Public Health Surveillance, Data Modernization, and COVID-19

Adi V. Gundlapalli, MD, PhD, MS Data, Analytics, and Visualization Task Force CDC COVID-19 Response

Chief Public Health Informatics Officer Center for Surveillance, Epidemiology, and Laboratory Services

agundlapalli@cdc.gov

AMDIS Physician-Computer Connection June 2021





cdc.gov/coronavirus

Public Health Surveillance

The ongoing systematic collection, analysis, and interpretation of data, closely integrated with the timely dissemination of these data to those responsible for preventing and controlling disease and injury (Thacker and Berkelman 1988)

Data Sharing Principles

- ✓ Automated, **low burden**, **timely** data capture
- ✓ Efficient, low cost
- ✓ Works for all types of surveillance
- ✓ Provides background information for multiple conditions
- ✓ Encourages research and patient engagement
- ✓ Maintains privacy
- ✓ Works well for routine needs
- ✓ Scales and evolves during a public health emergency

Meeting Public Health Surveillance Needs

- Local, regional, and national surveillance investments
- Real-time situational awareness
- Preserve privacy and confidentiality
- Areas of improvement
 - Interoperability
 - Application of standards
 - Reporting burden on health care and public health
 - Ability to link individuals within and across datasets
 - Longitudinal healthcare data





Pathways to Surveillance Data

- Mandated Reporting
 - Fulfills legal requirement by jurisdiction
 - May fulfill need for timely data
 - Provides personal identifiers
 - Enables local public health investigation and intervention
- Administrative Data
 - Provides no personal identifiers
 - May be used for monitoring
 - No direct engagement of patients
- Registries
 - Offers systematic data collection
 - Provides personal identifiers
 - Informs clinical care
 - Possibly oriented for research purposes
 - Possible access to patient biological specimens





Challenges may include high costs or increased burden on patients and clinical providers



COVID-19 Pandemic: Evolving Data Needs

- February and March 2020
 - Diagnostic testing for SARS-CoV-2 (RT-PCR)
 - Patients noted around the country
- April December 2020
 - Case and Laboratory data
 - Hospitalization and Death data
 - Myriad presentations and Long-term sequelae
 - Health disparities
- January May 2021
 - Continued data needs
 - Vaccination data

E		
	-	· /

COVID-19 Surveillance

- Primary public health action is local
- State, tribal, local, and territorial jurisdictions (STLT)
- National perspective
 - Support STLT
 - Situational awareness
 - Inform guidance and policy
 - Clinical and public health
 - Prevention and mitigation
 - Disproportionately affected populations



COVID-19 Surveillance - National

- Syndromic surveillance
- Laboratory data
- Case surveillance
- Mortality data
- Healthcare data
- Nontraditional sources
 - Mobility data
 - Webscraping for news items
- Vaccination data



National Syndromic Surveillance Program



Laboratory Testing

United States COVID-19 Cases, Deaths, and Laboratory Testing (NAATs) by State, Territory, and Jurisdiction

Maps, charts, and data provided by CDC, updated daily by 8 pm ET[†]



COVID-19 Nucleic Acid Amplification Tests (NAATs) Performed in Last 7 Days by State/Territory



https://covid.cdc.gov/covid-data-tracker/#testing

Case and Death Surveillance

United States COVID-19 Cases, Deaths, and Laboratory Testing (NAATs) by State, Territory, and Jurisdiction

Maps, charts, and data provided by CDC, updated daily by 8 pm ET[†] TOTAL CASES TOTAL DEATHS 32.855.010 7 DAY CASE RATE PER 100,000 584,975 58.6 +27.857 New Cases +639 New Deaths CDC | Data as of: May 20, 2021 1:15 PM ET. Posted: May 20, 2021 8:56 PM ET View: Time period: Metric: O Level of Community Transmission # Last 7 Days O Count @ Rate per 100,000 Cases Since Ian 21, 2020 O Deaths Tests Performed Percent Positive This shows the number of COVID-19 cases for every 100,000 people over the last 7 days, allowing you to compare areas with different population sizes. US COVID-19 7-Day Case Rate per 100,000, by State/Territory

National Notifiable Disease Surveillance System Aggregate counts of COVID-19 cases reported by state and territorial jurisdictions to CDC

National Vital Statistics System Death data

Non-Traditional Data Sources: Mobility



Data Sources: Case data are courtesy of USAFacts.org. Refer to USAFacts for methods of data collection and processing. Officially verified U.S. case data are available on CDC's U.S. Cases page. The mobility metrics are generated utilizing Google Mobility Reports (<u>https://www.google.com/covid19/mobility</u>), Safegraph Social Distancing Metrics (<u>https://docs.safegraph.com/docs/social-distancing-metrics</u>), and Cuebing Mobility Insights (<u>mttps://docs.safegraph.com/docs/social-distancing-metrics</u>), and Cuebing Mobility Insights (<u>mttps://www.cuebing.com/viviatation-insights-covid19/</u>). The shelter in place orders are collected and compiled by CDC's COVID-19 response.

https://covid.cdc.gov/covid-data-tracker/#mobility

The Human Mobility and COVID-19 Transmission

Tracking Social Impact from Webscraping



Local COVID-19 clusters

- Meat packing plants
- Nursing homes
- Prisons
- Institutes of higher learning

COVID-19 Vaccinations in the United States (1 of 3)

		People Vaccinated	At Least One Dose	Fully Vaccinated
Total Vaccine Doses		Total	160,177,820	126,605,166
Delivered 351,955,515 Administered 279,397,250 Learn more about the distribution of vaccines.	% of Total Population	48.2%	38.1%	
	279,397,250 bution of vaccines.	Population ≥ 12 Years of Age	160,105,934	126,596,834
		% of Population ≥ 12 Years of Age	57.1%	45.2%
		Population ≥ 18 Years of Age	156,058,372	124,845,806
		% of Population ≥ 18 Years of Age	60.5%	48.4%
		Population ≥ 65 Years of Age	46,420,974	40,057,047
		% of Population ≥ 65 Years of Age	84.9%	73.2%
About these data			CDC Data as of: May 2), 2021 6:00am ET. Posted: Thursday, May 20, 2021 8:56 PM ET

https://covid.cdc.gov/covid -data-tracker/#vaccinations

COVID-19 Vaccinations in the United States (2 of 3)

Total Doses Administered Reported to the CDC by State/Territory and for Select Federal Entities per 100,000 of the Total Population



https://covid.cdc.gov/covid -data-tracker/#vaccinations

COVID-19 Vaccinations in the United States (3 of 3)



U.S. COVID-19 Vaccine Delivered by Vaccine Type



Number of People Fully Vaccinated in the U.S. by COVID-19 Vaccine Series Type

Data Modernization Initiative at CDC What is it?

CDC is at the heart of a national effort to create modern, integrated, and real-time public health data and surveillance that can protect us from any health threat.

"Data drives action!"

Moving public health from tracking threats to predicting them.

THE PUBLIC HEALTH ECOSYSTEM

COORDINATED AND SEAMLESS EXCHANGE OF DATA

Reduce Burden + Add Value

E

Enhance + Promote Interoperability

Put Data to Action



THEMATIC AREAS FOR DMI CARES ACT FUNDING



THEME 1

Data Sharing Across the Public Health Ecosystem Getting data to all levels of public health with upgrades to core surveillance systems.



THEME 2

CDC Systems and Service Enhancements for Ongoing Data Modernization Laying the foundation for cloud, machine learning, artificial intelligence, and advanced analytics at CDC.



THEME 3

New Standards and Approaches for Public Health Reporting Adopting new standards and approaches that will give public health agencies access to richer data.



Data to Partners

Technical and policy solutions for timely, complete, and accurate data from EHRs, labs, and other primary and new data sources to STLT partners and others in government, academics, and industry



Data to CDC and USG

Streamlined, coordinated, and interoperable public health reporting via API gateways supporting timely, complete, and accurate bi-directional data flows between STLT public health partners



Building a Public Health Workforce

Reskilling, upskilling, recruitment, and retention of a data science workforce with skills to design, implement, sustain, and innovate data modernization efforts

Ongoing Data Modernization and Innovation



Leverage state-of-the art analytics and data visualization capabilities to integrate data from new or non-traditional sources with minimal IT assistance to strengthen the detection, response, prevention, and forecasting of health threats

DMI PRIORITIES



We Can't Do This Alone!

- Federal
- Public Health
- Healthcare
- Academic
- Public-private

LABORATORIES

AMERICA'S HIEs:

COUNT ON US

Abbott

SHIEC



Questions?

For more information, contact CDC 1-800-CDC-INFO (232-4636) TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

