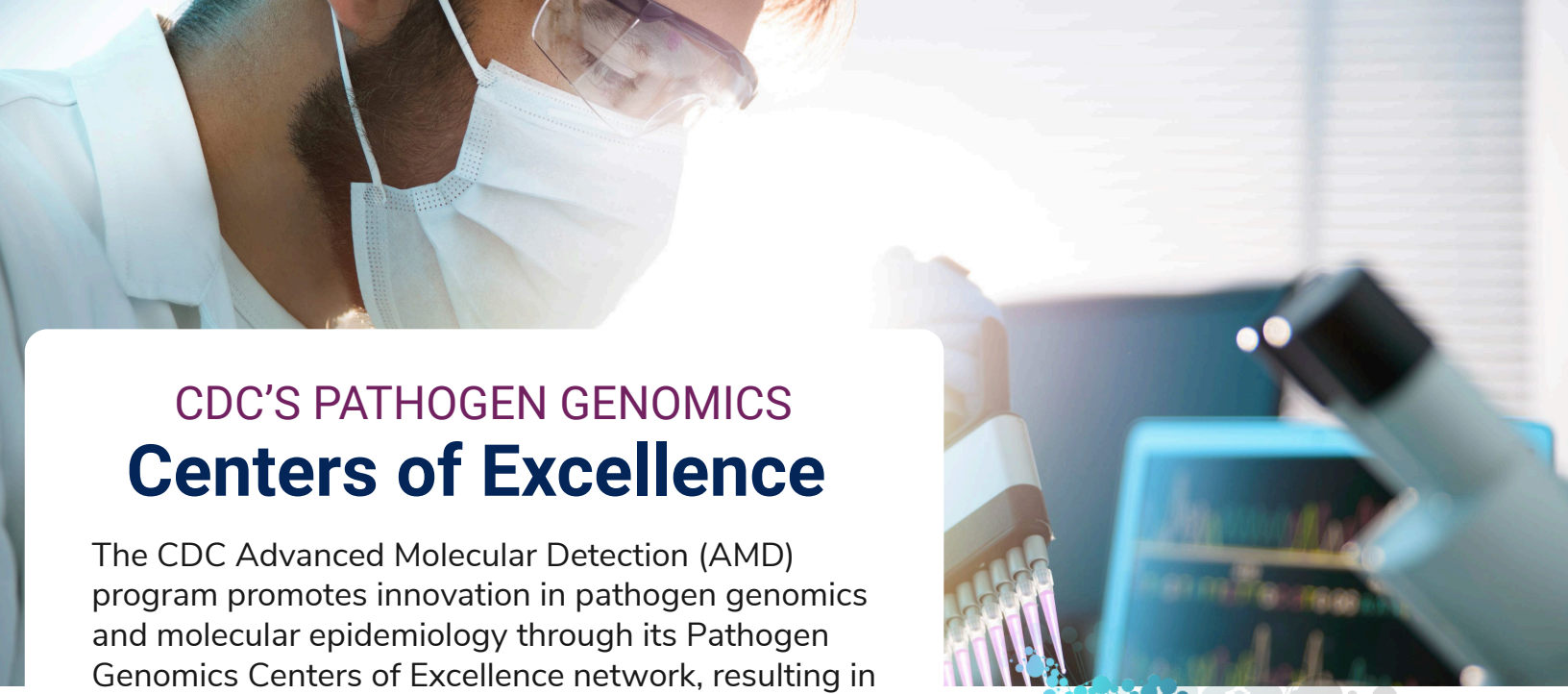

CDC'S PATHOGEN GENOMICS

Centers of Excellence

The CDC Advanced Molecular Detection (AMD) program promotes innovation in pathogen genomics and molecular epidemiology through its Pathogen Genomics Centers of Excellence network, resulting in faster, more effective responses to infectious disease threats.

Together, the centers:

- **Innovate:** Develop groundbreaking new tools and methods for detecting and analyzing pathogens while also identifying ways to integrate pathogen genomic technologies and academic advancements into public health efforts at state and local levels.
- **Educate:** Develop genomics technology trainings and expand existing educational resources for public health professionals such as epidemiologists, bioinformaticians, and microbiologists to help ensure these tools are more accessible and useful in communities across the United States.
- **Respond:** Prepare for infectious disease threats by including a network of experts who can share critical data and implement genomics tools and analyses for early warnings and outbreak responses.

Safer

CDC's five centers facilitate the integration of cutting-edge genomics innovations into public health. From tracking new cases of **H5N1 bird flu** to detecting the source of ***Salmonella*** outbreaks to identifying specific **monkeypox** clades, the network makes Americans safer by using advanced molecular detection techniques to improve our nation's ability to prepare for, detect, and respond to infectious diseases.

Stronger

The centers in Georgia, Massachusetts, Minnesota, Virginia, and Washington integrate the on-the-ground expertise of public health agencies with the research capabilities of academic institutions and other partners. This collaboration produces practical tools that can be easily and quickly used for public health response.

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U.S. CENTERS FOR DISEASE CONTROL AND PREVENTION

CDC'S PATHOGEN GENOMICS CENTERS OF EXCELLENCE ACCOMPLISHMENTS

In 2024, the network finalized a new guide for implementing effective genomic surveillance and practical genomic epidemiology in public health programs. The framework offers straightforward and helpful suggestions that laboratories can use to build or improve use of genomics for infectious diseases, paving the way for better health outcomes.

Georgia Center of Excellence

The Georgia center, known as the Center for Applied Pathogen Epidemiology and Outbreak Control (CAPE), has developed new genomic sequencing methods and analytical approaches that streamline lab testing, allowing for simultaneous surveillance of multiple pathogens. When paired with a secure cloud-based platform to integrate multiple data streams, experts get more detailed insights into a pathogen's genetic characteristics, leading to more effective outbreak management.

Minnesota Center of Excellence

The Minnesota center expanded Minnesota's viral genomic surveillance program to include respiratory syncytial virus (RSV), one of the first initiatives of its kind in the United States. This program will provide insights on the RSV strains in circulating in communities and how they are spreading—essential information to help state and local leaders make informed choices to protect their community.

New England Center of Excellence

The New England center in Massachusetts developed advanced molecular detection methods to differentiate between clade I and clade II monkeypox virus. These methods allowed Massachusetts to confirm a clade II outbreak and helped public health officials assess the effectiveness of existing medications used to treat cases.

Northwest Center of Excellence

The Northwest center in Washington state developed testing protocols to sequence H5N1 viruses from diagnostic specimens collected both from humans and animals. During an outbreak in Washington, two Northwest partners used these methods to sequence viruses in samples from infected poultry and humans, analyze transmission between species, and assess risks from emerging H5N1 strains.

Virginia Center of Excellence

The Virginia center created a national computer-generated model, or "digital twin," of livestock farms to create dynamic risk maps for zoonotic diseases. By analyzing interactions among humans, livestock, and the environment—key pathways for highly pathogenic avian influenza—the network can better evaluate risk for disease.

What is pathogen genomics?

Pathogens are microorganisms like bacteria, viruses, and fungi that can cause disease. Scientists study their genetic material (DNA or RNA) through a process called **pathogen genomics.** This creates a unique "fingerprint" for each pathogen, helping experts identify them, see how they're changing, and understand how they're related to others. This information helps experts detect outbreaks early, track disease spread, and find the most effective treatments.