

CDC's Division of Foodborne, Waterborne, and Environmental Diseases (DFWED) Laboratories

DFWED Overview

- **DFWED's Mission** is to improve public health nationally and internationally through prevention and control of disease, disability, and death caused by foodborne, waterborne, and environmentally transmitted infections.
- DFWED has laboratories for foodborne, waterborne, mycotic (fungal), and environmentally transmitted diseases. Utilizing state of the art technology, DFWED laboratories serve as vital reference laboratories for the United States and the world, aid in critical disease detection, outbreak investigation, staff training, and public health research.

Waterborne Disease Prevention Branch Laboratories

- **The Waterborne Disease Prevention Branch (WDPB) laboratories** lead coordination and response for domestic and global water-transmitted diseases.
- In these laboratories, DFWED conducts a wide range of activities from diagnostics to surveillance, to outbreak investigations and emergency readiness, and basic and advanced research on new testing methods. The laboratories use clinical and environmental testing to investigate waterborne disease outbreaks in the US and abroad, research what causes waterborne diseases, and assist public health colleagues around the world to build their own lab capacity and expertise.
- **Waterborne disease laboratory activities:**
 - **Free- Living and Intestinal Amebas Laboratory:** *Naegleria fowleri*, a free-living amoeba, has an infection mortality rate over 97%. This laboratory includes a reference laboratory for pathogenic free-living amoebas including *Naegleria fowleri* in the US and globally, rapidly diagnoses infections to inform clinical consultations, and conducts research to develop or improve test methods. Fast, accurate data from this lab can assist physicians to make correct treatment decisions and save lives.
 - **Molecular Epidemiology Laboratory:** CDC laboratory for *Cryptosporidium* (Crypto), the #1 cause of diarrheal disease from recreational water, and *Giardia*. This laboratory works with state and local public health departments during Crypto and *Giardia* outbreaks, develops and applies innovative detection methods, tracks the source, and spread of Crypto and *Giardia*, and manages CryptoNet-- the first molecular surveillance system for parasites in the US.
 - **Environmental Microbiology and Engineering Laboratory (EMEL):** EMEL provides expertise on water-transmitted pathogens, such as how these pathogens enter, are transported, or even grow in the environment. This laboratory also provides support to investigate the cause and source of waterborne disease and outbreaks and conducts research on disinfecting water and enhancing environmental sampling techniques to support environmental testing in laboratories across the country.
 - **The Global WASH Laboratory:** This laboratory supports design and implementation of water quality monitoring in outbreak response efforts, such as large-scale cholera and typhoid outbreaks. The Global lab primarily builds and strengthens environmental microbiology laboratory capacity in low- and middle-income countries and recently launched a global wastewater and environmental surveillance program.

Enteric Diseases (Foodborne) Laboratories

- The DFWED enteric diseases, or foodborne, laboratories are CDC's lead laboratory supporting the effort to prevent illness caused by enteric (intestinal) disease. The laboratories are within the Enteric Disease Laboratory Branch and are critical in rapidly identifying foodborne pathogens, antimicrobial resistance, and helping control foodborne disease outbreaks.
- The enteric diseases laboratories conduct research on foodborne pathogens and antimicrobial resistance patterns, improve laboratory detection methods for foodborne pathogens, build laboratory capacity for foodborne infections in the US and globally, and strengthen bioterrorism preparedness and response for botulism.
- **Enteric diseases laboratory activities:**
 - **National Antimicrobial Resistance for Enteric Bacteria (NARMS):** NARMS was established in 1998 and is a collaboration among state and local public health departments, CDC, FDA, and USDA. The NARMS laboratory tracks antimicrobial resistance, studies patterns of emerging resistance, and researches the genes responsible for resistance in enteric bacteria. Antimicrobial data monitoring and interagency sharing can lead to better control of antimicrobial resistant foodborne pathogens in the food supply.
 - **National Botulism Laboratory (NBL):** NBL maintains CDC expertise for laboratory investigations of botulism. The laboratory provides technical assistance to US and international public health laboratories, clinical consultations to health providers treat potential cases, and studies new identification methods to better prepare for future botulism cases.
 - **PulseNet:** PulseNet is a national laboratory network that connects foodborne illness cases to detect outbreaks. The PulseNet laboratory responds to foodborne outbreaks, studies foodborne pathogens, and builds laboratory capacity in the US. PulseNet International performs a similar role for foodborne illnesses globally.
 - **National Enteric Reference Laboratories:** Reference activities for *Campylobacter*, *Helicobacter*, *Salmonella*, *Listeria*, *Yersinia*, *Vibrio*, *Escherichia*, and *Shigella*.

Mycotic (Fungal) Diseases Branch Laboratory

- **The Mycotic Diseases Branch (MDB) Laboratory** serves as a global reference laboratory, detecting new pathogens and emerging antifungal resistance. This laboratory also conducts applied research to detect disease-causing fungi in natural and healthcare environments. The Mycotic Lab is within the Mycotic Diseases Branch, one of the few public health entities worldwide that focus on prevention and control of fungal diseases.
- **MDB laboratory activities:**
 - Generate new information about disease-causing fungi.
 - Find and identify disease-causing fungi in patient specimens and environmental samples.
 - Test clinical specimens to identify pathogens and see if they are resistant to antifungal medications.
 - Research and develop new detection techniques.
 - Use whole-genome sequencing to understand how and why certain fungi spread and make people sick.
 - Provide training and education in the US and globally to improve the ability to test and identify fungi.
 - Respond quickly to rare fungal disease outbreaks.