

## Proposed Module Flow with Learning Objectives

The following tables will provide an overall or terminal learning objective for each module contemplated as well the supportive or enabling learning objectives. Proposed content will be identified for each of the enabling learning objectives. Learning objectives are abbreviated and not in the form that will be used in each module. Note that this is a proposed module layout subject to change.

### Module 1 – Administrative Module

This module will familiarize participants with the overall goals of the course and provide necessary logistics.	
Objectives	Relevant Content
Provide instructors with delivery material and method	<ul style="list-style-type: none"> <li>• Pre-instruction logistics</li> <li>• Necessary materials for instruction</li> <li>• Optimal room configuration</li> </ul>
Introduce Instructors and Participants	<ul style="list-style-type: none"> <li>• Instructors will introduce themselves and provide background</li> <li>• Participant will introduce themselves, provide background and why they are taking the training</li> </ul>
Logistical Matters	<ul style="list-style-type: none"> <li>• Familiarize with building</li> <li>• Understand how breaks in instruction will occur</li> </ul>
Course Outline and Module Content	<ul style="list-style-type: none"> <li>• Provide a brief description of each module's content</li> <li>• Provide the overall goals of the training that this course is a performance level course focusing on cross-discipline awareness.</li> </ul>

### Module 2 – Foodborne Illness and the Associated Burden

This module will define the agents of foodborne illness and provide an understanding of the burden of foodborne illness in the United States.	
Objectives	Relevant Content
Foodborne Illness and Outbreaks	<ul style="list-style-type: none"> <li>• Why do we investigate?</li> <li>• Define illness, cluster and outbreak</li> </ul>
Pathogens Associated with Foodborne Illness	<ul style="list-style-type: none"> <li>• Bacterial</li> <li>• Viral</li> <li>• Parasitic</li> <li>• Toxins</li> </ul>

Burden Associated with Foodborne Illness	<ul style="list-style-type: none"> <li>• Disease Burden</li> <li>• Economic Burden</li> <li>• Burden on Industry</li> <li>• Regulatory Burden</li> </ul>
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### Module 3 – Response Teams – Planning and Preparation

This module will identify probable members of foodborne outbreak response teams and the knowledge, skills and attitudes necessary to work effectively in a team environment.	
Objectives	Relevant Content
Core Disciplines and Desirable Attributes	<ul style="list-style-type: none"> <li>• Epidemiologic</li> <li>• Laboratory</li> <li>• Environmental Health</li> </ul>
Agencies	<ul style="list-style-type: none"> <li>• Local Public Health System</li> <li>• State <ul style="list-style-type: none"> <li>○ Public Health</li> <li>○ Agriculture</li> <li>○ Others</li> </ul> </li> <li>• Federal <ul style="list-style-type: none"> <li>○ CDC</li> <li>○ FDA</li> <li>○ FSIS</li> <li>○ Others supporting FBO Response</li> </ul> </li> </ul>
Examples of Performed Response Teams	<ul style="list-style-type: none"> <li>• Epi Rapid Responders – Kentucky</li> <li>• CalFERT</li> <li>• RRT</li> <li>• Others</li> </ul>
Model Practices	<ul style="list-style-type: none"> <li>• Plan and Prepare</li> <li>• NIMS</li> <li>• RRT</li> <li>• References (Procedures...)</li> </ul>
Communication	<ul style="list-style-type: none"> <li>• Team Communication Concepts</li> <li>• Media used to Communicate</li> <li>• Cross-discipline communication strategies</li> </ul>

### Module 4 - Surveillance and Detection – Implications for Response

This module will introduce the various surveillance systems used to monitor foodborne illness what information is necessary to illicit an outbreak response.	
Objectives	Relevant Content

Surveillance Systems and best practices	<ul style="list-style-type: none"> <li>• Active and passive systems</li> <li>• Discipline-specific surveillance <ul style="list-style-type: none"> <li>○ Epidemiologic</li> <li>○ Laboratory</li> <li>○ Environmental</li> </ul> </li> </ul>
Other Surveillance Systems	<ul style="list-style-type: none"> <li>• Syndromic</li> <li>• Sentinel</li> </ul>
Detection of Clusters	<ul style="list-style-type: none"> <li>• Pathogen-specific –v- Complaint Identified <ul style="list-style-type: none"> <li>○ Compare and contrast</li> <li>○ Discuss the interrelationship between the systems</li> </ul> </li> </ul>
Moving from Illness to Investigation	<ul style="list-style-type: none"> <li>• Case notification</li> <li>• Finding additional cases</li> <li>• Hypothesis generation</li> <li>• Case definition</li> </ul>

### Module 5 – Laboratory Investigation

This module will identify goals, objectives, methods and tactics utilized by the laboratory investigator to investigate foodborne illness.	
Objectives	Relevant Content
Sample Collection Methods	<ul style="list-style-type: none"> <li>• Clinical methods identifying pathogens <ul style="list-style-type: none"> <li>○ Stool, blood vomitus</li> <li>○ bacteria, virus, parasites and toxins</li> </ul> </li> <li>• Environmental methods <ul style="list-style-type: none"> <li>○ Food</li> <li>○ Environmental Surfaces</li> </ul> </li> </ul>
Diagnostic Testing	<ul style="list-style-type: none"> <li>• Bacterial <ul style="list-style-type: none"> <li>○ Culture <ul style="list-style-type: none"> <li>▪ Serotyping, others</li> <li>▪ Advanced Molecular Detection (AMD): include PFGE, MLVA, WGS</li> </ul> </li> <li>○ PCR</li> <li>○ CIDT</li> </ul> </li> <li>• Viral <ul style="list-style-type: none"> <li>○ RT-PCR (mention advanced molecular detection)</li> <li>○ Immunoassays</li> </ul> </li> <li>• Parasitic <ul style="list-style-type: none"> <li>○ Microscopic</li> <li>○ PCR</li> </ul> </li> </ul>
Sample Integrity	<ul style="list-style-type: none"> <li>• Shipping</li> <li>• Chain of Custody</li> </ul>

## Module 6 – Epidemiologic Investigation

This module will identify goals, objectives, methods and tactics associated with the epidemiologic investigator to gather, analyze and interpret information related to an outbreak investigation.	
Objectives	Relevant Content
Information Gathering	<ul style="list-style-type: none"> <li>• Surveillance</li> <li>• Interviewing</li> </ul>
Analysis of Information	<ul style="list-style-type: none"> <li>• Observational               <ul style="list-style-type: none"> <li>○ Line Lists</li> <li>○ Epi Curves</li> <li>○ Spot Map</li> <li>○ Case Series</li> <li>○ Others – qualitative and quantitative data</li> </ul> </li> <li>• Measures of Association               <ul style="list-style-type: none"> <li>○ Relative Risk (cohort)</li> <li>○ Odds Ratio (case-control)</li> </ul> </li> <li>• Statistical Significance               <ul style="list-style-type: none"> <li>○ Confidence Intervals</li> <li>○ P-value</li> </ul> </li> </ul>

## Module 7 – Environmental Investigation

This module will identify goals, objectives, methods and tactics utilized by the environmental investigator during a foodborne outbreak investigation.	
Objectives	Relevant Content
Environmental Assessment	<ul style="list-style-type: none"> <li>• Provide relevant examples outbreaks along the farm-to-fork continuum</li> <li>• Compare and contrast to other duties of the environmental health practitioner</li> <li>• Defined as root cause analysis (environmental assessment)               <ul style="list-style-type: none"> <li>○ Contributing Factors</li> <li>○ Environmental Antecedents</li> </ul> </li> </ul>
Product Tracing	<ul style="list-style-type: none"> <li>• Investigational –v- Regulatory</li> <li>• Components of an effective product tracing</li> </ul>
Control Strategies	<ul style="list-style-type: none"> <li>• Notification Activities (HAN, Local, State and Federal Food Regulators)</li> <li>• Removal of food from distribution</li> <li>• Food worker exclusion</li> </ul>

## Module 8 – Multijurisdictional and Complex Outbreak Response

This module will identify multijurisdictional and other complex outbreaks and describe methods and tactics to coordinate the response	
Objectives	Relevant Content

Identification of multijurisdictional outbreaks	<ul style="list-style-type: none"> <li>• Picked up with AMD methods</li> <li>• Coordination methods local-state-federal</li> </ul>
Complex Outbreaks	<ul style="list-style-type: none"> <li>• Require multidisciplinary/multiagency approaches <ul style="list-style-type: none"> <li>○ Size of outbreak</li> <li>○ Severity of Pathogen</li> </ul> </li> </ul>
	<ul style="list-style-type: none"> <li>○ Novelty</li> <li>○ Logistical challenges (location, organizational characteristics, others)</li> <li>○ Intentional Outbreaks</li> </ul>
Cross-disciplinary team approach	<ul style="list-style-type: none"> <li>• Defined</li> <li>• Pre-identified teams</li> </ul>
Resource Needs	<ul style="list-style-type: none"> <li>• Mutual Aid, MOU, others</li> <li>• Epi <ul style="list-style-type: none"> <li>○ EPI-aid</li> <li>○ Vertical scaling to state and federal resources</li> </ul> </li> <li>• Lab <ul style="list-style-type: none"> <li>○ LERN and FERN</li> </ul> </li> <li>• EH <ul style="list-style-type: none"> <li>○ State, FSIS FDA</li> </ul> </li> </ul>

[Module 9 – Communication and Overcoming Barriers to Effective Response](#)

This module will identify barriers to effective outbreak response and methods and tactics to overcome these barriers.	
Objectives	Relevant Content
Barriers to Effective Response	<ul style="list-style-type: none"> <li>• Legal Barriers <ul style="list-style-type: none"> <li>○ HIPAA ad HITECH</li> <li>○ Disclosure and FOIA</li> </ul> </li> <li>• Organizational Barriers <ul style="list-style-type: none"> <li>○ Leadership</li> <li>○ Culture</li> <li>○ Resource</li> </ul> </li> <li>• Political</li> </ul>
Communication	<ul style="list-style-type: none"> <li>• External Communication Strategies <ul style="list-style-type: none"> <li>○ With external partners</li> <li>○ With the public</li> </ul> </li> <li>• Risk Communication <ul style="list-style-type: none"> <li>○ CDC model</li> <li>○ STARCC Model</li> </ul> </li> <li>• Methods of Communication <ul style="list-style-type: none"> <li>○ Traditional</li> <li>○ Electronic</li> <li>○ Social</li> </ul> </li> </ul>

## Module 10 – Reporting and the Value of Effective Foodborne Outbreak Response

This module will identify the various reporting methods and provide actual outcomes that led to food safety system change.	
Objectives	Relevant Content
Response Team Documentation	<ul style="list-style-type: none"> <li>• Debriefing</li> <li>• Hot Wash/AAR/Corrective Action Plans</li> </ul>
Reporting	<ul style="list-style-type: none"> <li>• NORS</li> </ul>
	<ul style="list-style-type: none"> <li>• NEARS</li> <li>• NARMS</li> <li>• CaliciNet</li> </ul>
Successes from the Field	<ul style="list-style-type: none"> <li>• Response and Outcomes lead to system change               <ul style="list-style-type: none"> <li>○ Egg Rule</li> <li>○ Hamburger</li> <li>○ Pasteurization of Juices</li> <li>○ Others</li> </ul> </li> </ul>

## Module 11 – Final Exercise

This module will be a multi-inject exercise incorporating the concepts delivered in the modules.	
Objectives	Content
Utilize epidemiologic, laboratory and environmental methods to solve a foodborne outbreak	The exercise will utilize an actual outbreak to determine a plausible causative agent and food vehicle. Content will be created and focused to reinforce learning objectives.