# Master of Public Health

# Applied Practice Experience

***Advancing Safety through Collaboration: Developing Public Health Education in Research and Laboratory Safety for Campus, Government, and Industry***

by

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submitted in partial fulfillment of the requirements for the degree

MASTER OF PUBLIC HEALTH

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# Chapter 1 - Portfolio Products

The Applied Practice Experience (APE) was completed with the Department of Environmental Health and Safety (EHS) at Kansas State University. The goal of the APE was to develop training and educational programs in Research and Laboratory Safety for the Kansas State University enterprise and a global audience of learners to foster a positive, proactive culture of safety, and to create a platform for achieving research and laboratory safety goals at other institutions.

Portfolio products detailed in Table 1.1 provide a summary of achievements during the APE across Master of Public Health (MPH) Foundational and Emphasis Area Competencies. Table 1.2 aligns each portfolio product to MPH Foundational Competencies. The portfolio products are attached as appendices to the Integrated Learning Experience (ILE) Final Report.

## Table 1.1 Summary of Portfolio Products

| **Portfolio Product** | | **Description** |
|---|---|---|
| 1 | Event Summaries and Metrics for Lab Safety Awareness Week, Biosafety and Biosecurity Summit, and Research Safety Bootcamp | Report of event summaries and metrics, including total event attendance, presentation metrics, training metrics, partnerships, and collaborations. |
| 2 | Post-event mixed-methods survey for safety education and training events. | Designed and implemented a mixed-methods post-event survey for feedback and continuous improvement efforts of university safety education and training programs. |
| 3 | Academic Innovation Fund Proposal Application for Safety Education Credentials – initial and full proposals (CEs, Microcredentials, Undergraduate and Graduate Certificate Programs) | Academic Innovation Fund initial and full proposals for the 2024 – 2025 funding cycle for Safety Education Credentials. |
| 4 | Incident and Near-Miss Analysis Report | Conducted a detailed analysis of lab-related incidents and near-misses to identify trends and inform targeted interventions. Findings were used to refine |

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| | | future training content and improve safety outcomes across the university. |

## Table 1.2 Portfolio Products and Competency Addressed

| Portfolio Product | | Number and Competency Addressed | |
|---|---|---|---|
| 1 | Biannual event metrics: attendance, training, partnerships, and collaborations. | 2 | Select quantitative and qualitative data collection methods appropriate for a given public health context |
| | | 9 | Design a population-based policy, program, project, or intervention |
| | | 11 | Select methods to evaluate public health programs |
| | | 13 | Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes |
| | | 16 | Apply leadership and/or management principles to address a relevant issue |
| | | 21 | Integrate perspectives from other sectors and/or professions to promote and advance population health |
| 2 | Mixed Methods Post-Event Surveys for Biannual Events | 2 | Select quantitative and qualitative data collection methods appropriate for a given public health context |
| 3 | Academic Innovation Fund Proposals: initial and full proposal | 10 | Explain basic principles and tools of budget and resource management |
| | | 13 | Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes |
| | | 18 | Select communication strategies for different audiences and sectors |
| | | 21 | Integrate perspectives from other sectors and/or professions to promote and advance population health |
| 4 | Design and instruction of the Research Safety 101 Course: Research Safety Bootcamp February 2025 | 19 | Communicate audience-appropriate (i.e., non-academic, non-peer audience) public health content, both in writing and through oral presentation |
| 5 | Campus Lab-Related Incident and Near-Miss Analysis Summary (2023 and 2024) | 1 | Apply epidemiological methods to the breadth of setting and situations in public health practice |
| | | 3 | Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate |

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| | | 4 | Interpret results of data analysis for public health research, policy, or practice |

# Chapter 2 - Competencies

The Master of Public Health (MPH) program at Kansas State University is guided by 22 foundational competencies across seven major topic areas. Foundational competencies cover topics in evidence-based approaches to public health, public health and health care systems, planning and management to promote health, policy in public health, leadership, communication, interprofessional practice, and systems thinking. MPH core coursework, including MPH 701 “Biostatistics”, MPH 720 “Administration of Health Care Organizations”, MPH 754 “Epidemiology”, MPH 802 “Environmental Health”, and MPH 818 “Social and Behavioral Basis of Public Health” collectively provide instruction across all 22 foundational competencies. All MPH program students must complete these five core courses. Table 2.2 provides the full list of foundational MPH competencies and alignment of core courses to each competency.

## Table 2.1 Summary of MPH Foundational Competencies

| **Number and Competency** | | **Description** |
|---|---|---|
| 2 | Select quantitative and qualitative data collection methods appropriate for a given public health context | Administered a mixed-methods (quantitative and qualitative) post-event survey for biannual safety education and training events<br><br>Collected quantitative event data, including presentation, attendance, partnership, and training metrics |
| 9 | Design a population-based policy, program, project, or intervention | Established biannual safety education and training hybrid events at Kansas State University for the campus and global community |
| 10 | Explain basic principles and tools of budget and resource management | Submission of two funding proposals, including an initial and full proposal to the Kansas State University Academic Innovation Fund for proposed safety education credentials |
| 19 | Communicate audience-appropriate (i.e., non-academic, non-peer audience) public health content, both in writing and through oral presentation | Developed and instructed a two hour training course for Research and Laboratory Safety topics at the Research Safety Bootcamp in February 2025. |
| 21 | Integrate perspectives from other sectors and/or professions to promote and advance population health | Biannual safety education and training events established partnerships across over 15 K-State colleges and departments and across external academic, government, and private organizations. |

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| | | Successful execution of each event is attributed to the interprofessional collaborations and teamwork toward shared goals and objectives. |

**Evidence-Based Approaches to Public Health**

Foundational competencies in Evidence-based Approaches to Public Health topics were achieved through two primary projects during the APE, including an incident and near-miss analysis and administration of a mixed-methods post-event survey. Coursework, including MPH 701, MPH 720, and MPH 754 were successfully completed during the MPH program.

Competency 1, “Apply epidemiological methods to the breadth of settings and situations in public health practice,” competency 3, “Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate,” and competency 4, “Interpret results of data analysis for public health research, policy, or practice” were achieved through an in-depth analysis and interpretation of lab-related incident and near-miss reports at the university to identify trends and focus areas for training.

Competency 2, “Select quantitative and qualitative data collection methods appropriate for a given public health context”, was achieved through creation, administration, and analysis of a mixed-methods post-event survey for biannual safety education and training events. The survey includes both qualitative and quantitative questions aimed at stakeholder feedback and event improvement.

In conclusion, the APE and related MPH coursework provided a strong foundation for applying evidence-based approaches to public health. During my APE, I completed two related projects including an incident and near-miss analysis report and a mixed-methods post-event survey. Throughout these two projects, I applied epidemiologic methods, selected appropriate data collection strategies, conducted thorough quantitative and qualitative analyses, and interpreted findings to inform public health practice at Kansas State University. These efforts demonstrated proficiency in competencies 1 and 2 by contributing to enhancing research safety culture and training effectiveness at the university level.

**Planning and Management to Promote Health**

Foundation competencies in Planning and Management to Promote Health topics were achieved through two primary projects during the APE, including establishment of biannual safety and education hybrid events at Kansas State University and submission of a funding proposal for long-term, sustainable safety education credentials at the university. Coursework

including MPH 701, MPH 720, MPH 754, MPH 802, and MPH 818 were successfully completed during the MPH program.

Competency 9, “Design a population-based policy, program, project or intervention”, and competency 11, “Select methods to evaluate public health programs” were achieved through established biannual safety education and training hybrid events at Kansas State University for the campus and global community and creation of evaluation methods for event success and refinement, including a post-event survey and internal department metric tracking. Internal department metric tracking includes collection of attendance, presentation, and logistics data for continuous event improvement.

Competency 10, “Explain basic principles and tools of budget and resource management,” was achieved through submission of an initial and full proposal to the Kansas State University Academic Innovation Fund for proposed, tiered safety education credentials including microcredentials, continuing education, and undergraduate and graduate certificates. The full proposal included a three-year budget projection, including profits and losses, and justification for investment in alignment with priorities of Next-Gen K-State.

In conclusion, the APE and MPH program coursework provided a platform for developing and demonstrating core competencies in Planning and Management to Promote Health. Through the successful design and implementation of biannual safety education and training events, as well as the submission of a detailed funding proposal for sustainable, tiered safety education credentials, I demonstrated the ability to design, evaluate, and strategically manage public health programs. These initiatives addressed competencies 9 and 10 by combining policy and program development, evaluation planning, and budget management to support long-term improvements in research safety education.

**Communication**

Foundational competencies in Communication topics were achieved through designing and instructing a research safety course for an audience of faculty, staff, students, government, and industry professionals at the Research Safety Bootcamp. DMP 815 was successfully completed during the MPH program.

Competency 18, “Select communication strategies for different audiences and sectors”, and competency 19, “Communicate audience-appropriate (i.e., non-academic, non-peer audience) public health content, both in writing and through oral presentation,” were achieved through development and instruction of a two hour “Research Safety 101” course at the February 2025 Research Safety Bootcamp. This course covered topics across chemical safety, biological safety, engineering controls, hazard communication, personal protective equipment

(PPE), electrical safety, fire safety, process safety, and regulations, standards, and best practices for academic laboratories. The course was designed to have elements of interactive and applied learning, including identifying common laboratory hazards in a lab hazard picture, reading and interpreting a safety data sheet, reading and interpreting a pathogen safety data sheet, and identifying key elements on laboratory signage. The audience for the course included both local and distance learners from varied backgrounds, industries, and professional roles. Applied learning, interactive activities, case studies, and discussions helped to bridge gaps between education levels, professional roles, and experience to create a valuable learning opportunity for all attendees.

**Interprofessional and/or Intersectoral Practice**

Foundational competencies in Interprofessional and/or Intersectoral Practice topics were achieved throughout the APE project of building, implementing, and refining biannual safety education and training events at Kansas State University. Coursework including MPH 720 and MPH 818 were completed as part of the MPH program.

Competency 21, “Integrate perspectives from other sectors and/or professions to promote and advance population health” was achieved throughout the process of establishing biannual safety education and training events at Kansas State University. External partner organizations, diverse university college and department contribution and participation, and a global audience of learners were paramount to the biannual event success and longevity. Organizations that have partnered with Kansas State University for biannual safety education and training events, including through event endorsement, event marketing, contribution of technical knowledge and resources, or cohosting include:

- American Society of Safety Professionals (ASSP) Heart of America Chapter
- National Bio and Agro-Defense Facility (NBAF)
- Federal Bureau of Investigation (FBI)
- Drug Enforcement Agency (DEA)
- 3M
- Fisher Scientific vendors
- Matheson
- Labconco Corporation, and
- Cobb Refrigeration

Kansas State University Colleges and Departments that have partnered and contributed to the biannual safety education and training events include:

- K-State Research and Extension
- Department of Psychological Sciences
- Department of Communications and Agricultural Education
- Office of Research Integrity Compliance and Security
- Veterinary Diagnostic Laboratory
- College of Veterinary Medicine Libraries
- Department of Diagnostic Medicine and Pathobiology
- K-State Libraries
- K-State Career Center
- K-State Olathe
- Biosecurity Research Institute
- College of Business
- Comparative Medicine Group
- Department of Grain Science and Industry
- Department of Electrical and Computer Engineering
- College of Engineering
- Department of Biological and Agricultural Engineering

Event attendees represent a global audience of learners and professionals across organizations and industries including:

- Kansas State University (KSU)
- City of Manhattan, KS
- United States Department of Agriculture (USDA) Plains Area
- National Bio and Agro-Defense Facility (NBAF)
- Kansas Department of Agriculture (KDA)
- Radiation Detection Technologies
- University of Missouri Kansas City
- Washington College
- Bowling Green State University
- Wright State University
- Smith College
- University of Michigan

- Grand Valley State University
- University of Texas Medical Branch
- CONMED Corporation
- Northshore Health
- Northwell Health

Working with these diverse groups of professionals and learners transformed my experience as an event host and as a learner.

## Table 2.2 MPH Foundational Competencies Course Mapping

| 22 Public Health Foundational Competencies Course Mapping | MPH 701 | MPH 720 | MPH 754 | MPH 802 | MPH 818 |
|---|---|---|---|---|---|
| **Evidence-based Approaches to Public Health** | | | | | |
| 1. Apply epidemiological methods to settings and situations in public health practice | x | | x | | |
| 2. Select quantitative and qualitative data collection methods appropriate for a given public health context | x | x | x | | |
| 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate | x | x | x | | |
| 4. Interpret results of data analysis for public health research, policy or practice | x | | x | | |

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| **Public Health and Health Care Systems** | | | | | |
| 5. Compare the organization, structure and function of health care, public health and regulatory systems across national and international settings | | x | | | |
| 6. Discuss the means by which structural bias, social inequities and racism undermine health and create challenges to achieving health equity at organizational, community and systemic levels | | | | | x |
| **Planning and Management to Promote Health** | | | | | |
| 7. Assess population needs, assets and capacities that affect communities' health | | x | | x | |
| 8. Apply awareness of cultural values and practices to the design, implementation, or critique of public health policies or programs | | | | | x |
| 9. Design a population-based policy, program, project or intervention | | | x | | |
| 10. Explain basic principles and tools of budget and resource management | | x | x | | |
| 11. Select methods to evaluate public health programs | x | x | x | | |
| **Policy in Public Health** | | | | | |
| 12. Discuss multiple dimensions of the policy-making process, including the roles of ethics and evidence | | x | x | x | |
| 13. Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes | | x | | x | x |
| 14. Advocate for political, social or economic policies and programs that will improve health in diverse populations | | x | | | x |
| 15. Evaluate policies for their impact on public health and health equity | | x | | x | |
| **Leadership** | | | | | |
| 16. Apply leadership and/or management principles to address a relevant issue | | x | | | x |
| 17. Apply negotiation and mediation skills to address organizational or community challenges | | x | | | |
| **Communication** | | | | | |
| 18. Select communication strategies for different audiences and sectors | DMP 815, FNDH 880 or KIN 796 | | | | |
| 19. Communicate audience-appropriate (i.e., non-academic, non-peer audience) public health content, both in writing and through oral presentation | DMP 815, FNDH 880 or KIN 796 | | | | |
| 20. Describe the importance of cultural competence in communicating public health content | | x | | | x |
| **Interprofessional Practice** | | | | | |
| 21. Integrate perspectives from other sectors and/or professions to promote and advance population health | | x | | | x |
| **Systems Thinking** | | | | | |
| 22. Apply a systems thinking tool to visually represent a public health issue in a format other than a standard narrative | | | x | x | |

## Table 2.3 Application of Systems Thinking Tools to a Public Health Issue

**Use of Systems Thinking Tools**

| Systems Thinking Tool | Description of Use |
|---|---|
| Innovation (Change Management) History for Key Biannual Safety Training and Education Events | Provides a timeline map of key events, event process, event metrics, and feedback mechanisms, allowing for a visualization of event growth and change and a tool to manage and adapt events to stakeholder needs long-term. |
| Process Mapping | Describes planning, implementation, evaluation, and refinement (including bottlenecks and areas for improvement) of each safety education and training event |

Systems thinking tools provide structured approaches for implementing effective public health interventions across challenges and sectors. Two systems thinking tools were applied to the biannual safety education and training event interventions at Kansas State University. First, the Innovation (Change Management) History tool was applied to provide an event timeline for key events with integrated event processes, metrics, and feedback mechanisms providing an illustration of event evolution and growth. This tool is adaptable and can be used for future events to continue to track continuous improvement efforts and ensure events are obtaining pre-identified objectives. Second, the Process Mapping tool was utilized to map the steps involved in planning, executing, and refining biannual events toward successful, effective research and laboratory safety initiatives. Each systems thinking tool provides a documented, replicable framework for institutions to refine and enhance their safety education and training programs toward engaged, applied learning based on data-driven insights.

### Innovation (Change Management) History

The Innovation (Change Management) History Systems Thinking Tool was used to map three key biannual safety training and education events, including Lab Safety Awareness Week in February 2024, the Biosafety and Biosecurity Summit in October 2024, and the Research Safety Bootcamp in February 2025. The Innovation (Change Management) History tool provides visualization to the timeline of each event process, from planning through event follow-up, and reveals how each event has evolved and grown based on feedback mechanisms from the prior

event(s). The purpose of this systems thinking tool in the context of mapping the biannual safety education and training events is to document key activities and dates, reveal event modifications from stakeholder feedback, and show a timeline of event progression and growth. The Innovation (Change Management) History Systems Thinking Tool will continue to be adapted and revised for each biannual event beyond the APE, with October 2025 event planning and conference dates added. The Innovation (Change Management) History Systems Thinking Tool can be applied to any public health intervention that is executed long-term or over a period of stages with periodic stakeholder feedback.

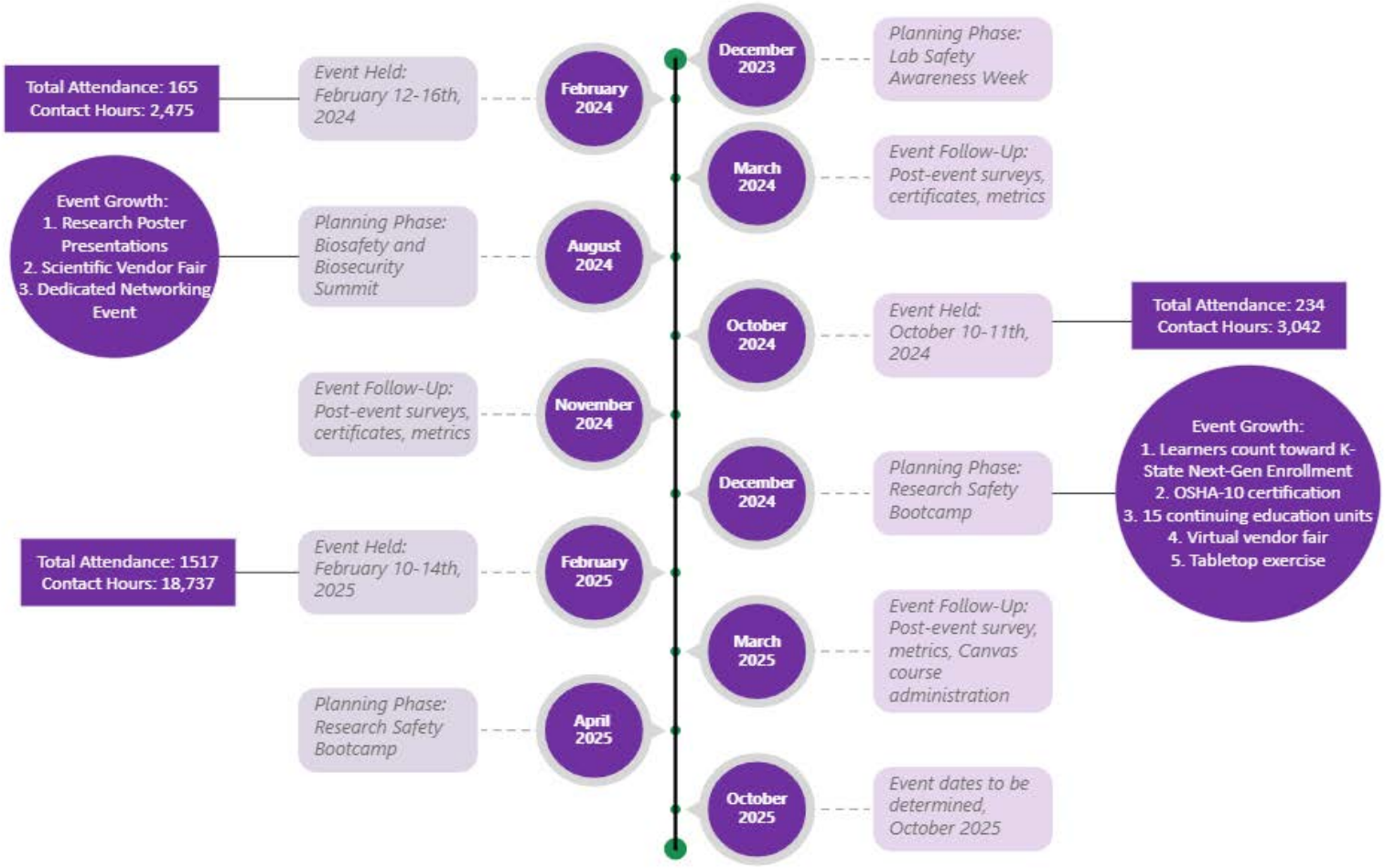


**Figure 2.1: Innovation (Change History) Management Systems Thinking Tool**

## Process Mapping

The Process Mapping Systems Thinking Tool provides a method to systematically outline a process, including key stages, bottlenecks, areas for improvement, and outcomes.

Establishing a process map was critical to planning, implementing, evaluating, and refining biannual safety education and training events in absence of prior models and literature. Each section of the process map (planning, execution, and follow up and refinement) lists key tasks, decision points, and outcomes that should be achieved to streamline the process and prepare for bottlenecks, unexpected outcomes, and event inefficiencies. A process map should be used to outline and clarify workflows, improve work process efficiency, reduce errors and negative outcomes, and to improve metric tracking. Implementation of the process mapping tool resulted in a long-term process checklist for future events at the university and as a resource for similar public health interventions at other institutions.

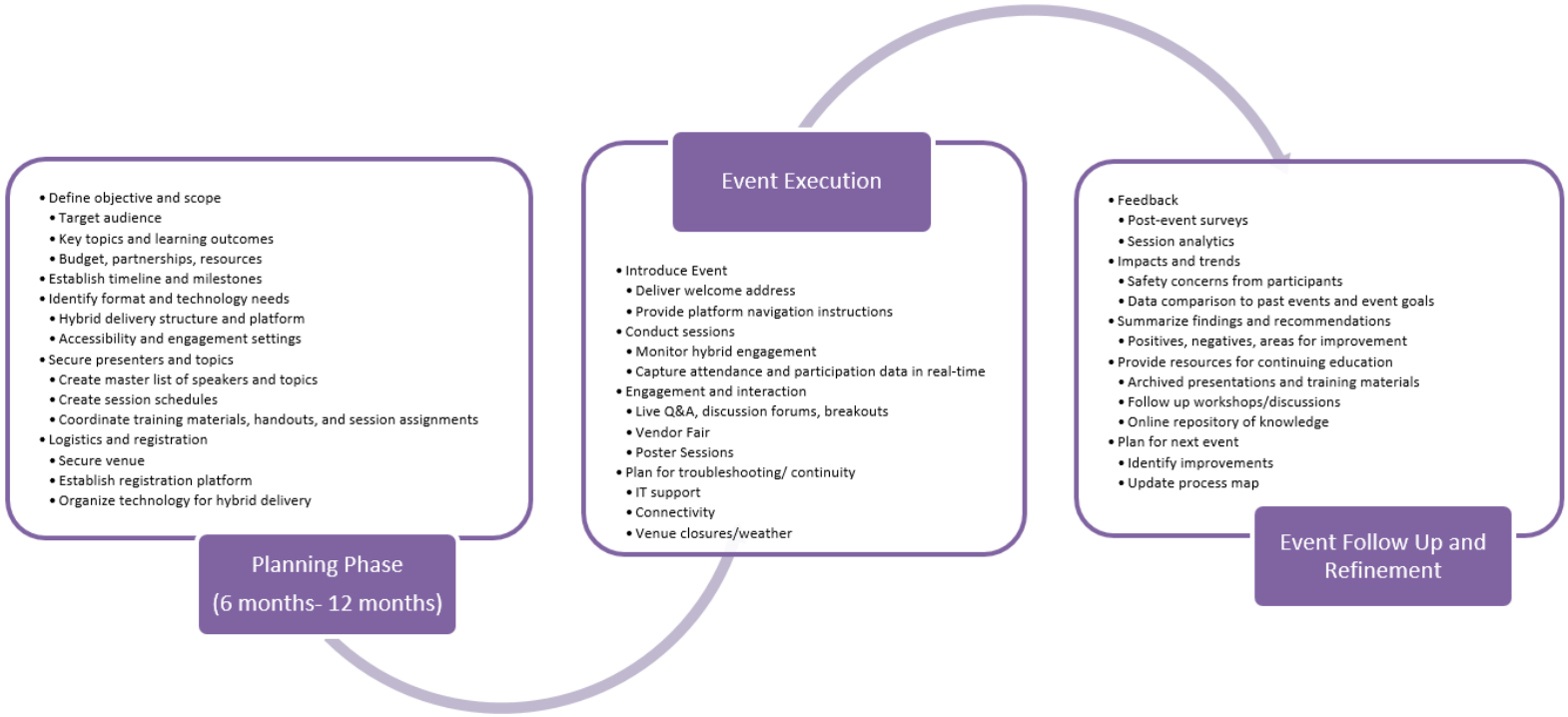


**Figure 2.2: Process Map for Biannual Safety Education and Training Events**