

Table of Contents

CHAPTER 1 Overview of CIFOR Guidelines	21
CHAPTER 2 Fundamental Concepts of Public Health	
Surveillance and Foodborne Disease	57
CHAPTER 3 Planning and Preparation	85
CHAPTER 4 Foodborne Disease Surveillance and	
Outbreak Detection	111
CHAPTER 5 Investigation of Clusters and Outbreaks	137
CHAPTER 6 Control Measures	167
CHAPTER 7 Special Considerations for	
Multijurisdictional Outbreaks	191
CHAPTER 8 Performance Indicators for Foodborne	
Disease Programs	205
CHAPTER 9 Legal Preparedness for the Surveillance and	
Control of Foodborne Disease Outbreaks	233
APPENDICES	245

Table of Contents

CHAPTER 1 Overview of CIFOR Guidelines	21
CHAPTER 2 Fundamental Concepts of Public Health Surveillance and Foodborne Disease	57
2.0. Introduction	57
2.1. Trends in Diet, the Food Industry, and Foodborne Disease Outbreaks.....	58
2.1.1. Dietary Changes.....	58
2.1.2. Changes in Food Production and Preparation.....	59
2.2. Trends in Food-Safety Problems	60
2.2.1. Food Product Recalls	60
2.2.2. Foodborne Disease and Outbreaks.....	61
2.2.2.1. Localized “event” outbreaks.....	61
2.2.2.2. Contaminated commercial product outbreaks.....	61
2.2.2.3. Local investigator role in contaminated commerical product outbreaks.....	62
2.3. Trends in Surveillance	62
2.3.1. Overview	62
2.3.2. Selected Surveillance Systems of Relevance to Foodborne Diseases	63
2.3.2.1. Notifiable disease surveillance	63
2.3.2.2. Foodborne illness complaints.....	64
2.3.2.3. Contributing factor and environmental antecedent surveillance	64
2.3.2.4. Hazard surveillance during routine inspections	65
2.3.2.5. Foodborne Diseases Active Surveillance Network.....	66
2.3.2.6. Behavioral Risk Factor Surveillance System	66
2.3.2.7. National Molecular Subtyping Network for Foodborne Disease Surveillance	67
2.3.2.8. National Antimicrobial Resistance Monitoring System – Enteric Bacteria.....	68
2.3.2.9. Foodborne Disease Outbreak Reporting System	68
2.3.2.10. National Electronic Norovirus Outbreak Network.....	69
2.3.2.11. Surveillance of the Food Supply	69
2.3.3. Quality and Usefulness of Surveillance Data	69
2.3.3.1. Completeness of detection and reporting of foodborne diseases	69
2.3.3.2. Culture-independent diagnostic tests	71
2.3.3.3. Quality and usefulness of information collected	71
2.4. Etiologic Agents Associated with Foodborne Diseases.....	72
2.4.1. Overview	72
2.4.2. Patterns in Etiologic Agents Associated with Foodborne Disease Outbreaks	74
2.4.3. Determining the Etiologic Agent in an Outbreak	75
2.4.3.1. Laboratory confirmation of etiologic agent	75
2.4.3.2. Other clues to the etiologic agent	76
2.4.3.2.1. Signs, symptoms, incubation period, and duration of illness	76
2.4.3.2.2. Suspected food	77
2.4.4. Mode of Transmission	78
2.4.4.1. Transmission by food	78
2.4.4.2. Transmission by water	78
2.4.4.3. Transmission from person-to-person	78
2.4.4.4. Transmission from fomites	78
2.5. References	79
CHAPTER 3 Planning and Preparation	85
3.0. Introduction	85
3.1. Agency Roles	86
3.1.1. Overview	86
3.1.2. Local, State, and Federal Agencies	86
3.1.2.1. Local health agencies	86
3.1.2.2. State agencies—health department	87
3.1.2.3. State agencies—environmental health	87
3.1.2.4. State agencies—food-safety regulatory authorities	88
3.1.2.5. Federal agencies—Centers for Disease Control and Prevention	88
3.1.2.6. Federal agencies—Food and Drug Administration	89

Table of Contents

3.1.2.7. Federal agencies—U.S. Department of Agriculture, Food Safety and Inspection Service	90
3.1.2.8. Cross-agency program—Rapid Response Teams	91
3.1.2.9. Cross-agency program—Food Emergency Response Network (FERN)	91
3.1.2.10. Cross-agency program—Federal Multi-Agency Coordination Group for Foodborne Illness Outbreaks (MAC-FIO)	91
3.1.3. Other Agencies	91
3.1.3.1. Tribes	92
3.1.3.2. Military	92
3.1.3.3. National Park Service	93
3.1.3.4. Other federal lands	93
3.1.3.5. Law enforcement	93
3.1.4. Industry—Food Manufacturers, Distributors, Retailers, and Trade Associations	94
3.1.5. Academic Centers	94
3.2. Outbreak Investigation and Control Team	95
3.2.1. Overview	95
3.2.2. Roles of Core Team Members	96
3.2.2.1. Team leader	96
3.2.2.2. Epidemiologic investigator	96
3.2.2.3. Environmental investigator	97
3.2.2.4. Laboratory investigator	97
3.2.2.5. Public information officer	98
3.2.2.6. Additional team members	98
3.2.3. Outbreak Investigation and Control Teams—Model Practices	98
3.2.3.1. Emergency response unit	98
3.2.3.2. Additional support for large-scale outbreaks	98
3.2.3.3. Agency-specific response protocol and other resources	99
3.2.3.4. Training for the team	99
3.3. Resources	101
3.3.1. Overview	101
3.3.2. Recommended Resources	101
3.3.2.1. Administrative staff	101
3.3.2.2. Legal counsel	101
3.3.2.3. Equipment	101
3.3.2.4. Supplies	101
3.3.2.5. Outbreak investigation documents	102
3.3.2.6. Reference materials	102
3.4. Foodborne Illness Complaint Processing	102
3.5. Records Management	102
3.5.1. Overview	102
3.5.2. Records Management—Model Practices	103
3.5.2.1. Information collection and sharing	103
3.5.2.2. Data tracking and analysis	103
3.6. Communication	103
3.6.1. Overview	103
3.6.2. Communication—Model Practices	103
3.6.2.1. Contact lists	104
3.6.2.2. Communication among the agencies and units of the outbreak investigation and control team	104
3.6.2.3. Communication with other local state, and federal authorities	104
3.6.2.4. Communication with local organizations, food industry, and other professional groups (including health-care providers)	105
3.6.2.5. Communication with the public	105
3.6.2.6. Communication with cases and family members	106
3.6.2.7. Communication with the media	106
3.7. Planning for Recovery and Follow-Up	107
3.7.1. Overview	107
3.7.2. Recommended Practices for Recovery and Follow-Up	107

Table of Contents

3.8. Legal Preparedness	107
3.9. Escalation	107
3.9.1. Overview	107
3.9.2. When to Ask for Help.	108
3.9.3. How to Obtain Help	108
3.10. Incident Command System	108
3.10.1.Overview	108
3.10.2.Definition and History of ICS	109
3.10.3.Context for Use	109
3.10.4.Training	110
3.11. Reference	110
CHAPTER 4 Foodborne Disease Surveillance and Outbreak Detection	111
4.0. Introduction	112
4.1. Overview.	112
4.2. Pathogen-Specific Surveillance	114
4.2.1. Purpose.	114
4.2.2. Background	114
4.2.3. Case Reporting and Laboratory Submission Process.	115
4.2.4. Epidemiology Process.	115
4.2.5. Laboratory Process	116
4.2.5.1. Cluster definition and triage	117
4.2.5.2. Microbiological Screening.	117
4.2.6. Timeline for Case Reporting and Cluster Recognition	118
4.2.7. Strengths of Pathogen-Specific Surveillance for Outbreak Detection	119
4.2.8. Limitations of Pathogen-Specific Surveillance	119
4.2.9. Key Determinants of Successful Pathogen-Specific Surveillance	119
4.2.9.1. Sensitivity of case detection	119
4.2.9.2. Prevalence of the agent and specificity of agent classification.	119
4.2.9.3. Sensitivity and specificity of interviews of cases.	120
4.2.9.3.1. Timing	120
4.2.9.3.2. Content.	120
4.2.9.4. Overall speed of the surveillance and investigation process.	121
4.2.10.Routine Pathogen-Specific Surveillance—Model Practices	121
4.2.10.1.Reporting and isolate submission.	122
4.2.10.2.Isolate/specimen submission and characterization	122
4.2.10.3.Case interviews.	122
4.2.10.4.Data analysis.	124
4.2.10.5.Communication	124
4.2.11.Multijurisdictional Considerations for Pathogen-Specific Surveillance	125
4.2.12.Indicators/Measures for Pathogen-Specific Surveillance.	125
4.3. Notification/Complaint Systems	125
4.3.1. Purpose.	125
4.3.2. Background	125
4.3.3. Group Illness and Independent Complaints	125
4.3.4. Epidemiology Process.	126
4.3.5. Public Health Laboratory Process	126
4.3.6. Strengths of Complaint Systems for Outbreak Detection	126
4.3.7. Limitations of Complaint Systems.	127
4.3.8. Key Determinants of Successful Complaint Systems	127
4.3.8.1. Sensitivity of case or event detection	127
4.3.8.2. Background prevalence of disease—group complaints	128
4.3.8.3. Sensitivity and specificity of case interviews—group complaints	128
4.3.9.Complaint Systems—Model Practices	128
4.3.9.1. Interviews related to individual complaints	129
4.3.9.2. Follow-up of food establishments named in individual complaints of possible foodborne illness	129
4.3.9.3. Interviews related to reported illnesses in groups	130
4.3.9.4. Clinical specimens and food samples related to group illness.	130

Table of Contents

4.3.9.5. Establishment of etiology through laboratory testing	131
4.3.9.6. Regular review of interview data	131
4.3.9.7. Improvement of interagency cooperation and communication	131
4.3.9.8. Other potentially useful tools	131
4.3.9.9. Simplification of reporting process	131
4.3.9.10. Increased public awareness of reporting process	132
4.3.9.11. Centralized reporting or report review process	132
4.3.10. Multijurisdictional Considerations for Complaint Systems	132
4.3.11. Indicators/Measures	133
4.4. Syndromic Surveillance	133
4.4.1. Overview	133
4.4.2. Background	133
4.4.3. Reporting	133
4.4.4. Epidemiology Process	133
4.4.5. Laboratory Process	133
4.4.6. Strengths of Syndromic Surveillance	133
4.4.7. Limitations of Syndromic Surveillance	134
4.4.8. Key Determinants of Successful Syndromic Surveillance Systems	134
4.4.8.1. Specificity and speed	134
4.4.8.2. Personal information privacy issues	135
4.4.9. Practices for Improving Syndromic Surveillance	135
4.5. References	136
CHAPTER 5 Investigation of Clusters and Outbreaks	137
5.0. Introduction	137
5.1. Characteristics of Outbreak Investigations	138
5.1.1. Importance of Speed and Accuracy	138
5.1.2. Principles of Investigation	139
5.1.2.1. Outbreak detection	139
5.1.2.2. Investigation leadership	139
5.1.2.3. Communication and coordination	140
5.1.2.4. Hypothesis generation	140
5.1.2.5. Standardized data collection forms and processes	141
5.1.2.6. Privacy of individuals, patients, and their families	141
5.2. Complaint, Cluster, and Outbreak Investigation Procedures	142
5.2.1. Conduct a Preliminary Investigation	142
5.2.1.1. For complaints of illness attributed to a particular event or establishment	142
5.2.1.2. For case clusters identified through pathogen-specific surveillance . .	142
5.2.2. Assemble the Outbreak Investigation and Control Team	142
5.2.2.1. Alert outbreak investigation and control team	142
5.2.2.2. Assess the priority of the outbreak investigation	142
5.2.2.3. Assemble and brief the outbreak investigation and control team .	142
5.2.3. Establish Goals and Objectives for the Investigation	143
5.2.3.1. Goals	143
5.2.3.2. Objectives	143
5.2.4. Select and Assign Investigation Activities	144
Table 5.1. Investigation activities for outbreaks associated with events or establishments reported through foodborne illness complaint systems	145
Table 5.2. Investigation activities for outbreaks identified by pathogen-specific surveillance	148
5.2.4.1. Cluster investigations—model practices	153
5.2.4.1.1. Use interview techniques to improve food recall	153
5.2.4.1.2. Use a dynamic cluster investigation process to generate hypotheses	153
5.2.4.1.2.1. Dynamic cluster investigation with routine interview of cases	154

Table of Contents

5.2.4.1.2.2. Dynamic cluster investigation without routine interview of cases	155
5.2.4.1.3. Interpretation of results of hypothesis generating interviews	155
5.2.4.1.4. Cross-reference case interviews with foodborne illness complaints	156
5.2.4.1.5. Use the FoodNet Atlas of Exposures	156
5.2.4.1.6. Conduct an environmental health assessment	157
5.2.4.1.6.1. Sources of information and activities included in an environmental health assessment	158
5.2.4.1.6.2. Qualifications to conduct an environmental health assessment.....	158
5.2.4.1.7. Conduct tracebacks/traceforwards of food items under investigation	158
5.2.5. Coordinate Investigation Activities.....	159
5.2.6. Compile Results and Reevaluate Goals for Investigation.....	160
5.2.7 Interpret Results.....	160
5.2.8. Conduct a Debriefing at End of Investigation	163
5.2.9. Summarize Investigation Findings, Conclusions, and Recommendations.....	163
5.2.10.Distribute Report	164
5.3. Multijurisdictional Considerations for Outbreak Investigations.....	164
5.4. Indicators/Measures	164
5.5. References	165
Chapter 6 Control Measures	167
6.0. Introduction	167
6.1. Information-Based Decision-Making	168
6.1.1. Concurrent Interventions and Investigations	168
6.1.2. Considerations When Implementing Control Measures	168
6.2. Control of the Source	170
6.2.1. Nonspecific Control Measures	170
6.2.1.1. Neither food nor facility has been implicated.....	170
6.2.1.2. Facility has been implicated	170
6.2.2. Specific Control Measures	171
6.2.2.1. Foods associated with food-service establishments or home preparation	172
6.2.2.1.1. Removing food from sale or preventing consumption	172
6.2.2.1.2. Cleaning and sanitizing	172
6.2.2.1.3. Training	172
6.2.2.1.4. Modifying a food-production or food-preparation process	172
6.2.2.1.5. Modifying the menu	173
6.2.2.1.6. Removing infected food workers	173
6.2.2.1.7. Closing food premises.....	173
6.2.2.1.8. Communicating with the public.....	173
6.2.2.2. Foods associated with a processor/producer	175
6.2.2.2.1. Procedures for removing food from the market	176
6.2.2.2.2. Communication with the public	178
6.2.2.2.3. Post-recall reporting by the food business or manufacturer	179
6.3. Intentional Contamination.....	180
6.3.1. Indicators of Intentional Contamination of Food	180
6.3.2. Actions to take when Intentional Contamination is Suspected	180
6.4. Control of Secondary Spread	181
6.4.1. Information for Health-Care Providers	181
6.4.2. Information for the Public	181
6.4.2.1. Personal protection from disease outbreak	181
6.4.2.2. Proper food preparation	181
6.4.2.3. Advice on personal hygiene.....	181
6.4.3. Exclusion and Restriction of Infected Persons from Settings Where Transmission Can Occur	182
6.4.4. Infection Control Precautions	182
6.4.5. Prophylaxis	183

Table of Contents

6.5. Communication	183
6.5.1. With Other Members of the Investigation and Control Teams.	183
6.5.2. With Agency Executives and Other Agencies	184
6.5.3. With the Public	184
6.5.4. With the Industry	185
6.6. End of the Outbreak	186
6.6.1. Determining When an Outbreak is Over	186
6.6.2. Determining When to Remove Restrictions.	186
6.6.3. Post-Outbreak Monitoring	186
6.7. After-Action Meetings and Reports.	187
6.8. Outbreak Report	187
6.9. Other Follow-Up Activities	188
6.9.1. Future Studies and Research	188
6.9.2. Publication of Outbreak Results	188
6.9.3. Education	188
6.9.4. Policy Action.	188
6.10. Multijurisdictional Considerations for Control Measures	189
6.11. Indicators/Measures	189
6.12. Reference	189
CHAPTER 7 Special Considerations for Multijurisdictional Outbreaks.	191
7.0. Introduction	191
7.0.1. Scope	192
7.1. Background	192
7.2. Major Indicators of a Multijurisdictional Outbreak and Notification Steps . .	194
7.3. Coordination of Multijurisdictional Investigations	196
7.4. Outbreak Detection and Investigation by Level	199
7.4.1. Outbreak Detection and Investigation at the Local Level	199
7.4.1.1. Detect outbreak	199
7.4.1.2. Ensure notification	199
7.4.1.3. Provide coordination.	199
7.4.2. Outbreak Detection and Investigation at the State Level	201
7.4.2.1. Detect outbreak	201
7.4.2.2. Ensure notification	201
7.4.2.3. Provide coordination.	201
7.4.3. Outbreak Detection and Investigation at the Federal Level.	203
7.4.3.1. Detect outbreak	203
7.4.3.2. Ensure notification	203
7.4.3.3. Provide coordination.	203
7.5. Multijurisdictional Outbreak Investigations After-Action Reports and Reporting to eFORS.	204
CHAPTER 8 Performance Indicators for Foodborne Disease Programs	205
8.0. Introduction	205
8.1. Purpose and Intended Use	206
8.2. Performance Indicators.	207
Table 8.1. Objectives of foodborne disease surveillance program	207
Table 8.2. Short-term objectives, indicators, subindicators, and metrics	208
Table 8.3. Intermediate objectives, indicators, subindicators, and metrics	212
Table 8.4. Long-term objectives, indicators, subindicators, and metrics	215
Table 8.5. CIFOR performance measures chosen for target range development .	217
CHAPTER 9 Legal Preparedness for the Surveillance and Control of Foodborne Disease Outbreaks	233
9.0. Introduction	233
9.0.1. Public Health Legal Preparedness	233
9.0.2. Ensuring Legal Preparedness for Foodborne Disease Outbreaks	234
9.0.3. The Constitutional Setting for Foodborne Disease Surveillance and Control.	234
9.0.4. Legal Basis for State and Local Public Health Agencies in Surveillance and Control of Foodborne Disease	234

Table of Contents

9.0.5. Legal Basis for CDC in Surveillance	235
9.1. Legal Framework for Mandatory Disease Reporting	235
9.1.1. Statutes and Regulations	235
9.1.1.1. Authorization by legislature	235
9.1.1.2. Regulatory process for maintaining and updating list of reportable diseases	236
9.1.2. Reporting Processes	236
9.1.2.1. Time frame and content of reports	236
9.1.2.2. Sources of reports	236
9.1.2.3. Reporting methods	237
9.1.2.4. Required submission of laboratory specimens	237
9.1.3. Accessing Medical and Laboratory Records	237
9.1.4. Enforcement	237
9.1.5. Protection of Confidentiality	237
9.1.6. Cross-Jurisdiction and Cross-Sector Coordination	238
9.2. Legal Framework for Surveillance and Investigation of Foodborne and Enteric Diseases	238
9.2.1. Sources of Surveillance Information	238
9.2.2. Statutes and Regulations Governing Surveillance and Investigation	239
9.3. Legal Framework for Measures and Methods to Prevent or Mitigate Foodborne Disease Outbreaks	239
9.3.1. General	239
9.3.2. Federal Roles and Authorizations	239
9.3.2.1. Federal Food, Drug, and Cosmetic Act	240
9.3.2.2. FDA Food Safety Modernization Act	240
9.3.2.3. Acts Authorizing USDA-FSIS	241
9.3.3. Roles and Legal Authority of State and Local Public Health Agencies	241
9.4. Public Health Investigations as the Basis for Regulatory Actions or Criminal Prosecution	242
9.4.1. Role of Data in Regulatory Action	242
9.4.2. Joint Investigation and Collection of Evidence in Criminal Prosecutions	242
9.5. CIFOR Legal Preparedness Resources	243
9.6. References	244
APPENDICES	245
Appendix 1. Glossary	246
Appendix 2. Onset, Duration, and Symptoms of Foodborne Illness and Associated Organism or Toxin (Bad Bug Table)	251
Appendix 3. List of Key Websites and Resources Cited	255