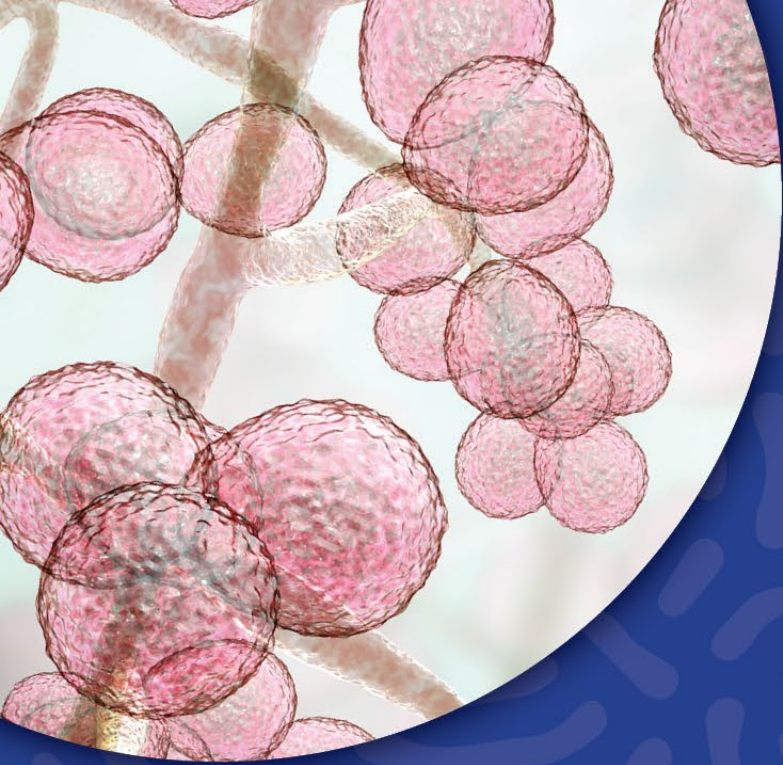
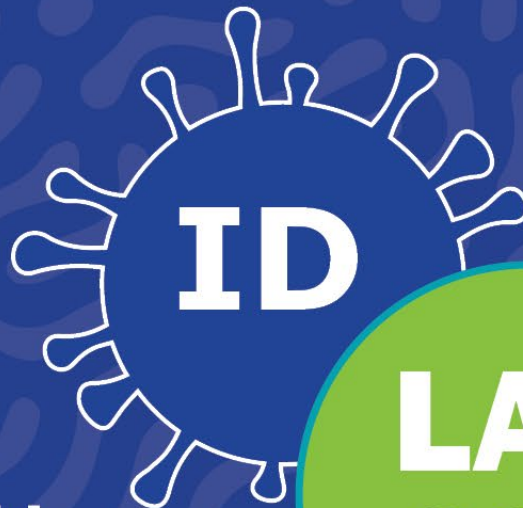
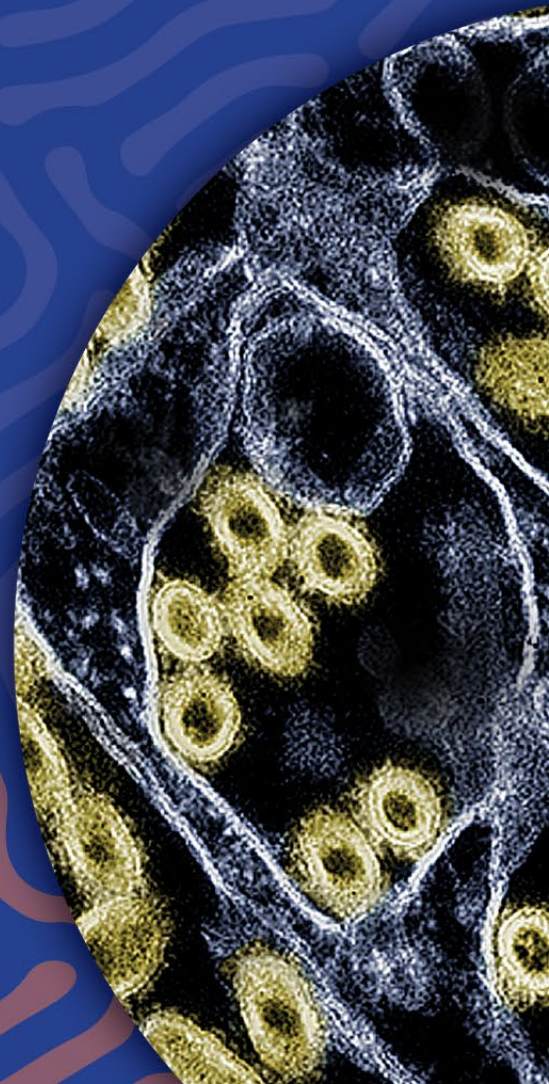




**2025**



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# Next Steps for Next Generation Sequencing

588-512-25 • 5.25 contact hours for this session



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# Opening Remarks

Christin L. Hanigan, Ph.D.

Program Manager, Infectious Diseases

# Overview of the day

- Opening Remarks
- Session 1 – What to do with the data?
  - Kelsey Florek, Ph.D.; Wisconsin Public Health Laboratory
- Session 2 – Genomic Epidemiology – what to do with that data part 2!
  - Daniel Evans, MS; Minnesota Public Health Laboratory
- Session 3 – Metagenomics
  - Kelly Oakeson, Ph.D.; Utah Public Health Laboratory
- Session 4 – Putting it all together
  - Kelly Oakeson, Ph.D.; Utah Public Health Laboratory

# Conflict of Interest Statement

## No Potential Conflicts of Interest

**Speaker:** Kelsey Florek, PhD, Wisconsin State Laboratory of Hygiene

I have NO conflicts of interest related to this presentation to disclose.

**Speaker:** Christin L. Hanigan, PhD, Association of Public Health Laboratories

I have NO conflicts of interest related to this presentation to disclose.

**Speaker:** Kelly Oakeson, PhD, Utah Department of Health and Human Services

I have NO conflicts of interest related to this presentation to disclose.

# Conflict of Interest Statement

## Potential or Actual Conflict of Interest

**Speaker:** Daniel Evans, MS, Minnesota Department of Health

### **Relationships with commercial interests:**

- Other financial benefits:
  - United States Army Reserve: Ongoing reservist military service

# Objectives

- Discuss how clinical and public health laboratories decide how to onboard sequencing for different use cases.
- Describe the metagenomics approaches and use cases currently used in pathogen genomics.
- Discuss how genomic epidemiology practices can be used by both public health and clinical laboratories.

# AMD Program

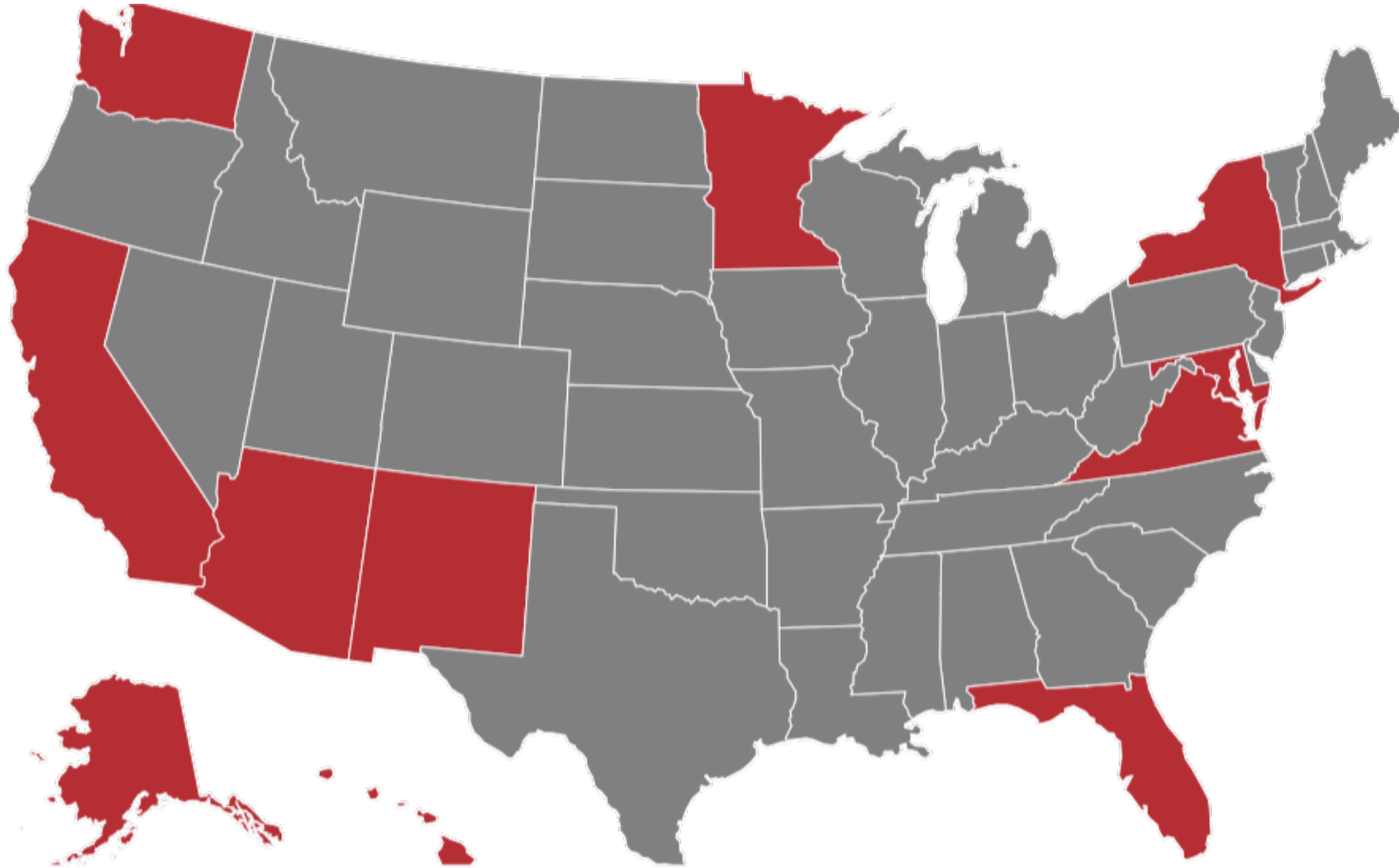


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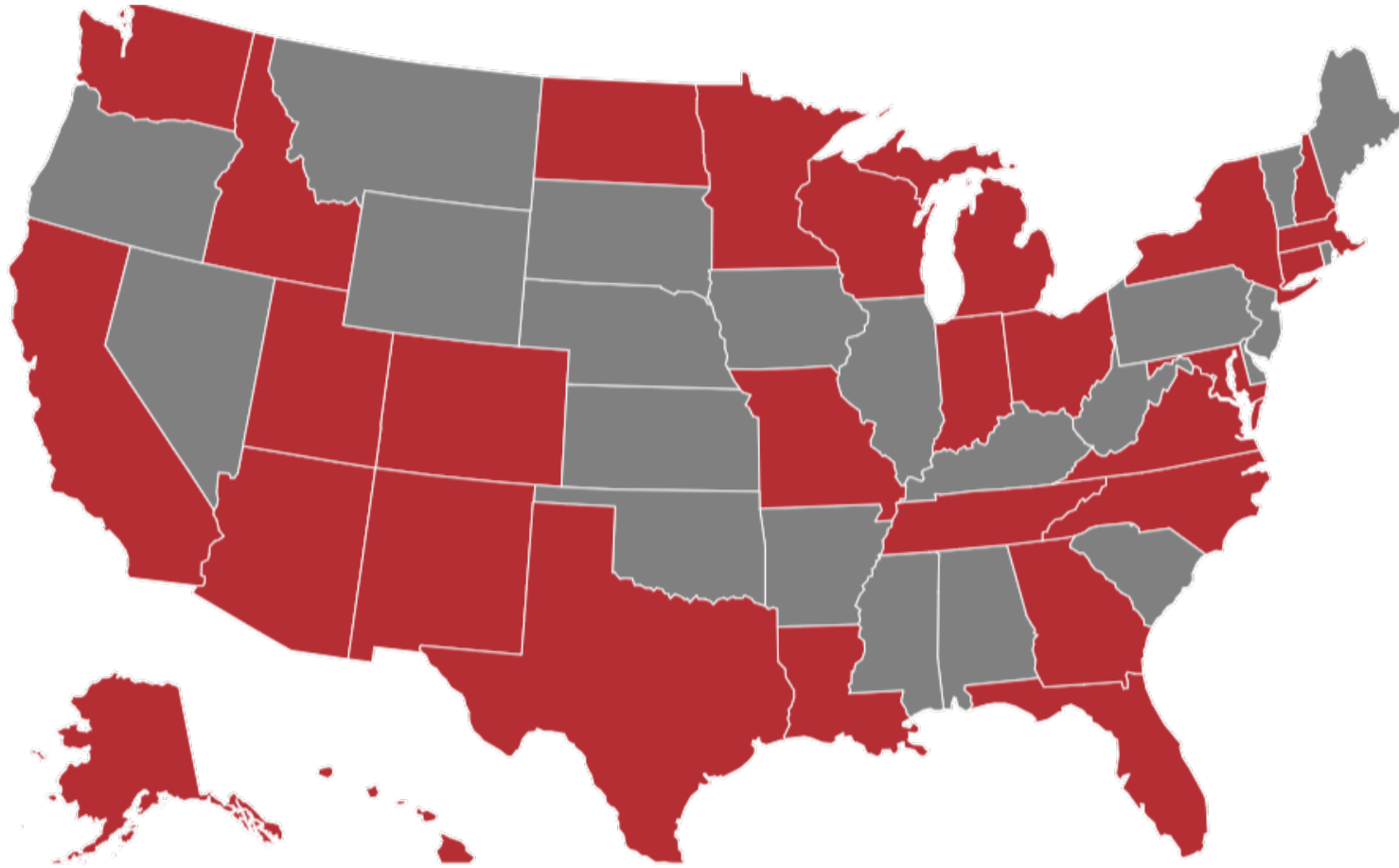
# NGS Capacity in State PHL (2013)

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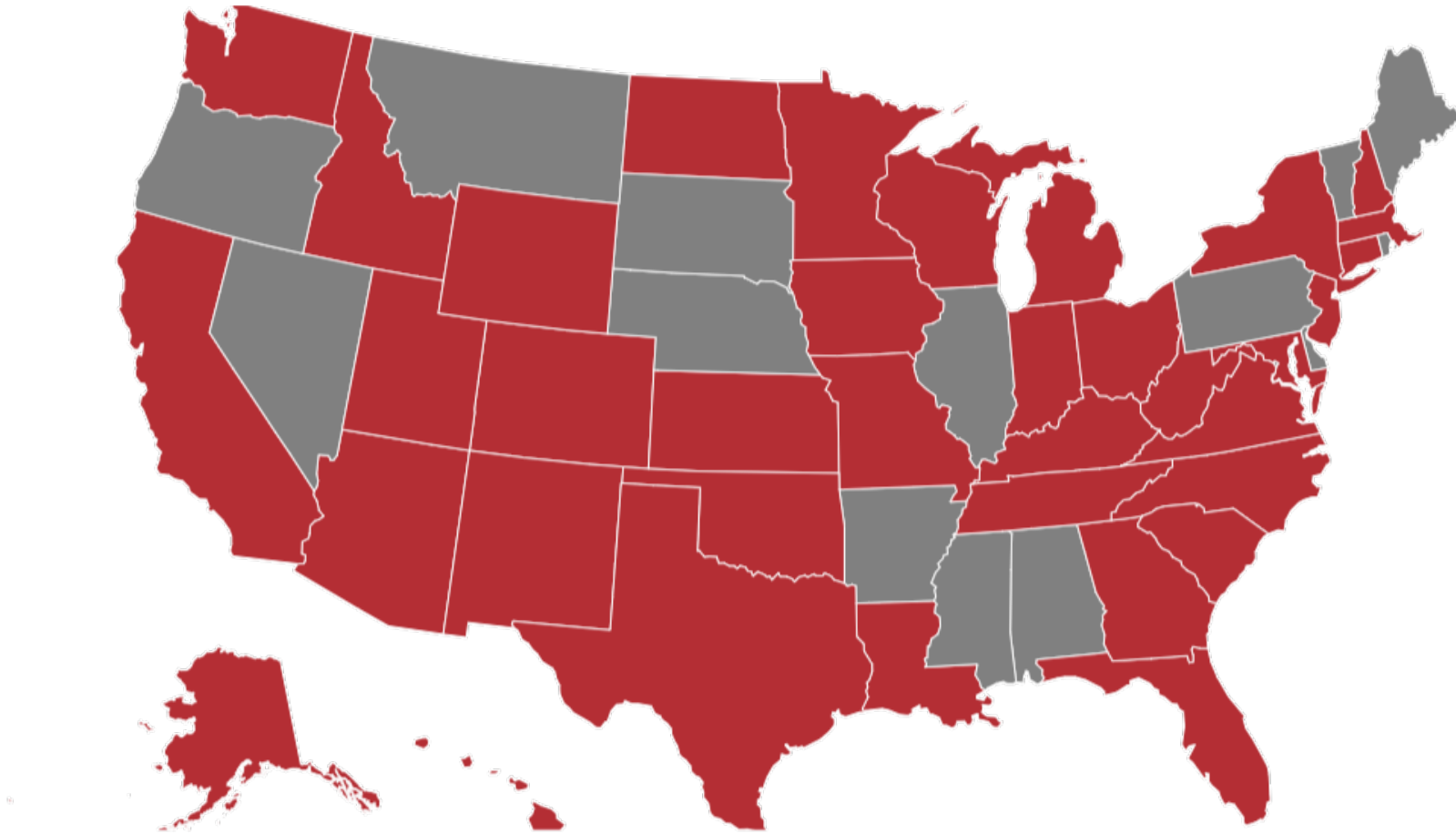
# NGS Capacity in State PHL (2015)

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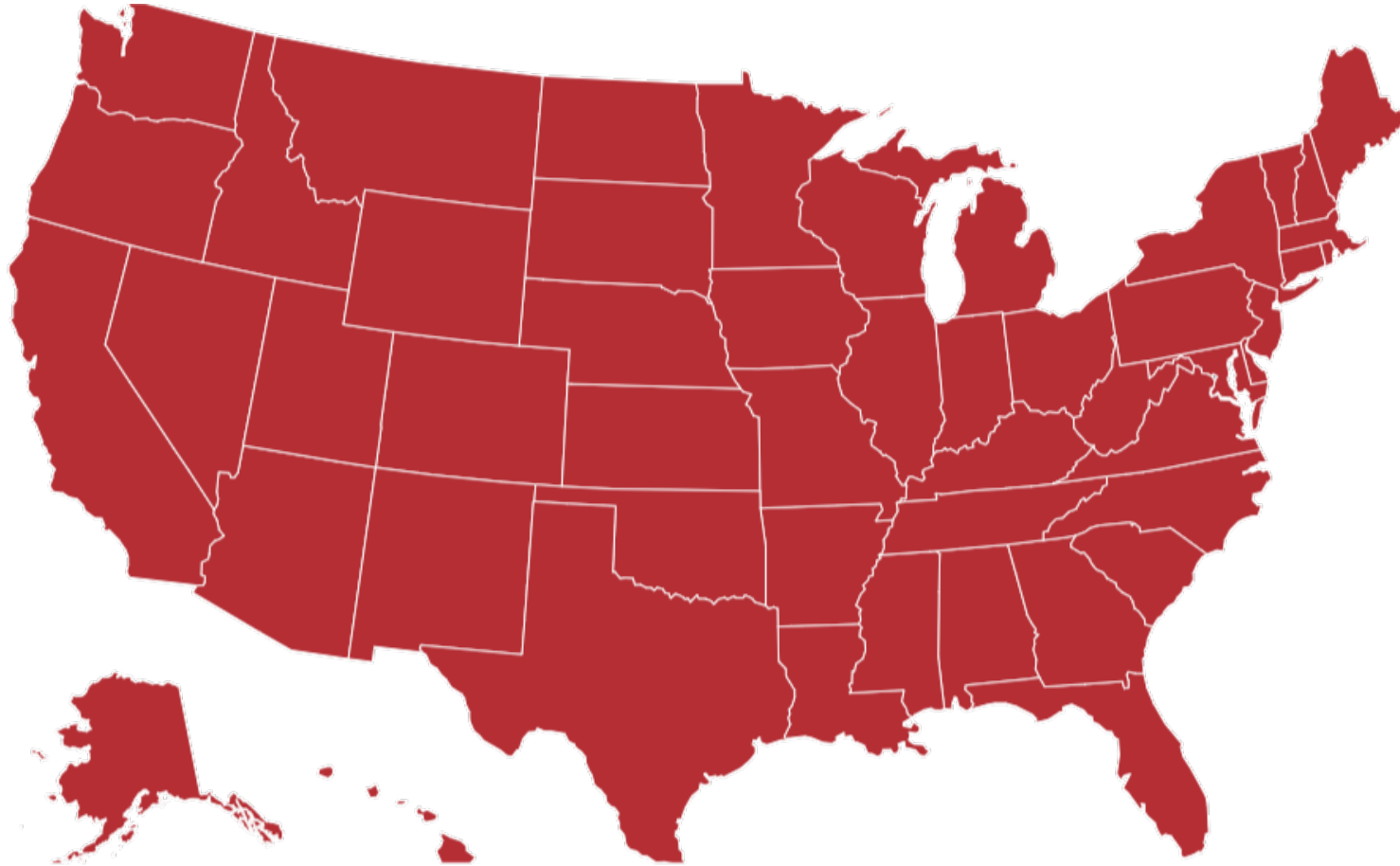
# NGS Capacity in State PHL (2016)

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# NGS Capacity in State PHL (2018)

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# BRIDGE to a Comprehensive National Strategy

The **AMD Strategic Framework** is meant to ensure effective and coordinated use of pathogen genomics, bioinformatics and genomic epidemiology in frontline infectious disease surveillance, preparedness and response.



**BUILD.** Strengthen and expand flexible, sustainable infrastructure for laboratory, information technology, data analytics and decision support.



**REINFORCE.** Invest in a strong, diverse and resilient public health workforce through new fellowship programs and new partnerships; foster ongoing career development, opportunities and pathways.



**INNOVATE.** Drive applied innovation in diagnostics, pathogen genomics, bioinformatics, data integration and molecular epidemiology.



**DEPLOY.** Integrate pathogen sequence data and bioinformatics with other federated data sources and systems; improve access to tools, maximize quality and speed of reporting, enhance data visualization and modeling for better decision support and timely and effective public health action.



**GUIDE.** Help establish quality systems, standards and frameworks for sequence-based assays, ensuring interoperability, reproducibility and regulatory readiness.



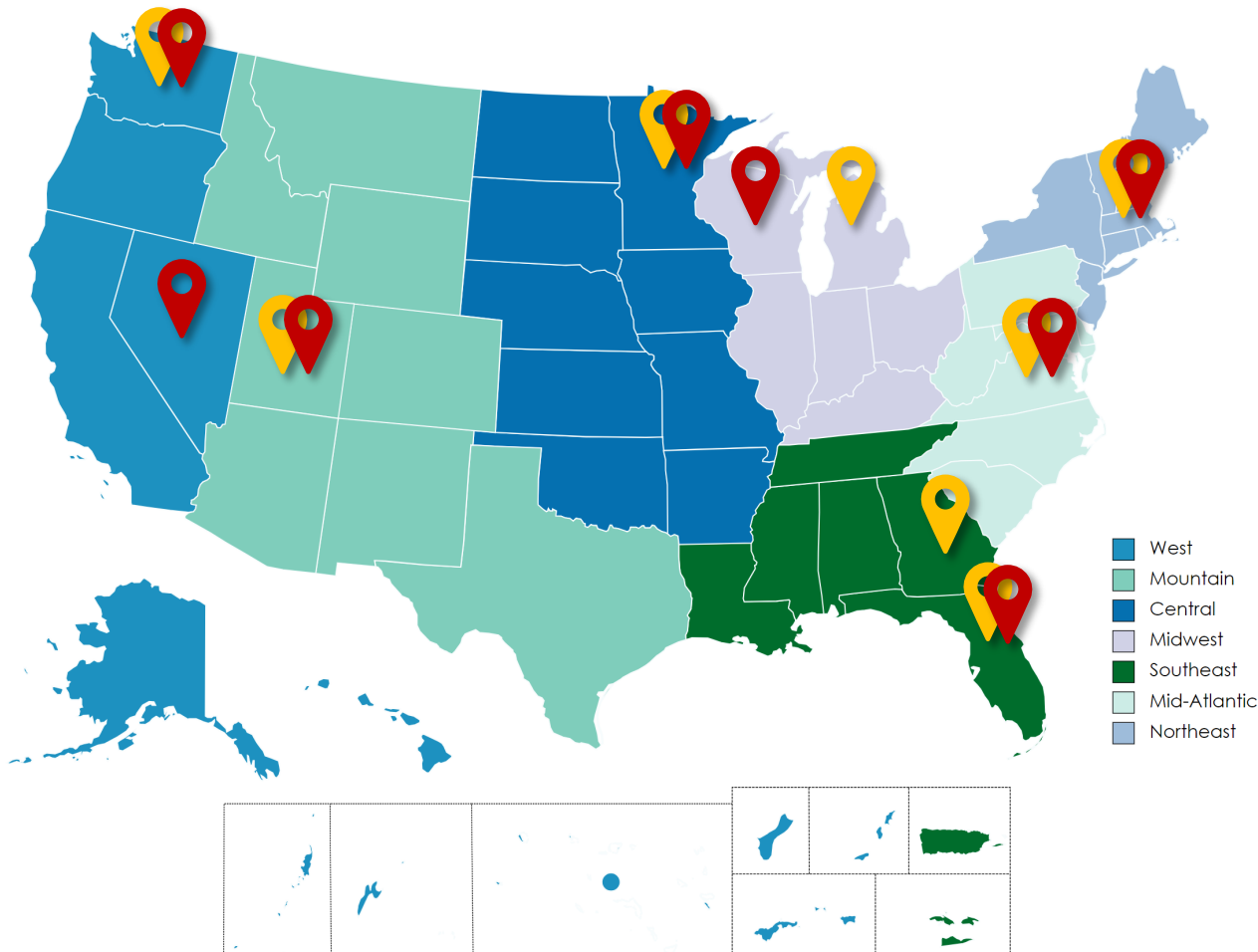
**ENGAGE.** Expand new and existing partnerships and collaborations with academia, public and private sector, both within the United States and abroad.

**One CDC. One Public Health.**

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# Build – Strengthening AMD Capacity

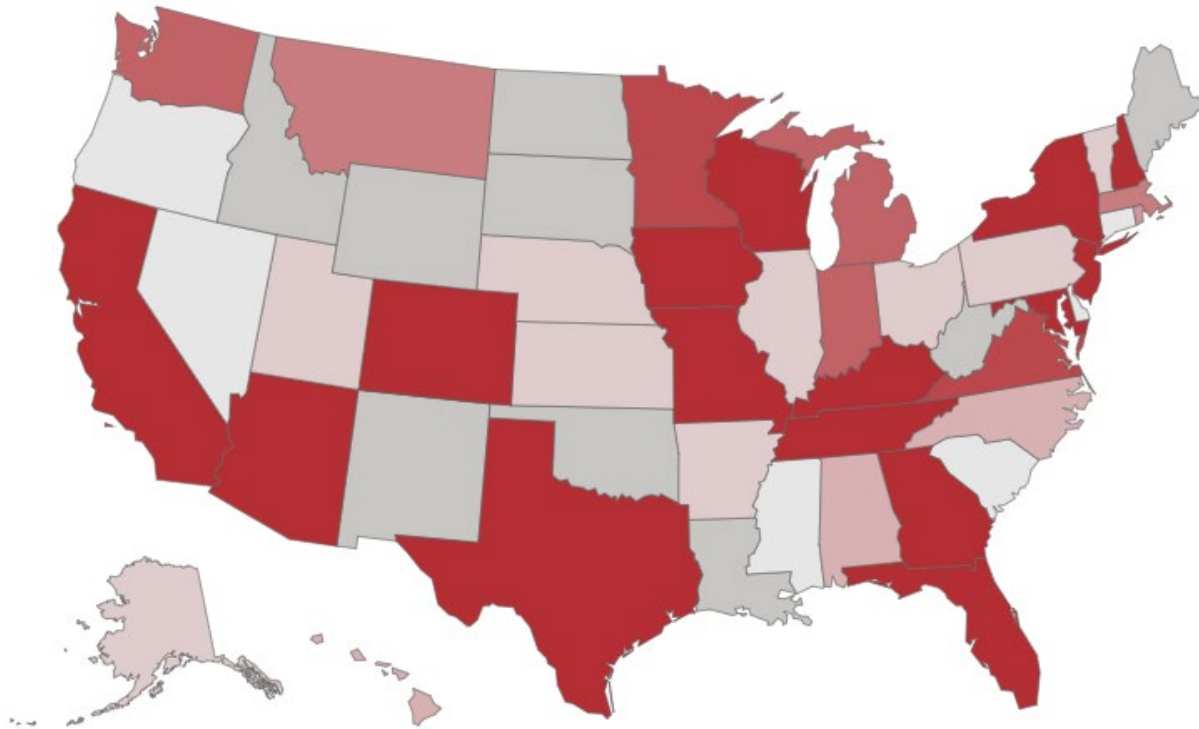


- The first **AMD Bioinformatic Regional Resources (BRRs)** and **AMD Training Leads** were established in 2016.
  - Generally one BRR and one training lead for each region, selected through a competitive process.
-  **BRRs** serve as regional bioinformatics consultants, providing dedicated expertise, helping address technical issues and define priorities.
-  **Workforce Development Training Leads** help plan, deliver and evaluate laboratory, bioinformatics and genomic epidemiology training across the region.

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# Reinforce - APHL Public Health Laboratory Fellowships



92 BIOINFORMATICS  
FELLOWS

300+ FELLOWS



70% OF BIOINFORMATICS  
FELLOWS HAVE STAYED  
IN PUBLIC HEALTH



15 STATE AND LOCAL  
PUBLIC HEALTH  
LABORATORIES

72 PUBLIC HEALTH  
LABORATORIES



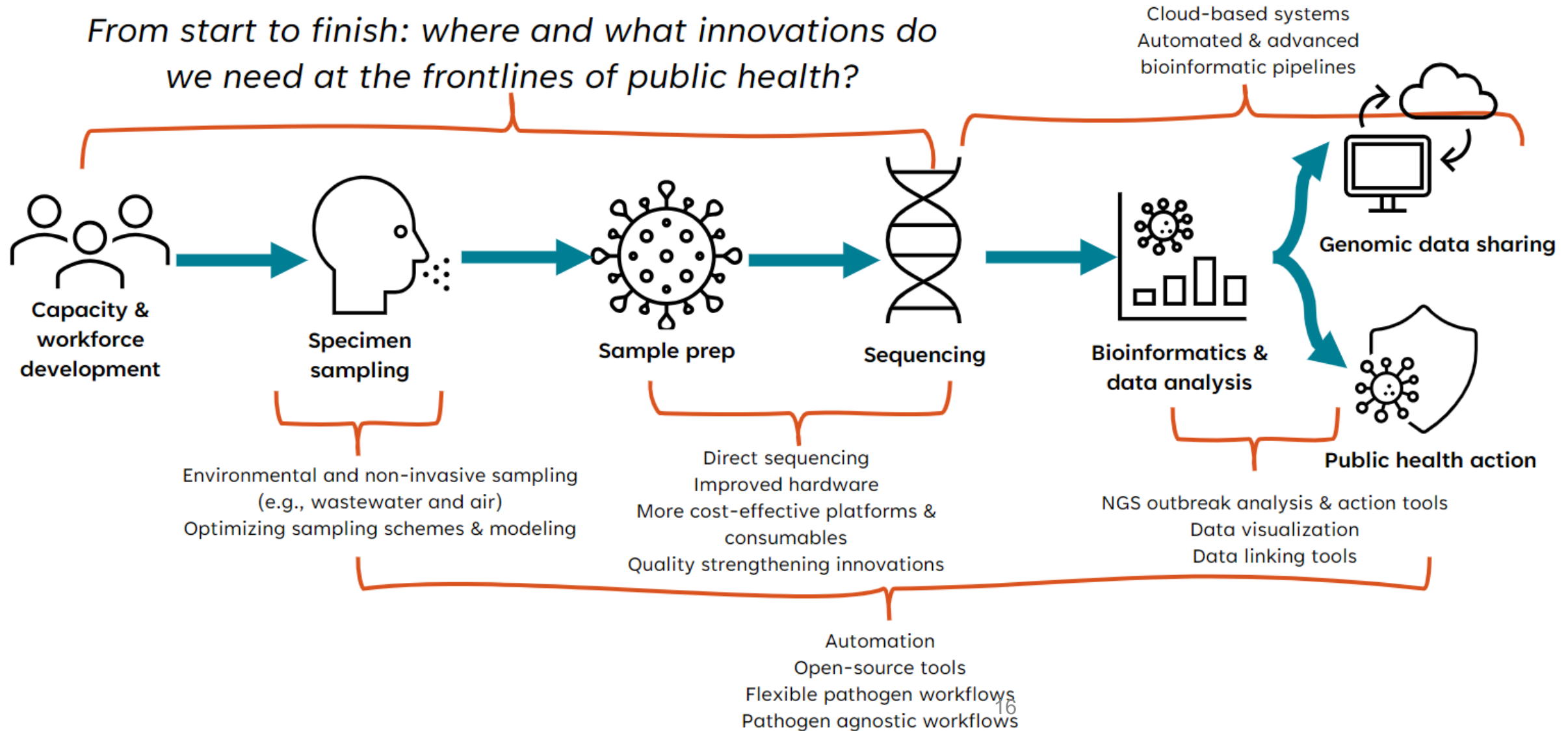
911 ACADEMIC  
INSTITUTIONS

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# Innovation

*From start to finish: where and what innovations do we need at the frontlines of public health?*



# Pathogen Genomics Centers of Excellence

## Georgia PGCOE: Georgia Department of Public Health

- Augusta University
- Emory University
- Georgia State University
- Georgia Tech Research Institute,
- University of Georgia
- University of Texas Health Science Center

## New England PGCOE: Massachusetts DOH (Education Lead)

- Broad Institute of MIT and Harvard
- Harvard Medical School/MassCPR
- Mass General Brigham healthcare system
- Boston University
- Yale University
- Fathom Information Design
- Theiagen Genomics

## Minnesota PGCOE: Minnesota Department of Health

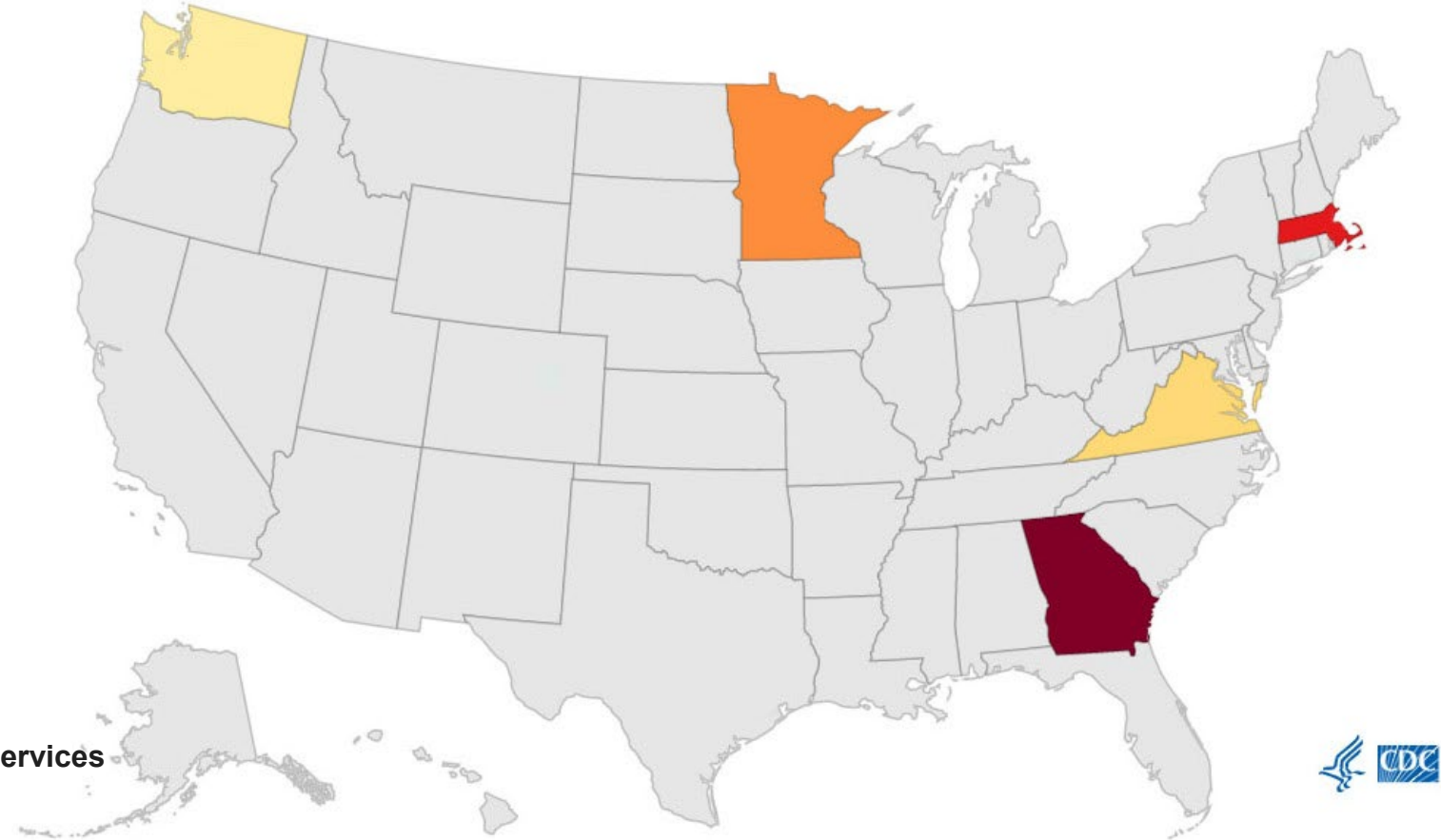
- University of Minnesota
- Mayo Clinic
- University of Pennsylvania College of Veterinary Medicine

## Virginia PGCOE: Virginia Division of Consolidated Laboratory Services

- Virginia Department of Health
- Virginia Commonwealth University
- University of Virginia

## Washington PGCOE: Washington State Department of Health

- University of Washington
- Fred Hutchinson Cancer Center
- Washington Animal Disease Diagnostic Laboratory
- Public Health – Seattle & King County



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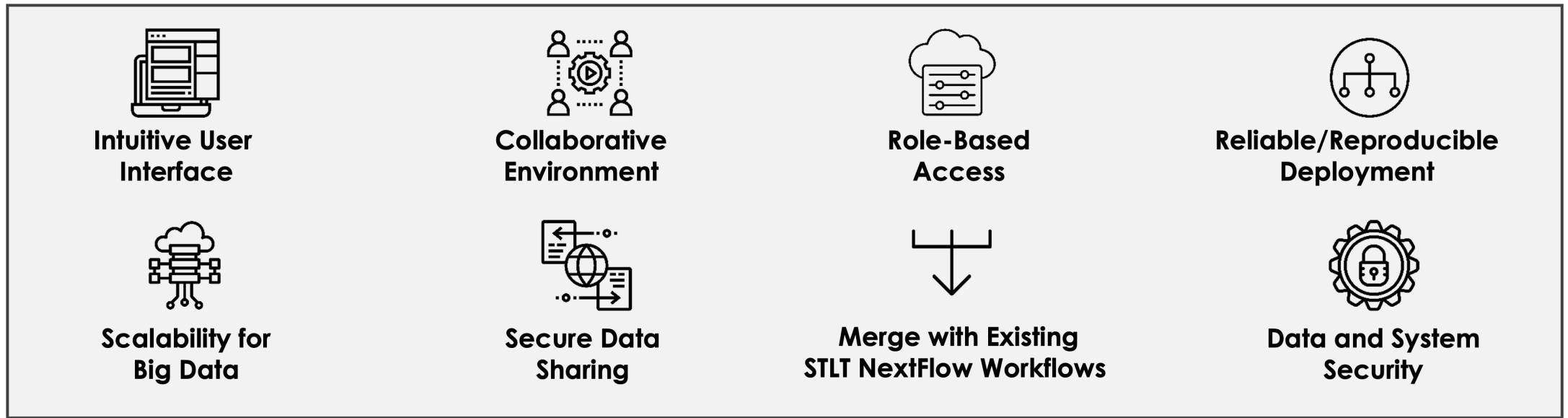


# Pathogen Genomics Centers of Excellence

- Working groups
  - Situational report working group (no longer meeting)
  - Landscape Analysis working group
- Response Base working groups
  - Six different working groups
    - Sample Acquisition and Transport
    - Models for Sequence data dissemination
    - Sharing of epidemiological and linked data
    - Data sharing agreements and IRBs
    - Building an on-call network
    - Coordinating pathogen genomic analytical capacity

# Deploy – A National Bioinformatics Platform

**Business Need:** Enable public health laboratories to perform pathogen genomics and contribute high quality data to publicly available data repositories thereby enhancing genomic epidemiology worldwide



Quality matters



Consistency and reproducibility are important



Collaboration amongst SMEs is critical

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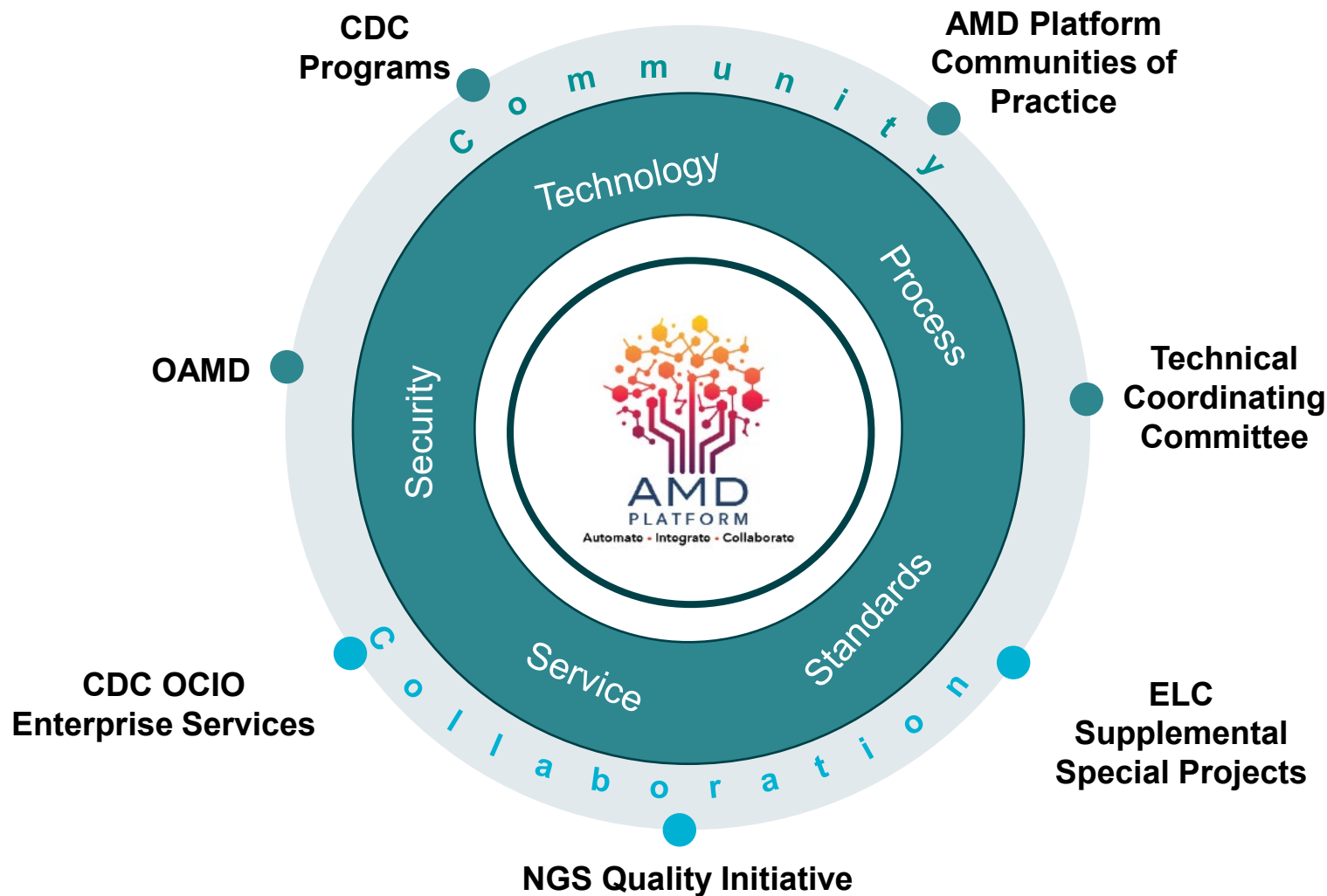
APHL  
2025



# AMD Platform

- Five communities of practice
  - Agile Architecture
  - Data Modernization
  - Quality and Standards
  - Applied Genomic Epidemiology
  - IT Security and Privacy
- Current status
  - MVP will be demoed to the domain leaders soon
  - Initial use cases – TB, C. auris, respiratory (MIRA)

# Community Drive collaborative process



# Guide - The CDC/APHL NGS Quality Initiative

**Harmonize quality standards** for NGS across public health.



**Develop** an NGS-focused Quality Management System (QMS) to ensure **high quality, reliable data**.



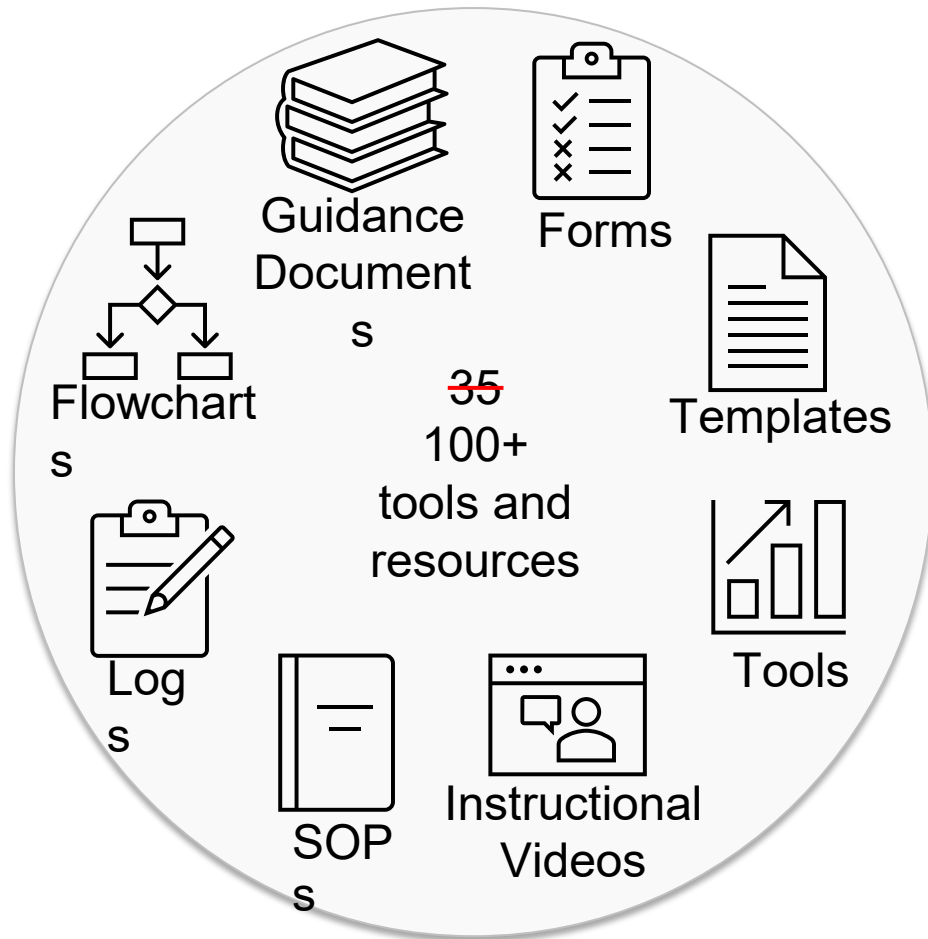
**Support** NGS activities to meet **multiple requirements**.



**Create a “toolkit”** to prevent duplication of efforts, increase efficiency, and save costs.

# Cross-cutting Collaboration on NGS Quality

## An NGS-focused QMS



## **From Initial Needs Assessment to a Foundational QMS**

- 25 products in development
- 5 -> 12 QSEs (35 -> 100+ products)
- Resources for
  - wet/dry-bench personnel
  - leadership (informational)

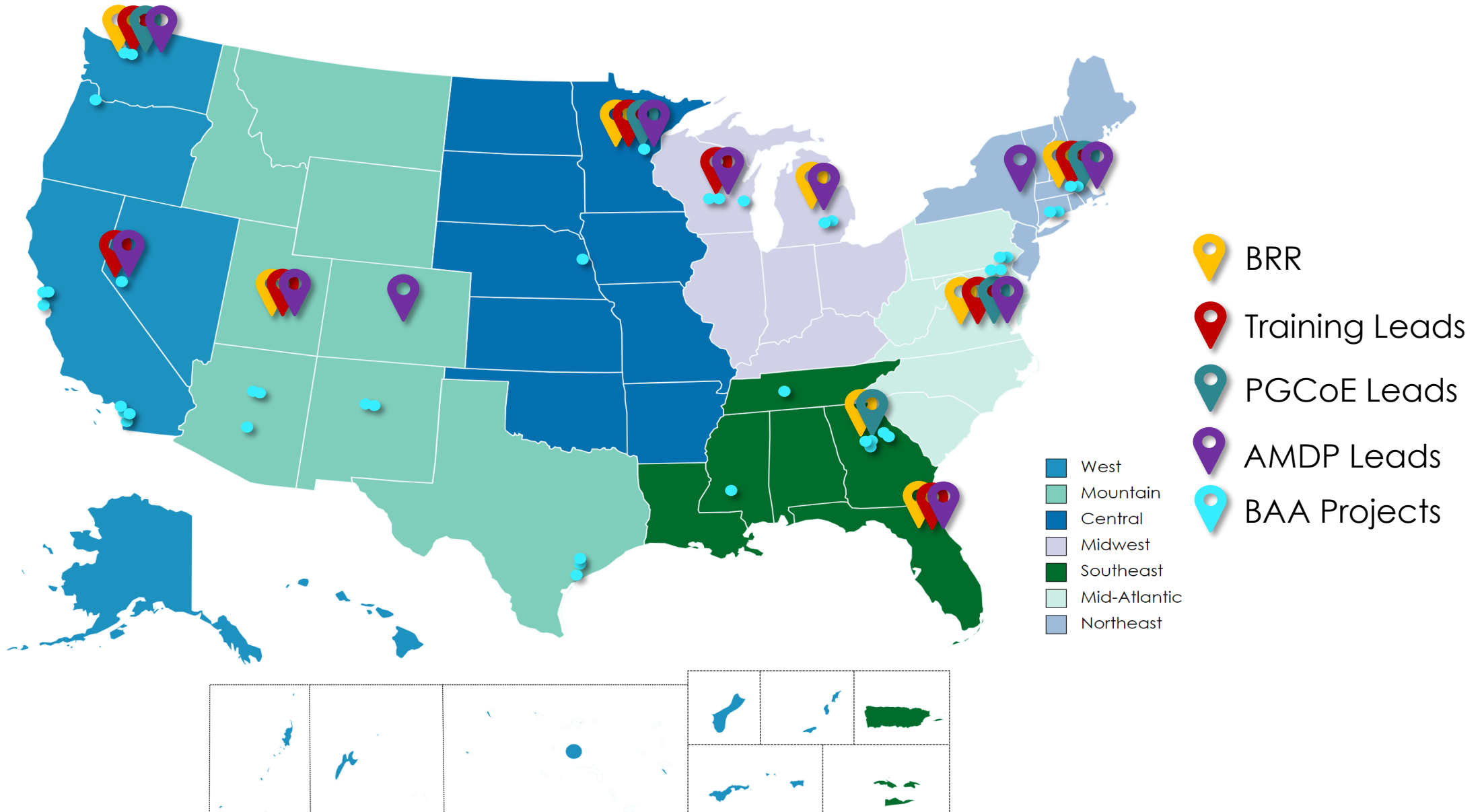
## **Gap Analysis**

- Personnel training and competency
- Sequencing workflows
  - evolving quality challenges

## **Partnerships**

- CDC, APHL, and PHLs
- Other quality focused groups

# Engage





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**One CDC. One Public Health.**

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# Questions?

[Christin.Hanigan@aphl.org](mailto:Christin.Hanigan@aphl.org)

# Session 1 – What to do with the Data?

Kelsey Florek



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# Session 2 – Genomic Epidemiology

Daniel Evans



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**LUNCH!**

# Session 3 – Metagenomics

Kelly Oakeson



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# Session 4 – Putting it all together

Kelly Oakeson



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