Consensus	• Balance is necessary – Ensures a broad range of perspectives and resources
Differing Opinions	• Varied input on appropriate balance – More public funding to reduce industry bias – Industry investment to ensure practical relevance
How do we encourage researchers, scientists, and industry members to be involved in produce safety research (including new professionals, multidisciplinary scientists, researchers at state and federal agencies)?	
Consensus	• Foster collaboration to attract and retain talent – Funding opportunities – Platforms for knowledge exchange
Differing Opinions	• Targeted training programs, research stipends • Alternate view: Broad outreach and engagement
How can existing resources be better utilized?	
Consensus	• Better coordination and collaboration • Data sharing, stable infrastructure, and connecting expertise

Differing Opinions	• Best specific structure • Centralized control and oversight • Decentralized, flexible structure that leverages local strengths
How can we stimulate "out-of-the-box" approaches to innovative research and development in the produce safety space? How can we better understand the economic incentives of innovation in the produce safety space and thus the return on investment (ROI) of innovation?	
Consensus	• Encourage *interdisciplinary* research – Seed funding for innovative ideas – Foster a culture of creativity • Demonstrate that change in practices will yield ROI
Differing Opinions	• Specific approaches • Structured programs • Flexibility and risk-taking
Characteristics of a perfect produce safety research system:	
• Oversight – Priority Setting: Industry, academia, government, other – Accountability: Align research with priority gaps, deliver practical solutions • Collaboration – Communication: Regular interaction, data sharing among researchers, industry, and regulatory bodies – Innovation: Interdisciplinary research, dedicated support innovative ideas • Funding – Stable Sources: Balance public and private funding – Flexible Allocation: Rapid response grants, and rolling submissions to RFPs	

Relevant Outputs: Link research to clear, practical insights for best practices and prevention strategies.

APPENDIX I: POLICY & ECONOMIC OPPORTUNITIES WORK GROUP ADDENDUM

Fresh Produce Food Safety "Marshall Plan"

	DATA INFRASTRUCTURE	FOOD SAFETY INFRASTRUCTURE	AGRICULTURAL WATER	FDA PUBLIC HEALTH ADVOCACY
Need	**Digital infrastructure to support food safety**	**Grant or low-interest loan programs to address food safety investments in fresh produce growing, packing, and processing operations**	**National strategy to address the infrastructure and microbiological quality of the nation's agricultural water supply**	**Leadership in both fresh produce safety and the important role fresh produce plays in diet**
Recommendation	1. Improve FDA capabilities to receive, manage, analyze, and utilize a wide variety of data from fresh produce growers (domestic and imported). *Requires funding.* 2. Build private-public partnerships in data-sharing to allow for better use of government resources, understanding of food safety trends, risks, and faster resolution of food safety events. 3. Facilitate broad access to the FDA and USDA public datasets. 4. Within the produce industry, promote data standardization and data science capacity-building, including technology access and technical support, and education and outreach to promote engagement. *Requires funding.* 5. Promote academic research in the application of data science to improve food safety, land utilization, and grower resource management. *Requires funding.*	1. Provide funding sources for growers to make needed improvements within a fresh produce operation (to achieve food safety and efficiency improvements) *Requires funding.* 2. Provide funding sources for food safety infrastructure solutions necessary to address shared resources for mixed agricultural regions (e.g., roadways, wildlife fencing, dust abatement). *Requires funding.* 3. Programs should be based on risk reduction and management gains for food safety; farm income should not be a consideration.	1. Enact a national cross-agency strategy that addresses the microbiological quality of agricultural water before the farm gate or assists the grower in improved management on the farm. 2. Fund cost abatement or refund programs to address expenses and expertise related to management of microbiological quality of agricultural water on the farm. *Requires funding.* 3. Fund research and innovation programs that address improvements in microbiological quality of agricultural water prior to or during irrigation events to reduce reliance on costly chemical water treatment, address concerns related to long-term impact on soil health, and minimize worker safety concerns. *Requires funding.*	1. Focus beyond implementation of the Produce Safety Rule (PSR) to systems that are prevention-focused versus compliance-focused outcomes. 2. Invest in cross-agency foodborne illness outbreak investigations that assure rapid identification of source, actionable resolution and dissemination of lessons learned, and associated data. 3. Work with industry to understand best practices, support implementation, verification, and validation strategies. 4. Ensure effective education and outreach programs through strong and consistent state CAP funding and CAP support all domestic growers (even those not under PSR). 5. Address the impact of pathogen zero tolerance policy, establish risk tolerance levels. 6. Resolve disincentives to pathogen testing to assure the right food safety outcomes. 7. Address policy and internal practices that are barriers to data-sharing and/or public data access. 8. Convene advisory boards and committees to support stakeholder engagement.

	RESEARCH AND USDA SUPPORT	GOVERNMENT STRUCTURE "SINGLE FOOD (SAFETY) AGENCY"	FARM BILL
Need		**Achieve a coordinated and systematic government approach to fresh produce**	
Recommendation	1. Assure the highest priority food safety research is being funded through implementation of a transparent interagency process led by the FDA and include a multidisciplinary advisory committee, such as NIH's. *Requires Funding.* 2. Adjust National Institute of Food and Agriculture's funding model to include the following: • expansion of vision to include public health • allowing for project continuity greater than 5 years. a. More accommodation for specialty crops, including farm size, broader crop inclusions, iterative research, and more focus on the understanding of foodborne illness. 3. Assure synchronization across the existing research and support mechanisms (e.g., grants, Extension) via an oversight mechanism.	1. Improvements in food safety for fresh produce can be best achieved through a revised government structure that achieves the following: • assure outcome-based implementation of PSR (beyond compliance) and focus on prevention of illness • focus on "Farm to Fork" safety, inclusive of full supply chain • achieves goals on risk assessment, management, and reduction • support public health advocacy for food safety, domestic production through consumption and access • improves agency budget priority within context of HHS Secretary's portfolio. • nimble responsiveness to food safety events, natural disasters, changes in science, other domestic production needs or improvements in import protections	1. Develop programs to address graduate level training gaps in food safety (e.g., National Needs Fellows) 2. Address loss of extension funding and extension resources

APPENDIX J: ACRONYMS

ACRONYM	FULL NAME DESCRIPTION
CAN	California Agricultural Neighbors
CDC	Centers for Disease Control and Prevention
CAP	Cooperative Agreement Program (Produce Safety)
CDFA	California Department of Food and Agriculture
CFR	Code of Federal Regulations
CPS	Center for Produce Safety
DFSC	Desert Food Safety Coalition
FBIA	Food and Beverage Issues Alliance
FDA	Food and Drug Administration
FSPCA	Food Safety Preventive Controls Alliance
FSIS	Food Safety and Inspection Service (USDA)
FSMA	Food Safety Modernization Act
FSOP	Food Safety Outreach Programs (USDA NIFA)
FTE	Full-Time Equivalent
GFSI	Global Food Safety Initiative
GAP	Good Agricultural Practices
HACCP	Hazard Analysis and Critical Control Points
HHS	U.S. Department of Health and Human Services
HP2030	Healthy People 2030 (initiative)
IFPA	International Fresh Produce Association
KPI	Key Performance Indicator
LGMA	Leafy Greens Marketing Agreement
MAHA	Make America Healthy Again
MCFB	Monterey County Farm Bureau
NASDA	National Association of State Departments of Agriculture
NCBI	National Center for Biotechnology Information
NIFA	National Institute of Food and Agriculture (USDA)

ACRONYM	FULL NAME DESCRIPTION
NIH	National Institutes of Health
OFRR	On-Farm Readiness Review
PFAS	Per- and polyfluoroalkyl substances
PFSE	Partnership for Food Safety Education
PPP	Public-Private Partnership
PSA	Produce Safety Alliance
PSR	Produce Safety Rule (under FSMA)
RFP	Request for Proposals
RUF	Reagan-Udall Foundation for the FDA
SAFE	Sustainable Alliance for Food Ecosystems
SOAR	Strengths, Opportunities, Aspirations, Results (analysis framework)
SSA	Sprout Safety Alliance
SSC	Sustainably-Funded Stakeholder Collaboration
STEC	Shiga toxin-producing *Escherichia coli*
STOP	STOP Foodborne Illness (advocacy group)
USDA	United States Department of Agriculture
WGS	Whole Genome Sequencing

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