

Appendix C: Foodborne, Waterborne, and Environmentally Transmitted Diseases

Focus Area Name

Foodborne, Waterborne, and Environmentally Transmitted Diseases

Focus Area Contact Information:

Racquel Williams, iic3@cdc.gov

Donald Sharp, das8@cdc.gov

Approximate Average Annual Award: \$2,000,000

Funding Opportunity Description

1. Background

Each year, approximately 48 million foodborne illnesses occur in the United States (1 in 6 Americans are affected), which results in an estimated 128,000 hospitalizations and 3,000 deaths. In addition to human impact, foodborne illnesses cost billions of dollars in health care, industry, and personal/income losses. In the United States, the estimated annual burden of waterborne disease is approximately 7.2 million cases and 7,000 deaths, and \$3.3 billion in direct healthcare costs. To address these important public health problems, improvements in the capacity of public health agencies to efficiently detect, control and establish more efficient prevention and control measures are necessary. Local and state PHLs play a role in routine surveillance of foodborne and waterborne disease, in detecting outbreaks of foodborne and waterborne illness, and in a wide variety of testing activities during investigations of outbreaks of foodborne and waterborne disease.

Healthy People 2020

This focus area supports the following Healthy People 2020 objectives:

Food Safety, Objective 1: Reduce infections caused by pathogens transmitted commonly through food.

Food Safety, Objective 2: Reduce the number of outbreak-associated infections due to Shiga toxin-producing *E. coli* O157, or *Campylobacter*, *Listeria*, or *Salmonella* species associated with food commodity groups.

Environmental Health, Objective 5: Reduce waterborne disease outbreaks from water intended for drinking among persons served by community water systems.

Other National Public Health Priorities and Strategies:

- Public Health Emergency Preparedness (PHEP) Cooperative Agreement <https://www.cdc.gov/cpr/readiness/phep.htm>
- Public Health Emergency Preparedness and Response Capabilities: National Standards for State Local, Tribal, and Territorial Public Health <https://www.cdc.gov/cpr/readiness/capabilities.htm>
- HHS Strategic Plan, 2018-2022: <https://www.hhs.gov/about/strategic-plan/index.html>

- CDC Strategic Framework, 2016-2020: [cdc.gov/about/organization/strategic-framework/index.html](https://www.cdc.gov/about/organization/strategic-framework/index.html)
- U.S. Government Global Water Strategy: https://www.usaid.gov/sites/default/files/documents/1865/Global_Water_Strategy_2017_final_508v2.pdf

2. CDC Project Description

a. Approach

I. Purpose

Building state and local laboratory capacity is necessary to have a strong national foodborne and waterborne disease outbreak detection and investigation system. CDC is committed to helping improve local and state laboratory capacity by funding the recipient to work on a variety of related issues and projects. The overall purpose is to improve collaboration between laboratories, between laboratorians and epidemiologists and environmental health specialists, and to improve a variety of laboratory detection, investigation, and reporting systems.

II. Outcomes

Activities in this focus area should achieve or contribute to the following proximal outcomes (refer to section ii, “Outcomes” under Part II, A-2-a or the overall logic model in this NOFO for a full list of outcomes of this cooperative agreement):

PO-1. Improved collaboration and communication across public health laboratories and other stakeholders

PO-4. Improved awareness of new tools and resources for public health laboratories and other stakeholders

PO-5. Improved awareness and understanding of public health laboratory workforce development needs and opportunities

PO-6. Improved access to training opportunities among laboratory professionals

PO-7. Enhanced technical and non-technical knowledge, skills, and abilities among public health laboratory professionals in diverse settings

PO-8. Improved understanding of data-related challenges and data-informatics solutions among laboratory professionals and other stakeholders

PO-9. Improved implementation of quality and safety systems and practices in public health laboratories

PO-11. Improved awareness and understanding among laboratory professionals of emerging methods and processes in public health laboratories



PO-12. Improved dissemination of evidence-based practices to public health laboratories and other stakeholders

Activities in this focus area should achieve or contribute to the following intermediate outcomes (refer to section ii, “Outcomes” under Part II, A-2-a or the overall logic model in this NOFO for a full list of outcomes of this cooperative agreement):

IO-1. Established communities of practice and other collaborative relationships among and between laboratories and other stakeholders

- Improved collaboration and coordination between laboratories, and between laboratorians, epidemiologists, environmental health specialists and bioinformaticians at local, state, federal, and international levels

IO-3. Improved competence and engagement of public health laboratory workforce

- Improved laboratory workforce competency in foodborne, waterborne, and environmentally transmitted disease detection and response

IO-4. Enhanced practices, methods, technical capabilities, and infrastructure within the public health laboratory system

- Improved laboratory methods for detection, investigation, and reporting foodborne, waterborne, and environmentally transmitted illnesses

IO-6. Improved public health laboratory detection, surveillance, and response

- Improved laboratory systems for detection, investigation, and reporting foodborne, waterborne, and environmentally transmitted illnesses

III. Funding Strategy

CDC funding strategy for this focus area is described in section iv, “Funding Strategy,” under Part II, A-2 (CDC Project Description; a. Approach) in this NOFO. Funds should be used for program activities, which could include: personnel, travel, supplies, equipment, contractual and consultant support for proposed activities.

Funded recipient is expected to adhere to the requirements of the cooperative agreement. This may include:

- Identifying a designated person with overall responsibility for all activities as well as personnel responsible for each activity;
- Participating in implementation, support, and monitoring efforts at least quarterly.

Budgets should be submitted with sufficient level of detail so that the technical monitor, project officer, or the grants management officer can determine the necessity, reasonableness, and allocability of costs relative to the proposed grant activities, and their allowability pursuant to the applicable federal cost principles and requirements.

IV. Strategies and Activities

Activities under this focus area should be guided by strategies in the following categories: Policy, Partnership, and Communication (S2), Training and Capacity Building (S3), and Laboratory Quality, Safety, and Informatics for Public Health Testing Services, Surveillance and Response (S4).

S.2. Policy, Partnership, and Communication

S2.2. Collaborate and build relationships among laboratory professionals and other stakeholders in public health, healthcare, and beyond

- Support the Council to Improve Foodborne Outbreak Response (CIFOR) in identifying barriers to rapid and accurate foodborne disease outbreak detection and investigation.
- Support CIFOR's efforts to develop and implement solutions to these identified barriers.
- Support global food safety activities (e.g. PulseNet International (PNI)).

S2.3. Facilitate information exchange and dissemination among practitioners and other stakeholders

- Help improve methods to rapidly obtain, collate, analyze, and disseminate combined food and water safety epidemiologic and laboratory information.
- Support the compilation, dissemination, discussion, and professional exchange of information about various aspects of foodborne, waterborne, and environmentally transmitted disease among the laboratory, epidemiology, and environmental health disciplines through conferences, webinars, and meetings.

S2.5. Promote and provide information about the tools and resources available to public health laboratories and other stakeholders

- Support and assist state and local authorities in the use and adoption of recommendations contained in the *CIFOR Guidelines for Foodborne Disease Outbreak Response, Third Edition, 2019* and the *CIFOR Guidelines Toolkit*.

S3. Training and Capacity Building

S3.1. Identify training and workforce development needs among laboratory professionals in diverse settings

- Identify training needs and provide training opportunities for PHL staff and executive leadership.
- Use needs assessment results to inform the development and delivery of training and workforce development resources for PHL staff and leadership.

S3.3. Facilitate the development and delivery of training and workforce development resources

- Support foodborne and waterborne disease outbreak response training of laboratorians and other local and state officials through



various training opportunities, including the Epi-Ready Team Training Courses.

- Support training of laboratorians in the detection, categorization and identification of foodborne, waterborne, and environmentally transmitted organisms, and the diagnosis of foodborne, waterborne, and environmentally transmitted disease.
- Apply best practices to all training and workforce development products, resources, and events (e.g., CDC Quality Training Standards and Laboratory Competencies).
 - Monitor and evaluate effectiveness of training and workforce development products, resources, and events regularly and consistently.
 - Provide topic-specific technical expertise for the design, development, and delivery of training and workforce development products, resources, and events.
 - Collaborate with CDC to review training and workforce development products, resources, and events.

S4. Laboratory Quality, Safety, Preparedness, and Informatics for Public Health Testing Services, Surveillance, and Response

S4.1. Develop and implement informatics-related solutions and standards to improve data exchange and interoperability

In coordination with the collaborative CDC workgroup that provides governance for informatics projects accomplished through collaborations with CDC partners governance workgroup and the recipient's informatics program:

- Develop and maintain secure communication systems for information exchanges and transfers.
- Support development of improved methods to electronically disseminate laboratory results.

S4.2. Identify and address systems to improve the practice of laboratory quality and safety in public health laboratories

- Develop best practices, and performance and quality standards.

S4.3. Identify and address emerging methodological and process improvements in public health laboratories

- Evaluate and improve existing laboratory workflows to better implement new technologies [e.g., whole genome sequencing (WGS)], including guidance for changes to PHL practice.

S4.4. Provide technical assistance to state and local public health laboratories to support improvements in public health outcomes

- Increase laboratory workforce capacity to more rapidly and efficiently identify agents of foodborne, waterborne, and environmentally transmitted disease, including capability to recognize new pathogens as well as known pathogens in new food and environmental vehicles, and effectively respond to the challenges of culture-independent diagnostic testing.

- Support environmental health, science and microbiology activities related to waterborne investigations.

b. Evaluation and Performance Measurement

I. CDC Evaluation and Performance Measurement Strategy

The CDC Evaluation and Performance Measurement Strategy for this focus area uses the guidance from the overall CDC Evaluation and Performance Measurement Strategy described in this NOFO (Part II, A-2-b-i. CDC Evaluation and Performance Measurement Strategy), to address the following specific performance measures (including process measures and outcome measures) for this focus area.

Process measures for each of the activities in this focus area may include:

Strategy and Activity	Process Measure
<p>S2.2. Collaborate and build relationships among laboratory professionals and other stakeholders in public health, healthcare, and beyond</p> <ul style="list-style-type: none"> • Support the Council to Improve Foodborne Outbreak Response (CIFOR) in identifying barriers to rapid and accurate foodborne disease outbreak detection and investigation. • Support CIFOR’s efforts to develop and implement solutions to these identified barriers. • Support global food safety activities (e.g., PNI). 	<ul style="list-style-type: none"> • Number of staff and number of members who participate on the CIFOR Council, Governance Team, and Development Teams. • Number of CIFOR products supported, including 3rd edition of the CIFOR Guidelines, the CIFOR Toolkit, and other CIFOR materials. • Number of PNI regional and PNI steering committee meetings and calls organized. • Number of trainings and proficiency testing supported in PNI regions.
<p>S2.3. Facilitate information exchange and dissemination among practitioners and other stakeholders</p> <ul style="list-style-type: none"> • Help improve methods to rapidly obtain, collate, analyze, and disseminate combined food and water safety epidemiologic and laboratory information. • Support the compilation, dissemination, discussion, and professional exchange of information about various aspects of foodborne, waterborne, and environmentally transmitted disease among the laboratory, epidemiology, and environmental health disciplines through conferences, webinars, and meetings. 	<ul style="list-style-type: none"> • Number of InFORM Conference/Regional Meeting bimonthly Executive Committee and sub-committees calls attended. • Number of staff and laboratorians supported for travel to InFORM/Regional Meetings. • ≥90% of attendees rate InFORM 2020 sessions and trainings as tools that help increase job performance. • CaliciNet SharePoint site maintained and accessible on recipient’s website. • Number of PulseNet Steering Committee calls coordinated. • Number of in-person meetings at InFORM/Regional Meetings coordinated.



	<ul style="list-style-type: none"> • Number of training activities conducted for PulseNET WGS and analysis workflows. • Number of CryptoNet training and reporting activities conducted.
<p>S2.5. Promote and provide information about the tools and resources available to public health laboratories and other stakeholders</p> <ul style="list-style-type: none"> • Support and assist state and local authorities in the use and adoption of recommendations contained in the CIFOR Guidelines for Foodborne Disease Outbreak Response, Third Edition, 2019 and the CIFOR Guidelines Toolkit. 	<ul style="list-style-type: none"> • Number of communication mechanisms and messages promoting the use of the CIFOR Guidelines for Foodborne Disease Outbreak Response, Third Edition, 2019 and the CIFOR Guidelines Toolkit.
<p>S3.1. Identify training and workforce development needs among laboratory professionals in diverse settings</p> <ul style="list-style-type: none"> • Identify training needs and provide training opportunities for PHL staff and executive leadership. 	<ul style="list-style-type: none"> • Report summarizing recommendations, including prioritization of training needs in the PulseNet network. • Number of new and emerging training needs identified for PulseNet network • Number of trainings conducted in coordination with CDC.
<p>S3.3. Facilitate the development and delivery of training and workforce development resources</p> <ul style="list-style-type: none"> • Support foodborne and waterborne disease outbreak response training of laboratorians and other local and state officials through various training opportunities, including the Epi-Ready Team Training Courses. • Support training of laboratorians in the detection, categorization and identification of foodborne, waterborne, and environmentally transmitted organisms, and the diagnosis of foodborne, waterborne, and environmentally transmitted disease. • Apply best practices to all training and workforce development products, resources, and events (e.g., CDC Quality Training Standards and Laboratory Competencies). 	<ul style="list-style-type: none"> • Number of laboratory professionals participating in foodborne and waterborne disease outbreak response training (e.g., Epi Ready), and CaliciNet, PulseNet and CryptoNet trainings. • CaliciNet users meeting held annually. • CaliciNet training workshop held annually. • Number of PulseNet trainings developed and implemented, including coordination of continuing education credits if needed. • Number of CryptoNet trainings developed and implemented.
<p>S4.1. Develop and implement informatics-related solutions and standards to improve data exchange and interoperability</p>	<ul style="list-style-type: none"> • Number and types of informatics approaches and improvements for data



<ul style="list-style-type: none"> • Develop and maintain secure communication systems for information exchanges and transfers. • Support development of improved methods to electronically disseminate laboratory results. 	<p>exchange between laboratory and epi databases.</p> <ul style="list-style-type: none"> • Number and types of informatics approaches for linking case patient ID in laboratory databases for more efficient data linking at local, state, and national level.
<p>S4.2. Identify and address systems to improve the practice of laboratory quality and safety in public health laboratories</p> <ul style="list-style-type: none"> • Develop best practices and performance and quality standards. 	<ul style="list-style-type: none"> • Number and types of Quality Management System (QMS) laboratory good practice documents provided to PHLs for PulseNet related workflows. • Supported coordination and maintenance of PulseNet’s quality management system, including certification of annual proficiency testing.
<p>S4.3. Identify and address emerging methodological and process improvements in public health laboratories</p> <ul style="list-style-type: none"> • Evaluate and improve existing laboratory workflows to better implement new technologies [e.g., whole genome sequencing (WGS)], including guidance for changes to PHL practice. 	<ul style="list-style-type: none"> • Number of process improvement evaluations conducted, such as LEAN, to aid PHLs in integrating WGS into routine workflows. • Number of process improvement evaluations conducted as new technologies are integrated into PulseNet. • Evaluated workflows to incorporate parasite WGS (e.g., Cryptosporidium) into PulseNet workflows.
<p>S4.4. Provide technical assistance to state and local public health laboratories to support improvements in public health outcomes</p> <ul style="list-style-type: none"> • Increase laboratory workforce capacity to more rapidly and efficiently identify agents of foodborne, waterborne, and environmentally transmitted disease, including capability to recognize new pathogens as well as known pathogens in new food and environmental vehicles, and effectively respond to the challenges of culture-independent diagnostic testing. • Support environmental health, science and microbiology activities related to waterborne investigations. 	<ul style="list-style-type: none"> • Support work performed by at least 5 CaliciNet-Outbreak Support Centers (CN-OSCs). • Support work performed by at least 2 CaliciNet-Unexplained Viral Diarrheal Centers (CN-UVDs). • Number and types of workflows developed and implemented in response to changing clinical and diagnostic laboratory practice, such as CIDTs. • Conference calls and one in- person meeting supported for workflow development. • Validation of workflow improvements with no less than 2 PHLs for laboratory approaches including isolate recovery.



	<ul style="list-style-type: none"> • Coordination of processing and testing workflows for environmental samples.
--	---

Outcome measures for this focus area may include:

Outcome	Outcome Measure
<p>IO-1. Established communities of practice and other collaborative relationships among and between laboratories and other stakeholders</p> <ul style="list-style-type: none"> • Improved collaboration and coordination between laboratories, and between laboratorians, epidemiologists, environmental health specialists and bioinformaticians at local, state, federal, and international levels 	<ul style="list-style-type: none"> • Increased number of communication and collaborative efforts among public health scientists, laboratorians, epidemiologists, bioinformaticians, and environmental health scientists. • Increased number of collaborative efforts among global public health partners.
<p>IO-3. Improved competence and engagement of public health laboratory workforce</p> <ul style="list-style-type: none"> • Improved laboratory workforce competency in foodborne, waterborne, and environmentally transmitted disease detection and response 	<ul style="list-style-type: none"> • Increased number of state and local health departments and laboratories that are prepared to respond to current and emerging foodborne, waterborne, and/or environmentally transmitted public health threats. • Increased number of frontline public health workers at the state and local level who are competent and prepared to respond to foodborne, waterborne, and/or environmentally transmitted disease outbreaks, threats, and emergencies. • Increased number of trainings to improve the effectiveness, preparedness, and sustainability of the PHL workforce to meet emerging public health challenges related to foodborne, waterborne, and/or environmentally transmitted pathogens.
<p>IO-4. Enhanced practices, methods, technical capabilities, and infrastructure within the public health laboratory system</p> <ul style="list-style-type: none"> • Improved laboratory methods for detection, investigation, and reporting foodborne, waterborne, and environmentally transmitted illnesses 	<ul style="list-style-type: none"> • Increased number of PHLs capable of performing and evaluating new technologies and changes in clinical laboratory practice (e.g., next-generation sequencing (NGS) and culture-independent diagnostic testing). • Decreased state and local health department time to identify causes, risk factors, and appropriate interventions for those affected by foodborne,



	waterborne, and/or environmentally transmitted threats to public health.
<p>IO-6. Improved public health laboratory detection, surveillance, and response</p> <ul style="list-style-type: none"> Improved laboratory systems for detection, investigation, and reporting foodborne, waterborne, and environmentally transmitted illnesses 	<ul style="list-style-type: none"> Decreased PHL time to detect and report foodborne, waterborne, and/or environmentally transmitted agents in tissue, food, water, or other environmental samples.

II. Applicant Evaluation and Performance Measurement Plan

The recipient will be required to submit a detailed Evaluation and Performance Measurement plan within the first 6 months of award and work with CDC staff to ensure that the evaluation plan is feasible and consistent with proposed focus area activities, the intent of this NOFO, and CDC’s evaluation approach.

c. Collaborations

With CDC funded programs

General guidance for collaborations with CDC funded programs is described in section a, “With other CDC programs and CDC-funded organizations,” under Part II, A-2-iii-1 (Collaborations) in this NOFO. The recipient is expected to work effectively with the CDC Food Safety Office, Enteric Diseases Laboratory Branch, the Outbreak Prevention and Response Branch, and Waterborne Disease Prevention Branch within NCEZID/DFWED, as well as the Viral Gastroenteritis Branch in NCIRD/DVD, the Parasitic Diseases Branch in CGH/DPDM, and the Water, Food and Environmental Health Services Branch in NCEH/DEHSP.

With organizations external to CDC

General guidance for collaborations with organizations external to CDC is described in section b, “With organizations not funded by CDC,” under Part II, A-2-iii-1 (Collaborations) in this NOFO. The recipient must demonstrate the capacity to work effectively with state agencies, federal agencies [Food Safety and Inspection Service (FSIS) of the U.S. Department of Agriculture (USDA), U.S. Food and Drug Administration (FDA), Environmental Protection Agency (EPA)], and national associations [Association of Food and Drug Officials (AFDO), Association of State and Territorial Health Officials (ASTHO), Council of State and Territorial Epidemiologists (CSTE), the National Environmental Health Association (NEHA), National Association of County and City Health Officials (NACCHO), the National Association of State Departments of Agriculture (NASDA), the National Association of State Public Health Veterinarians (NASPHV), the Association of State Drinking Water Administrators (ASDWA)]. The recipient should also have experience in working with agricultural, environmental and chemical laboratories.

The recipient is expected to provide leadership for enhancing existing and developing new strategic partnerships that best suit the needs of the nation’s PHL system, at state, territorial, tribal, and local levels. Recipient is encouraged to explore opportunities for new collaborations with additional partners to advance public health priorities.



d. Target populations

In addition to PHLs and PHL professionals supporting state, local, tribal, and territorial public health programs, the specific target population of this focus area also includes environmental health specialists and epidemiologists and other stakeholders of the PHL system, such as policy makers, clinical laboratories, healthcare organizations, professional organizations, as well as the general public.

e. Organizational Capacity

Refer to section c, “Organizational Capacity of Recipients to Implement the Approach” under Part II, A-2 (CDC Project Description) in this NOFO.

The recipient should demonstrate considerable partnership experience and work effectiveness in the public health community and related public health systems, as it relates to foodborne, waterborne, and environmentally transmitted disease outbreaks and other public health foodborne, waterborne, and environmentally transmitted threats and emergencies. The recipient should also demonstrate expertise and long-standing relationships with partners in the PHL science field, substantial experience in conducting the proposed activities, and existing staffing and infrastructure to achieve outcomes.

f. Work Plan

The recipient is required to provide a work plan for this focus area that provides both a high-level overview of the entire five-year period of performance and a detailed description of the first year of the award. The work plan should follow the general guidance provided in section d, “Work Plan” under Part II, A-2 (CDC Project Description) in this NOFO, and address the specific strategies, activities, outcomes, and performance measures of this focus area. After the award is made, the proposed work plan (including the evaluation and performance measurement plan) may be adjusted in collaboration with the CDC Technical Monitor(s) to ensure integration of the strategies and activities and achievement of the period of performance outcomes.

g. CDC Program Support to Recipient

CDC Food Safety Program staff will provide technical monitoring and program support for this focus area as described in section f, “CDC Program Support to Recipients”, under Part II, A-2 (CDC Project Description) in this NOFO. CDC technical monitor(s) will meet with the recipient’s public health staff at least monthly or on an ad hoc basis for emerging issues via conference call to discuss project progress and future actions. In addition, CDC may participate in all relevant stakeholder and other meetings, either in-person or by teleconference.