# Coronavirus Disease 2019 (COVID-19)

# SPHERES

SARS-CoV-2 Sequencing for Public Health Emergency Response, Epidemiology, and Surveillance
Updated June 18, 2020

## A National Open Genomics Consortium for the COVID-19 Response

CDC is leading the **SARS-CoV-2 Sequencing for Public Health Emergency Response, Epidemiology and Surveillance (SPHERES)**, a new national genomics consortium to coordinate SARS-CoV-2 sequencing across the United States. Large-scale, rapid genomic sequencing of the virus that causes COVID-19 will allow public health experts to



- Monitor important changes in the virus as it continues to circulate.
- Gain important insights to support contact tracing.
- Provide crucial information to aid in identifying diagnostic and therapeutic targets.
- Advance public health research in the areas of transmission dynamics, host response, and evolution of the virus.

With extensive participation from US clinical and public health laboratories, academic institutions, and the private sector, the SPHERES consortium aims to generate information about the virus that will strengthen COVID-19 mitigation strategies.
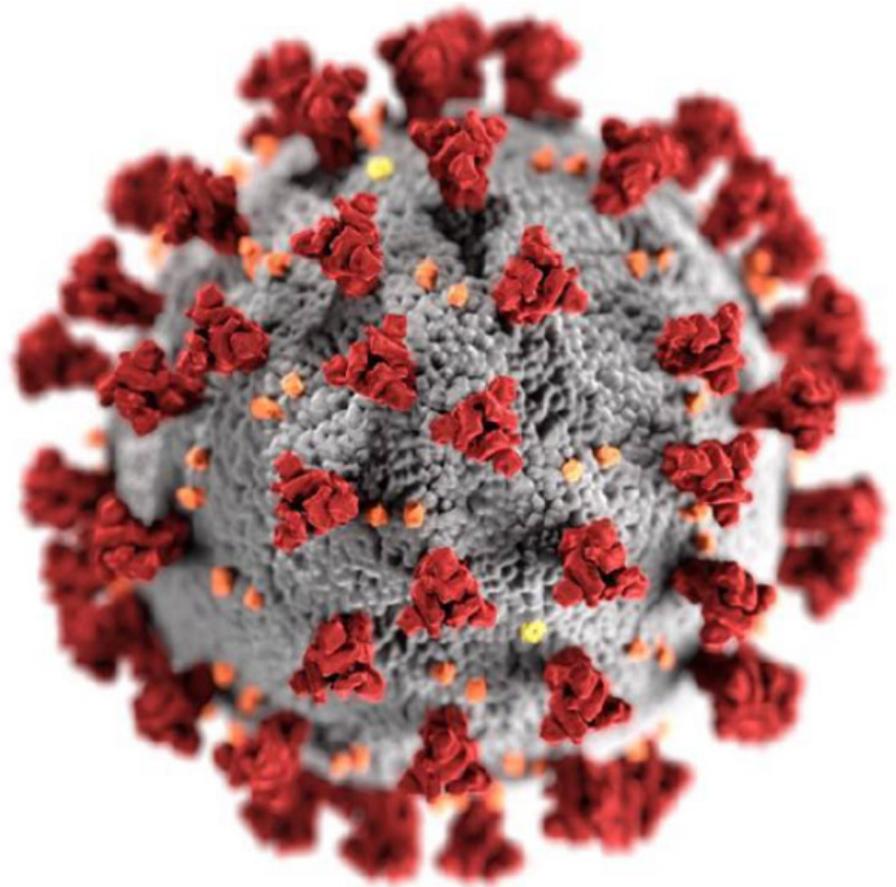
## SPHERES Overview

The SPHERES consortium is being led by [CDC's Advanced Molecular Detection (AMD) program](#), which over the past six years has invested in federal, state, and local public health laboratories to expand the use of pathogen genomics and other advanced laboratory technologies to strengthen infectious disease surveillance and outbreak response. SPHERES aims to

- Accelerate the use of real-time pathogen sequence data and molecular epidemiology for the COVID-19 pandemic response.
- Organize and manage public health sequencing and response efforts across the United States.
- Coordinate and support sequencing at state and local public health laboratories across the country.
- Better engage US clinical, academic, and commercial laboratories that are sequencing—or planning to sequence— SARS-CoV-2 data on any scale.
- Improve communication and knowledge-sharing between US laboratories.
- Develop consensus guidance on critical data and metadata standards.
- Reduce barriers to bioinformatic analysis and data sharing.
- Better align sequencing requirements and resource needs with different sources of funding, technology, expertise, and other means of support.

The SPHERES consortium includes 37 state and local public health laboratories, several large regional and national clinical diagnostic corporations, and academic and non-profit leaders in pathogen genomics, bioinformatics, and public health from across the country. Moreover, the consortium aligns federal laboratories and public health agencies with international genomics efforts and engages the private sector in efforts to better understand the genomics and patterns of SARS-CoV-2 transmission across the United States.

# SPHERES Objectives

The SPHERES consortium has 8 core objectives:

1. To bring together a network of sequencing laboratories, bioinformatics capacity and subject matter expertise under the umbrella of a massive and coordinated public health sequencing effort.
2. To identify and prioritize capabilities and resource needs across the network and to align sources of federal, non-governmental and private sector funding and support with areas of greatest impact and need.
3. To improve coordination of genomic sequencing between institutions and jurisdictions and to enable more resilience across the network.
4. To champion concepts of openness, standards-based analysis, and rapid data sharing throughout the United States and worldwide during the COVID-19 pandemic response.
5. To accelerate data generation and sharing, including the rapid release of high-quality viral sequence data from clinical and public health laboratories into both the National Center for Biotechnology Information (NCBI) and Global Initiative on Sharing All Influenza Data (GISAID) repositories in near-real time.
6. To provide a common forum for US public, private, and academic institutions to share protocols, methods, bioinformatics tools, standards, and best practices.
7. To establish consistent data and metadata standards, including streamlined repository submission processes, sample prioritization criteria, and a framework for shared, privacy-compliant unique case identifiers.
8. To align with other national sequencing and bioinformatics networks, and to support global efforts to advance the use of standards and open data in public health.
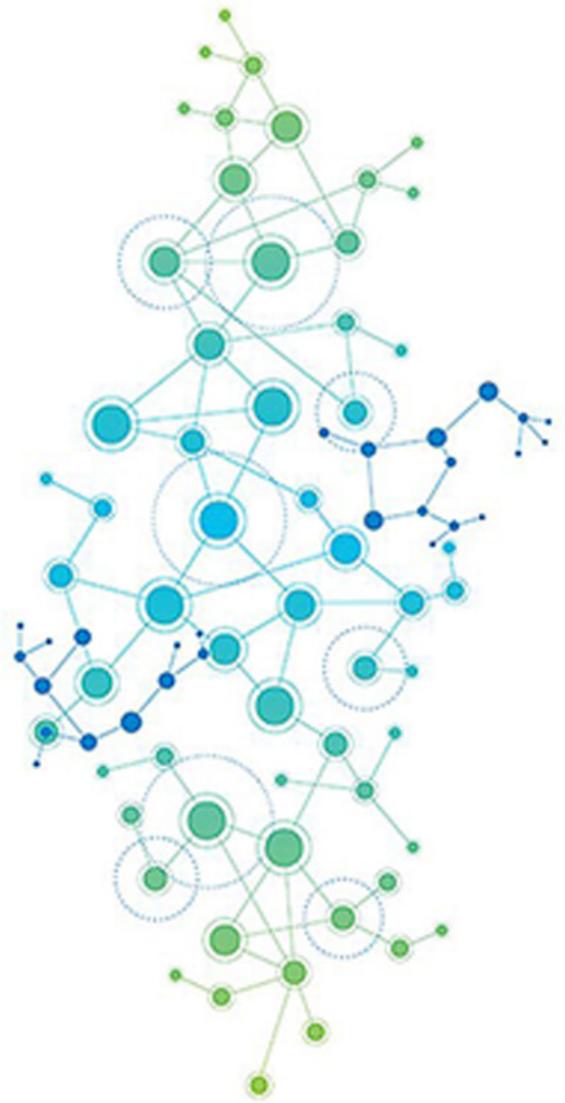
# SPHERES is a consortium of the US public health and scientific community that includes

## Federal Agencies and Laboratories                                                     −

Centers for Disease Control and Prevention, Office of Advanced Molecular Detection
Argonne National Laboratory
Defense Health Agency, Global Infectious Disease Surveillance
Food and Drug Administration
Lawrence Berkeley National Laboratory
Los Alamos National Laboratory
National Institute of Allergy and Infectious Diseases, Office of Genomics and Advanced Technology
National Institutes of Health, National Human Genome Research Institute
National Institute of Standards and Technology
National Library of Medicine, National Center for Biotechnology Information
Naval Health Research Center
United States Army Medical Research Institute of Infectious Diseases
Walter Reed Army Institute of Research

## State and Local Public Health Laboratories

Alaska
Arizona
Arkansas
California
Colorado
Connecticut
Delaware
District of
Columbia
Florida
Hawaii
Idaho
Illinois
Kansas
Kentucky
Massachusetts
Maine
Maryland
Michigan

Minnesota
Nevada
New Hampshire
New Mexico
New York
New York City
North Carolina
North Dakota
Oregon
South Carolina
Texas
Utah
Virginia
Washington
Wisconsin
Wyoming



## Academic Institutions

Augusta University – Medical College of
Georgia
Baylor University
Cornell University
Emory University
Georgia State University
Georgia Southern University
Georgetown University
Louisiana State University
Mount Sinai School of Medicine
New York University
Northern Arizona University
Oregon Health and Science University
Southern Illinois University
Stanford University
University of Buffalo
University of California, Davis

University of California, Irvine
University of California, Los Angeles
University of California, San Francisco
University of California, Santa Cruz
University of Chicago
University of Florida
University of Hawaii, Manoa
University of Maryland
University of Minnesota
University of Nebraska
University of New Mexico
University of Pittsburgh
University of South Florida
University of Washington
Yale University

## Corporations −

Abbott Diagnostics
AKESOgen
Beckman Coulter Inc
bioMérieux
Color Genomics
Fluidigm Corporation
Ginkgo Bioworks
IDbyDNA
Illumina
In-Q-Tel
Integrated DNA Technologies
Invitae Corporation
LabCorp

New England BioLabs
One Codex
Oxford Nanopore Technologies
Pacific Biosciences
Qiagen
Quest Diagnostics
Roche Diagnostics
Swift Biosciences
Thermo Fisher Scientific
Twist Biosciences
Verily Life Sciences
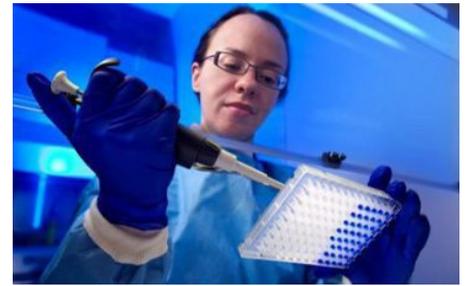


## Non-Profit Public Health and Research Laboratories −

Association of Public Health Laboratories
Bill and Melinda Gates Foundation
Broad Institute
Chan Zuckerberg BioHub
Fred Hutchinson Cancer Research Center
HudsonAlpha Institute for Biotechnology
Innovative Genomics Institute
J. Craig Venter Institute

Johns Hopkins University Applied Physics Laboratory
Public Health Alliance for Genomic Epidemiology
Scripps Research
The Jackson Laboratory
Translational Genomics Research Institute – North
Walder Foundation
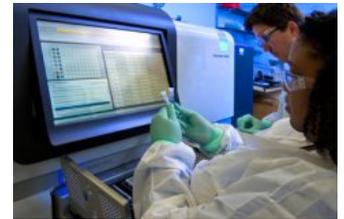


## International Collaboration −

Genome Canada [↗]
COVID-19 Genomics UK Consortium (COG-UK) [↗]

## Additional Information

To request additional information about the SARS-CoV-2 SPHERES consortium, including how to join, please email CDC's Office of Advanced Molecular Detection at oamd@cdc.gov.

Information for Laboratories on COVID-19

Press Release: CDC launches national viral genomics consortium to better map SARS-CoV-2 transmission

SPHERES: Poster 📄

SPHERES: Objectives Poster 📄