

# LABORATORY EXPERTISE



Advanced Molecular Detection laboratory scientists use genomic sequencing to gather data on pathogens.

THE WORK OF CDC'S  
**National Center for Emerging and Zoonotic Infectious Diseases (NCEZID)** is about protecting America's health, safety, and security. NCEZID is ground zero when there's an outbreak of infectious disease. We have world-class scientists, researchers, emergency responders, and laboratories to protect people from illnesses.



## HOW WE KEEP AMERICANS SAFE

NCEZID laboratories serve as vital reference laboratories for the United States and the world, aiding in critical disease detection, investigation, training, and public health research. In addition to managing the Laboratory Response Network, NCEZID provides oversight for a number of highly specialized laboratories.

**Some important work NCEZID laboratories have produced includes:**

- Discovering and **characterizing new infectious disease threats.**
- Providing an **early warning system** for new or emerging viruses like chikungunya.
- **Monitoring changes** in known germs that hurt people, including new drug-resistant strains like carbapenem-resistant Enterobacteriaceae (CRE) in hospital settings.
- **Preparing reference materials** (strains, cultures, and blood samples) that help confirm germs and providing quality assurance for other laboratories.

National Center for  
**EMERGING and ZOO NOTIC INFECTIOUS DISEASES**





## 4 BIOSAFETY LAB LEVELS

### BSL1



### BSL2



### BSL3 (WITH RISK-BASED ENHANCEMENTS)



### BSL4



● Required safety equipment

● Risk-based enhancements

www.cdc.gov/24-7

- **BSL1** – these labs handle agents that pose minimal risks and are not known to consistently cause disease in healthy adults
- **BSL2** – these labs handle agents that pose only moderate risks to lab staff or the environment
- **BSL3** – these labs handle agents that can cause serious or fatal disease
- **BSL4** – the highest level of lab safety in the world, these labs handle the deadliest germs that cause life-threatening and frequently fatal disease

## NCEZID Laboratories include:

- The **Infectious Disease Pathology Lab** is the primary unit at CDC that tests and evaluates tissues from patients with infectious diseases of unknown origin; they can test for more than 200 viruses and bacteria.
- **Viral special pathogens** labs work with some of the world's most dangerous viruses that need to be handled at the highest biosafety level (BSL4) containment laboratory. Laboratorians sometimes deploy to the field, as they did during the Ebola epidemic to set up a laboratory in Bo, Sierra Leone.
- **Bacterial special pathogens** labs work on anthrax and other potentially deadly bacteria.
- **Rickettsial zoonoses** labs provide expertise in the diagnosis of diseases such as Rocky Mountain spotted fever and discovery of other tickborne disease pathogens. Tests developed by the labs have improved the speed and sensitivity of rickettsial pathogen detection.
- **PulseNet** labs and enteric (gastrointestinal) diseases labs are critical in rapidly identifying foodborne pathogens and helping control foodborne disease outbreaks.
- **Healthcare-associated infections (HAIs)** laboratories look at causes of infectious illnesses occurring in patients who receive health care. They also issue protocols that partners can use for testing for specific pathogens causing HAIs.
- The **Biotechnology Core Facility** is a collection of six laboratories that use cutting-edge technologies like genomic sequencing to test for infectious and bioterror agents. It also evaluates emerging technologies for improving diagnostic tests as part of the Advanced Molecular Detection Program).

**NCEZID laboratorians quickly detect harmful pathogens—whether spread by people, animals, insects, food, or a bioterrorist.**