

Industry Day Webinar

January 12, 2023

CDC-ONC Industry Day Webinar

Today's objectives:

- Present strategy for modernizing public health data and information systems from:
 - CDC DDPHSS (Deputy Director Public Health Science and Surveillance)
 - CDC CFA (Center for Forecasting and Analytics)
 - CDC OCIO (Office of the Chief Information Officer)
 - ONC (Office of the National Coordinator for Health Information Technology)... especially related to potential engagements with non-government entities (businesses, academia, ...)
- Describe topic areas for CDC-ONC Industry Day (Feb 27-28) presentation proposals

Your posts in the webinar chat will help guide content development for the CDC-ONC Industry Day.

Agenda

1. Welcome and Introductions
2. Data Modernization Overview
3. Data Modernization Initiatives
4. Policies, Standards and Technology
5. Forecasting and Analytics
6. Q & A
7. Closing remarks

Joe Gibson, CDC Foundation

Jen Layden, CDC: DDPHSS

Rishi Tarar, CDC: DDPHSS

Ryan Argentieri, ONC

Dylan George, CDC: CFA

Joe Gibson, CDC Foundation

Joe Gibson, CDC Foundation

CDC-ONC Industry Day call for abstracts and other information: fbcinc.com/cdcid



Industry Days Webinar Data Modernization: Program Overview & Data Modernization Initiatives

January 12, 2023

Presentations by:

- CDC Foundation
- Centers for Disease Control and Prevention
- Office of the National Coordinator for Health Information Technology

Data Modernization: Transforming Public Health Data, Systems, and Processes

Jennifer Layden, MD, PhD

Acting Deputy Director for Public Health
Science and Surveillance



WHAT IS THE

Data Modernization Initiative?

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.



Our Ultimate Goal

To move from siloed and brittle public health data systems to connected, resilient, adaptable, and sustainable **‘response-ready’** systems that can help us solve problems before they happen and reduce the harm caused by the problems that do happen.

Better, Faster, Actionable Insights for Decision-Making



Problems we are trying to solve - current state



Siloed information

Disconnected and/or proprietary systems driven by disease-specific budget lines keep us from seeing the complete picture



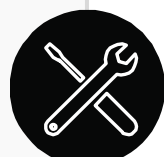
Systems not response ready

Most systems at health departments are not flexible, do not use cloud, and are not scalable.



Outdated skills

The public health workforce needs training to use today's technologies more effectively



Patchwork of policies

The variable landscape of data collection and reporting across the nation complicates rapid response to emerging threats



Heavy burdens for providers

Providers in healthcare and at health departments are burdened with sending data to many places in many ways



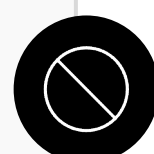
Public health not in healthcare data ecosystem

Public health got left behind as federal incentives and regulations helped healthcare systems to easily share data automatically in the Electronic Health Record.



Data not shared quickly

The combined effects of siloed systems, burdensome processes, and the disconnect with healthcare data limit public health's ability to move data in a timely manner.



Inconsistent access to data

Disconnected systems and the patchwork of policies lead to inconsistent data access across public health jurisdictions and with the public.

Phases of DMI strategic roadmap

Phase 1: Lay the groundwork

Established the DMI program, data exchange, visualization and foundational cloud computing capabilities; designed North Star Architecture, established DMI consortium

Phase 2: Adopt standards and establish impact

Drive to response-readiness and public health impact; includes use case delivery, adopt enterprise decisions, building core DMI capabilities, change management, adopting interoperability standards, establishing public health (PH) system certification

Today

Phase 3: Expand foundation for broader impact


Build on Phase 2 outcomes to build capabilities across US PH ecosystem and grow impact through activating further use cases

Phase 4: Improve ecosystem continuously

Establish 'flywheel' of public health-driven use cases, maintain and evolve externally provided capabilities and internal architecture

Priorities and Opportunities for 2023

- Prioritize building response ready case and lab data systems to get data quickly and reliably
- Increasing collaboration and data sharing with public health and private partners
- Investment in open data products for the public
- Establish and piloting public health use cases with TEFCA and QHINs
- Automated lab data exchange (ELR and ETOR)
- Development and adoption of CDC Front Door

A hand pointing at a futuristic digital interface. The background is dark blue with glowing white and light blue circular patterns, binary code (0s and 1s), and abstract geometric shapes. The hand is in the center, pointing towards the viewer.

Pressure points where we want to show iterative impact:

-
- ✓ Faster, better access
 - ✓ Reduced burden
 - ✓ Better dissemination and visualization
 - ✓ Supporting access, use, and exchange of data at all levels



How can we modernize faster, more efficiently, and equitably?

We are focusing on the



**DATA and
TECHNOLOGY**



PEOPLE



& POLICIES

we need to ***move the country forward.***



DATA and TECHNOLOGY

Modernization means **reimagining what data can do — and what we can do with data and technology.**

It means creating a shared, common infrastructure to deliver high-quality, real-time information for public health decisions.



CORE SURVEILLANCE CAPABILITIES

- Case reporting
- Laboratory tests
- Deaths
- Notifiable diseases
- Emergency visits
- Immunizations



RESPONSE-READY DATA

- Common operating picture
- Forecasting & analytics
- Scalable outbreak response



REIMAGINED SYSTEMS

- Response ready systems that are delivered iteratively
- Always on systems that use DevOps best practices
- Invest in data as a product



NON-INFECTIOUS DISEASES AND CONDITIONS

- Accelerated Modernization Pilot Initiative



HEALTH EQUITY

- Race, ethnicity, and other demographic data
- Social Determinants of Health



PEOPLE

Modernization is about partnership and connection points.

It's about giving people the skills, tools, access, and support they need.

Ultimately, it's about **helping the people we serve.**



PARTNERSHIPS

- Consortium for Data Modernization
- CDC Foundation Listening Sessions
- Data and Surveillance Workgroup



TOOLS AND SKILLS

- Training and upskilling
- Technical support
- New hiring processes and mechanisms



CONNECTION POINTS

- CDC Implementation Teams
- CSTE S/I committee
- Communities of Practice (NVSS, NSSP)
- Public Health FHIR® Accelerators
- PHII Learning community



LOCAL DECISIONS

- More granular data
- Individual/family decisions



POLICY

Modernization relies on **getting data where it needs to go** to protect health.

We need to ensure the right policies, authorities, data use agreements, and relationships are in place to support **modern data exchange**.

INTEROPERABILITY AND SHARING

- USCDI+
- TEACA
- Data Use Agreements
- Open data policies
- Data standards (FHIR)



FEDERAL POLICIES

- Evidence Act
- 21st Century Cures Act
- Federal Data Strategy
- FITARA
- Presidential Executive Orders



DATA AUTHORITIES

- ONC regulations
- CMS regulations
- Public Health Emergency Declarations



GOVERNANCE

- CDC's IT and Data Governance board
- State and local governance



Agenda

1. Welcome and Introductions Joe Gibson, CDC Foundation
2. Data Modernization Overview Jen Layden, CDC: DDPHSS
3. **Data Modernization Initiatives CDC: DDPHSS & OCIO Area Leads**
4. Policies, Standards and Technology Ryan Argentieri, ONC
5. Forecasting and Analytics Dylan George, CDC: CFA
6. Q & A Joe Gibson, CDC Foundation
7. Closing Remarks Joe Gibson, CDC Foundation



Technical Overview

Rishi Tarar, OCIO



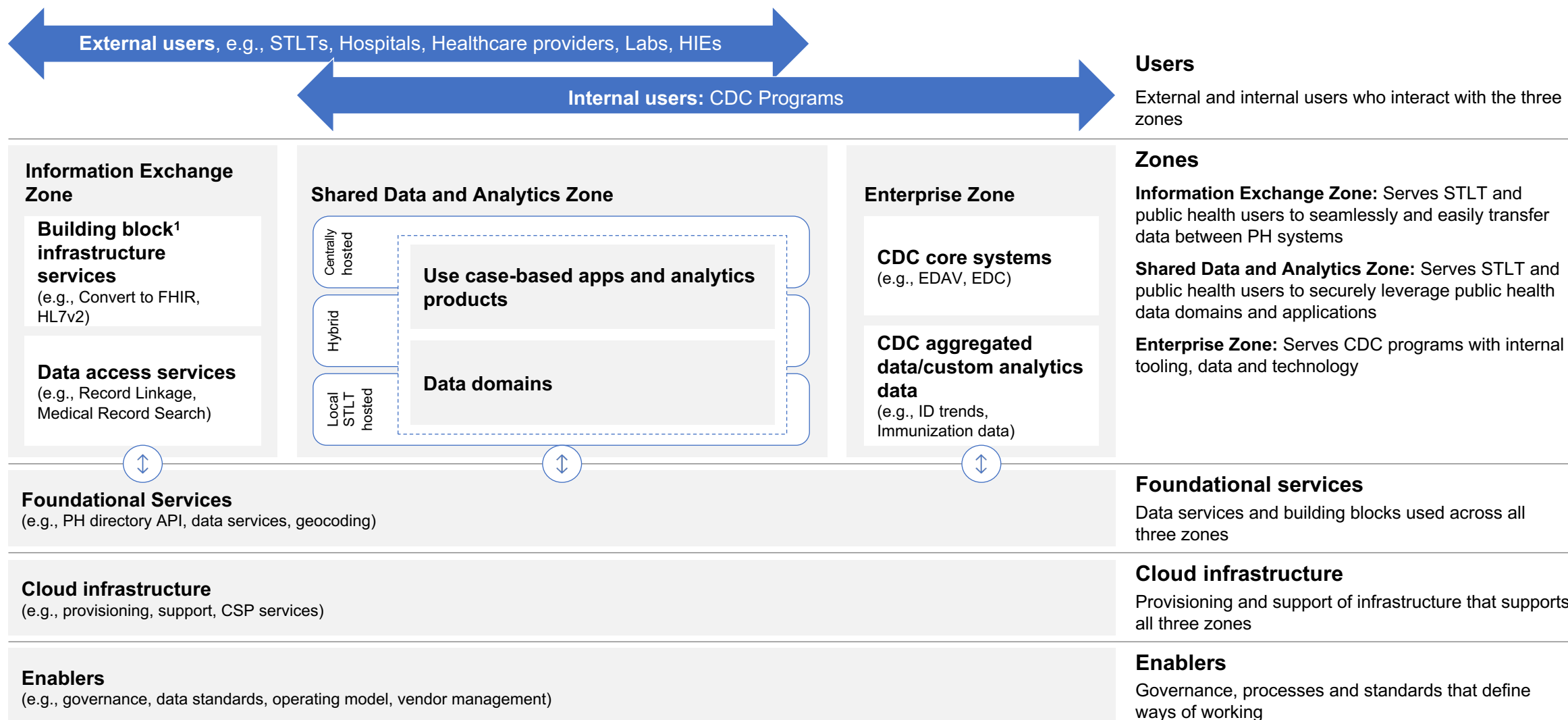
North Star Architecture (NSA)

NSA is how we will make data available for decision-makers when they need it, not days or weeks later.

Rishi Tarar

rrt8@cdc.gov

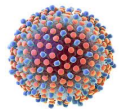
North Star Architecture: High Level Overview



1. Building blocks: reusable components (incl. code, services, API) that serve as foundational elements that can be used across multiple use cases / systems

Two use cases selected to help operationalize North Star Architecture

Phase 2 use cases are critical because they allow us to positively impact public health and build out components of the architecture – together they represent key building blocks required for numerous notifiable infectious and non-infectious diseases



Viral Hepatitis

Detect outbreaks of viral hepatitis and inform interventions to substantially improve case management and reduce transmission



Public health impact



Feasibility



Scalability



SET-NET Maternal and newborn health

Improve maternal health and prevent pregnancy complications and maternal deaths

Implications:

Streamlined public health reporting and share back of analysis / reports to STLTs

Data Exchange (DEX)

Data Exchange (DEX) building block within NSA will serve as a central component for the CDC "front-door" approach.

Overview of the “CDC front door”

What is it?

Single point for moving data into and out of the agency that public health partners and STLTs can use

Aspirations for the “CDC front door”



Simplified data sharing for external stakeholders



Time saved to focus on public health activities from reduced reporting burden and streamlined experience

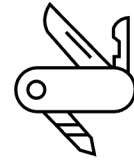


Reduced time to add new data feeds



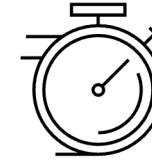
Lower maintenance costs by reducing number of systems

DEX future state objectives



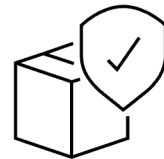
Multi-format data ingestion and validation

Endpoints will support ingestion and validation of multiple data formats (e.g., FHIR, HL7v2.x, CDA, CSV), any time and for any data volume



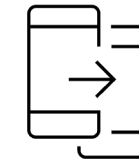
Immediate data provisioning

Data will be ingested and provisioned in EDAV within minutes of receipt for faster stakeholder access



Automatic data status tracking

Senders (PH partners) and recipients (CDC programs) will be able to track the status of data transmission automatically



Secure data transferring

Data will be shared through secure, modern API endpoints for a more trusted PH partner and program experience

Enterprise Data Analytics and Visualization (EDAV)

EDAV allows you to securely ingest, transform, store, analyze, and visualize your data from a single location.

EDAV's Three Components

The **Enterprise Data Analytics and Visualization (EDAV)** platform is a data management and processing ecosystem where users can identify, store, transform, analyze, visualize, and share their data with both internal and external audiences.



Access to...

- Scalable, secure cloud-based infrastructure
- Industry-leading analytics and visualization tools
- Enterprise data storage and management



Support with...

- Projects at any stage of development
- Technical advice with data science and tools use
- Integration with existing systems



Training to...

- Use EDAV platform for common use cases
- Learn the analytics and visualization tools
- Track progress with certificates and badges

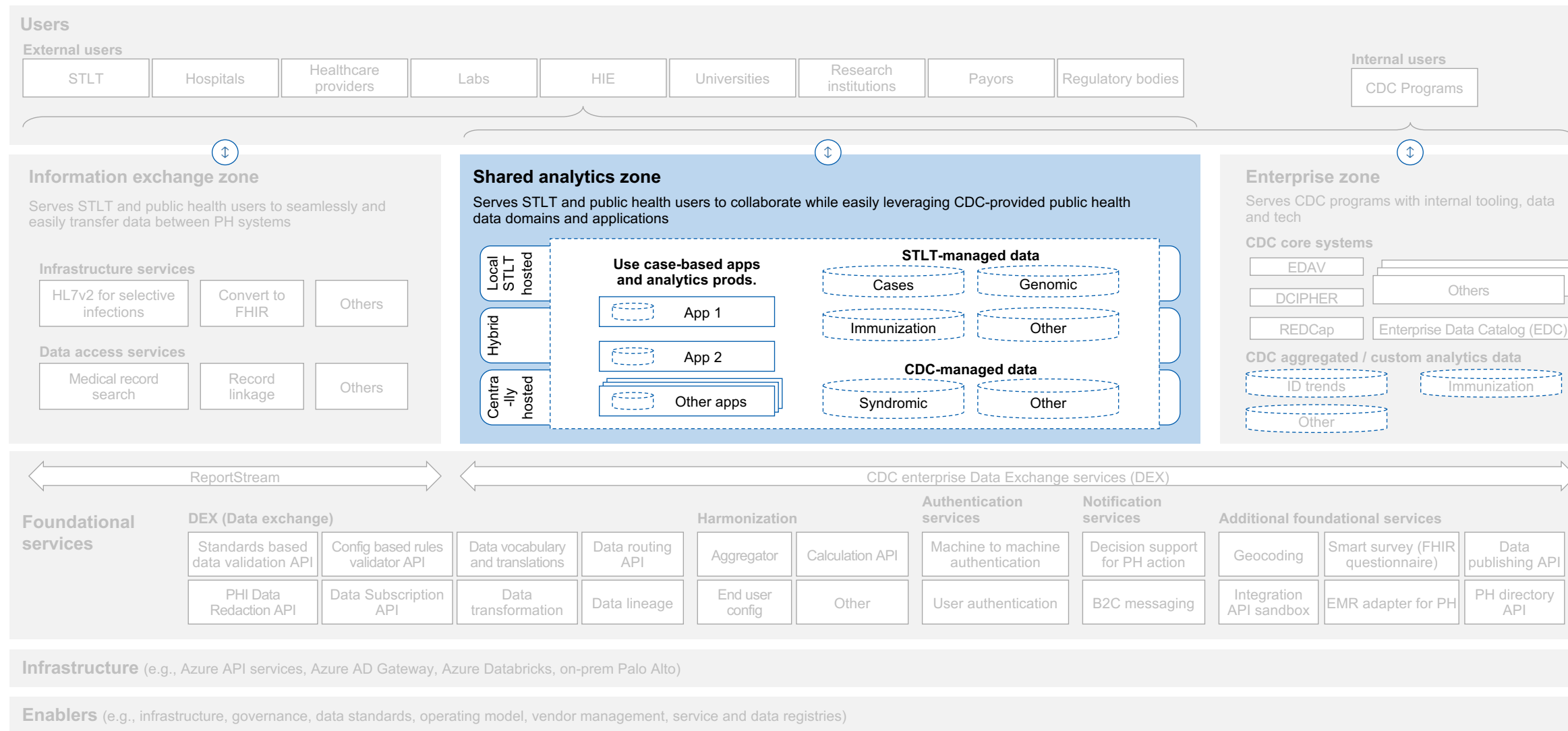
Quick numbers...

- Data lake holds
 - 1,348 terabytes – Aug 2022
 - 269 terabytes – Jan 2022
- Data lake holds 15.2 million files
- 175 active projects with CDC programs
- 3,755 CDC users onboarded to EDAV Platform
- 3,079 assets published to DATA.CDC.GOV
- 588 CDC staff have upskilled through Data Academy

Shared Analytic Zone (SAZ)

1. North Star Architecture (NSA): Focus on Shared Analytics Zone

Focus for this document



1. High level context of the Shared Analytics Zone

Context

SAZ is a SaaS offering by CDC – CDC to be responsible for operating and maintaining the environment

SAZ provides a **flexible deployment model ensuring** STLTs continue to have the option to use their own solutions (*local*), CDC-provided SAZ (*central*), or a combination (*hybrid*)

STLTs and PH actors using SAZ to have **complete ownership of and control over their data** incl. access management

Potential key architectural components

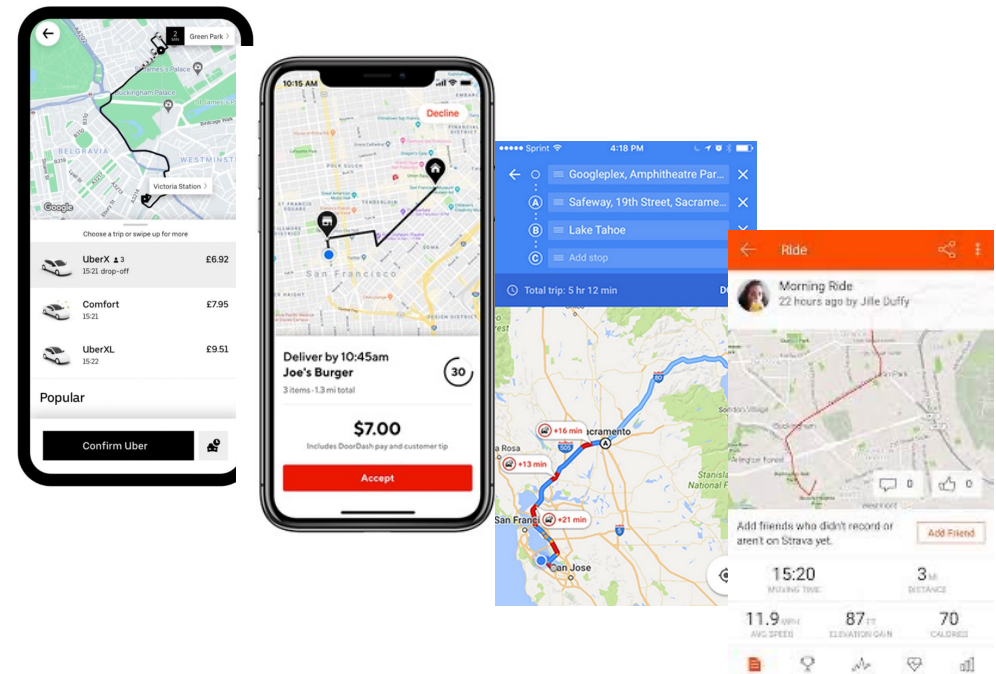
- 1 Configurable STLT workspaces**
STLTs may be offered workspaces with modular functionality (e.g., FHIR conversion building block) that they can enable or disable based on their independent evolving needs
- 2 Hosting of shared applications**
Instances of large shared applications (e.g., NBS) may be hosted in containers that leverage other building blocks in SAZ (e.g., authentication)
- 3 Independent access management**
Foundational functionality (incl. security and access management) may be managed by an external party who may be ISO certified, in order to build trust that STLTs and PH actors own and control their data
- 4 Shared PH data sets**
Curated, analytics-ready datasets may be shared by STLTs, PH actors, or CDC, with the owner having complete ownership and control over their data
- 5 Automated infrastructure**
Workspace provisioning and management may be automated to improve user experience and enable efficient and safe scaling

Building Blocks

What is a building block?

Goal: to provide CDC programs and STLTs with modern, modular tools to solve challenges working with public health data.

- A foundational service or application that makes it easier, faster, and cheaper to build other things with it
- Reusable across different scenarios



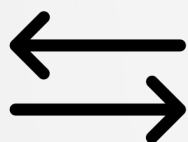
Building Blocks in Public Health: Examples



Location Services (i.e., address validation, standardization, and data enrichment) with one or more STLT(s)



Data Harmonization Services for data structures and semantics (e.g., transformations, format conversions, validations, data cleaning) with a CDC program, STLT, and/or data provider



Data Transport Services (authorization and authentication, directory services, automated reporting to CDC)



Data Linkage Services with one or more STLT(s)

Direct inquiries to
DMI@cdc.gov

DMI
@ CDC
—



Agenda

1. Welcome and Introductions Joe Gibson, CDC Foundation
2. Data Modernization Overview Jen Layden, CDC: DDPHSS
3. Data Modernization Initiatives CDC: DDPHSS & OCIO Area Leads
4. **Policies, Standards and Technology** **Ryan Argentieri, ONC**
5. Forecasting and Analytics Dylan George, CDC: CFA
6. Q & A Joe Gibson, CDC Foundation
7. Closing Remarks Joe Gibson, CDC Foundation





Office of the National Coordinator
for Health Information Technology



CDC & ONC Shared Priorities: Updates and Opportunities for Industry in 2023

Presented by Ryan Argentieri, ONC Office of Technology

January 12, 2023



Agenda

Overview of Shared Priorities

USCDI & USCDI+

Helios FHIR Accelerator

What is TEFCA and why is it important?

How to Get Involved

Questions & Discussion



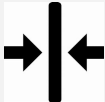
Significant Shifts Are Occurring Which Can Benefit Public Health

Current State: High Processing Burden

DATA USE AGREEMENTS NEGOTIATED ONE AT A TIME

DATA SENT MULTIPLE TIMES, IN MULTIPLE FORMATS TO MULTIPLE ENDPOINTS

PH INFORMATION SYSTEMS LACK CONSISTENCY AND COMMON FUNCTIONALITIES

 **ALIGNMENT WITHIN AND BEYOND PUBLIC HEALTH**



Emerging State: Greater Connectivity & Flexibility

COMMON AGREEMENTS & RULES OF THE ROAD ARE PRE-NEGOTIATED IN ADVANCE

STANDARDIZED DATA SENT & RECEIVED ONCE TO FILL MULTIPLE USERS' NEEDS

PH INFORMATION SYSTEMS ARE CONSISTENT ACROSS STLT & CDC PROGRAMS

ONC FHIR API Requirements: Access “without special effort”



Open “application programming interfaces” (APIs) and apps are what make it easy to check your bank account or buy stocks or order meal delivery on your smartphone

- We want providers and patients to have that same experience with the health care system

21st Century Cures Act requires availability of APIs that can be accessed “without special effort”

- ONC rule takes steps to prevent business and technical barriers to information-sharing

As of December 31, 2022, all certified technology developers were required to deploy a standard FHIR API across their entire customer base

- This will create a climate for innovation as apps can now be developed that will work across all EHR systems

Shared Priorities to Help Advance Public Health

USCDI & USCDI+

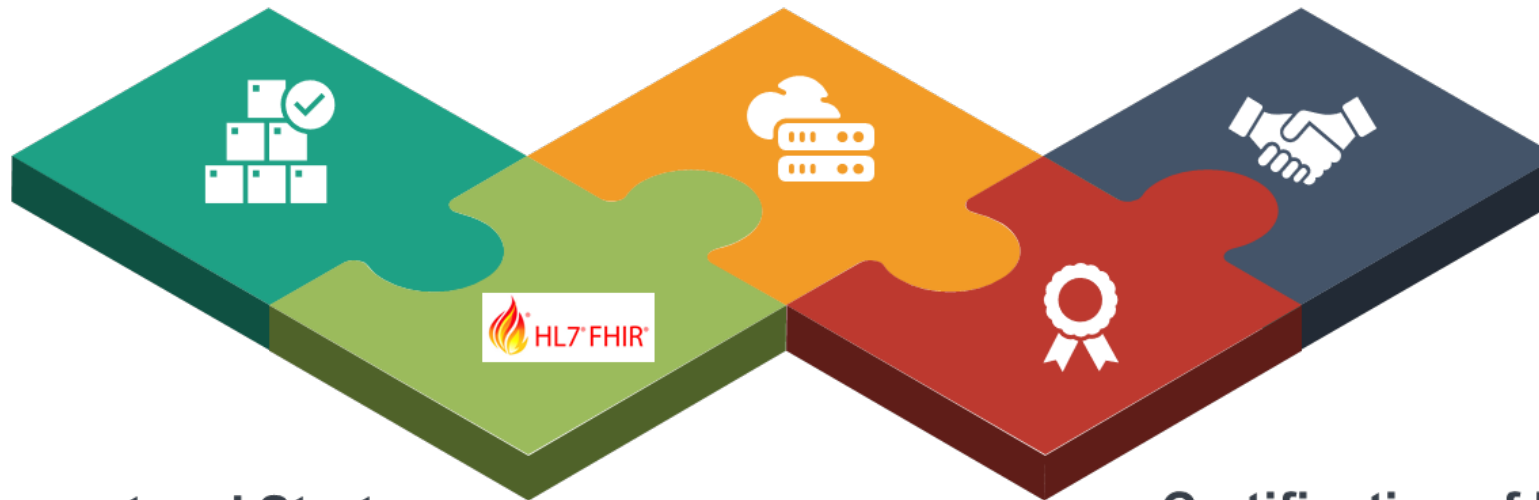
Prioritize and harmonize data most crucial to the needs of public health and beyond

North Star Architecture

Help public health jurisdictions share and analyze data with each other and CDC

TEFCA

Develop common, pre-negotiated agreements to simplify data exchange nationwide



FHIR Advancement and Strategy

Adopt standards that can be more easily extended and reused as conditions change

Certification of IT & Data Systems

Ensure IT & data systems used by public health are sustainable and meet baseline requirements for security and functionality



Agenda

Overview of Shared Priorities

USCDI & USCDI+

Helios FHIR Accelerator

What is TEFCA and why is it important?

How to Get Involved

Questions & Discussion

United States Core Data for Interoperability (USCDI)



Create a Core Set of Standardized Data Elements for Health

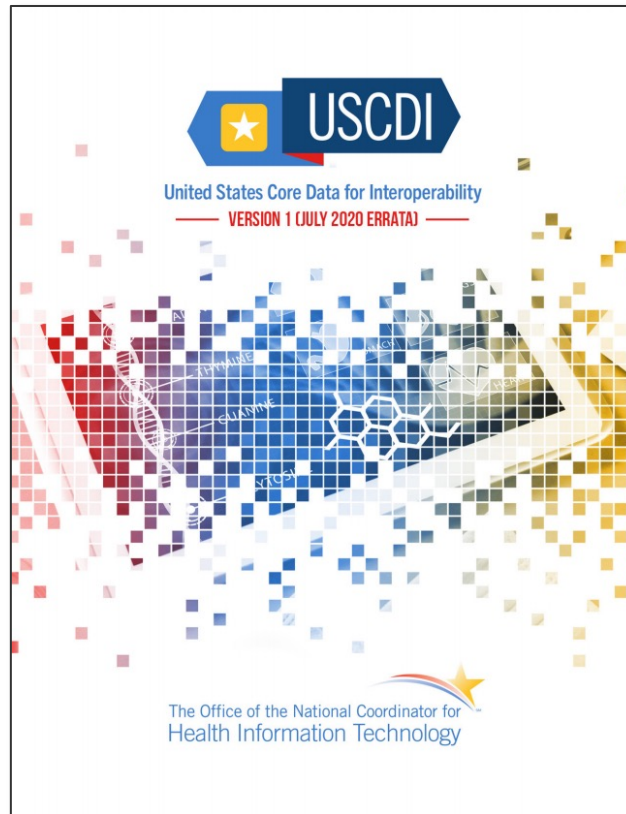
Common core of standardized data to support treatment, payment, healthcare operations, requests from patients, post-market surveillance, research, public health, and other authorized uses.

<https://www.healthit.gov/USCDI>

<https://www.healthit.gov/sites/isa/files/2023-01/Draft-USCDI-Version-4-January-2023-Final.pdf>

United States Core Data for Interoperability (USCDI)

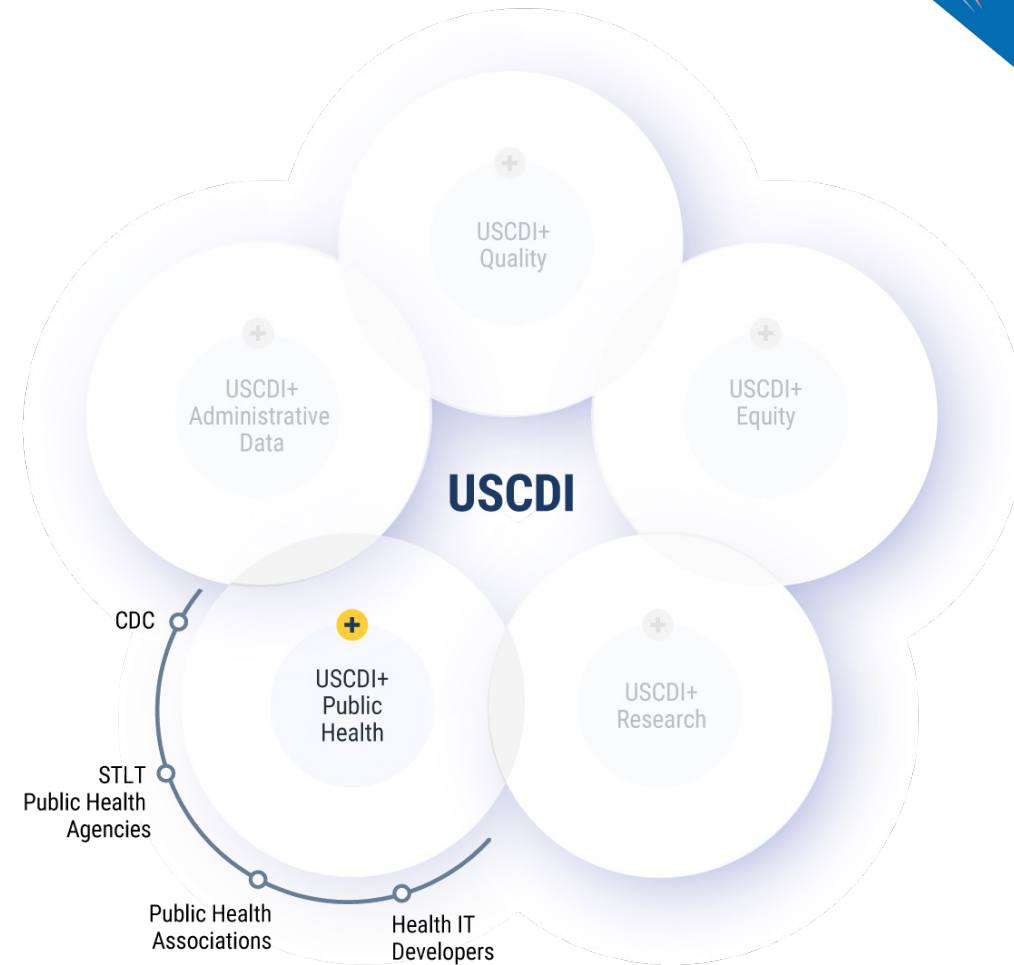
- **New standard established by ONC in the 2020 21st Century Cures Act Final Rule**
- **Minimum dataset required for interoperability**
 - Defines required data elements and vocabulary standards
 - Agnostic to format
 - Focuses on patient access/care coordination use cases
- **Updated on annual cycle with federal agency and industry input**
 - Updates based on multiple criteria including standards maturity and public/industry priority



USCDI v1 Summary of Data Classes and Data Elements		
Allergies and Intolerances <ul style="list-style-type: none"> • Substance (Medication) • Substance (Drug Class) • Reaction 	Laboratory <ul style="list-style-type: none"> • Tests • Values/Results 	Smoking Status <ul style="list-style-type: none"> • Smoking Status
Assessment and Plan of Treatment <ul style="list-style-type: none"> • Assessment and Plan of Treatment 	Medications <ul style="list-style-type: none"> • Medications 	Unique Device Identifier(s) for a Patient's Implantable Device(s) <ul style="list-style-type: none"> • Unique Device Identifier(s) for a Patient's Implantable Device(s)
Care Team Members <ul style="list-style-type: none"> • Care Team Members 	Patient Demographics <ul style="list-style-type: none"> • First Name • Last Name • Previous Name • Middle Name (incl Middle Initial) • Suffix • Birth Sex • Date of Birth • Race • Ethnicity • Preferred Language • Current Address • Previous Address • Phone Number • Phone Number Type • Email Address 	Vital Signs <ul style="list-style-type: none"> • Diastolic Blood Pressure • Systolic Blood Pressure • Body Height • Body Weight • Heart Rate • Respiratory Rate • Body Temperature • Pulse Oximetry • Inhaled Oxygen Concentration • BMI Percentile (2 - 20 Years) • Weight-for-length Percentile (Birth - 36 Months) • Head Occipital-frontal Circumference Percentile (Birth - 36 Months)
Clinical Notes <ul style="list-style-type: none"> • Consultation Note • Discharge Summary Note • History & Physical • Imaging Narrative • Laboratory Report Narrative • Pathology Report Narrative • Procedure Note • Progress Note 	Problems <ul style="list-style-type: none"> • Problems 	
Goals <ul style="list-style-type: none"> • Patient Goals 	Procedures <ul style="list-style-type: none"> • Procedures 	
Health Concerns <ul style="list-style-type: none"> • Health Concerns 	Provenance <ul style="list-style-type: none"> • Author Time Stamp • Author Organization 	
Immunizations <ul style="list-style-type: none"> • Immunizations 		

USCDI+ for Public Health

- Capture the data needs of public health that fall outside the scope of USCDI; improve data quality and availability
- Current priority areas:
 - Case-based Surveillance
 - Lab Data Exchange
 - Bi-Directional Exchange with Healthcare and Other Partners
 - Maternal and Child Health
 - Resource Reporting / Situational Awareness
 - Risk Behaviors & Health Equity
- Datasets will provide implementation guidance analogous to US Core for USCDI+ for PH as well as to align with new CDC-led reporting initiatives under DMI's North Star Architecture
- Profile/IG development will be necessary for many data elements included, may need to occur within respective domain areas.
- Email USCDI.Plus@hhs.gov for more information





Agenda

Overview of Shared Priorities

USCDI & USCDI+

Helios FHIR Accelerator

What is TEFCA and why is it important?

How to Get Involved

Questions & Discussion

Helios FHIR Accelerator

- Helios Priorities:
 - Bulk Data
 - Aggregate Data
 - Align and Optimize
 - [Helios | HL7 International](#)
- Connectathons (next week and in May)
- Workgroups
- Pilot opportunities



Agenda

Overview of Shared Priorities

USCDI & USCDI+

Helios FHIR Accelerator

What is TEFCA and why is it important?

How to Get Involved

Questions & Discussion



Network interoperability 101: What are networks and why are they important?

Networks are essential mechanisms for scalability of data exchange

Every data sharing arrangement has to solve a common set of issues:

- What are the purposes of the proposed data sharing?
- What data are we sharing?
- Who is allowed to share data and how do we validate who is eligible?
- How are we going to share the data? What data, what format, how to transport it?
- What legal arrangement is needed to enable this data sharing?
- What security arrangement needs to enable this data sharing?
- How do we put all of this into production (testing, go-live, monitoring)?

Highly inefficient to repeat this process between every set of exchange partners

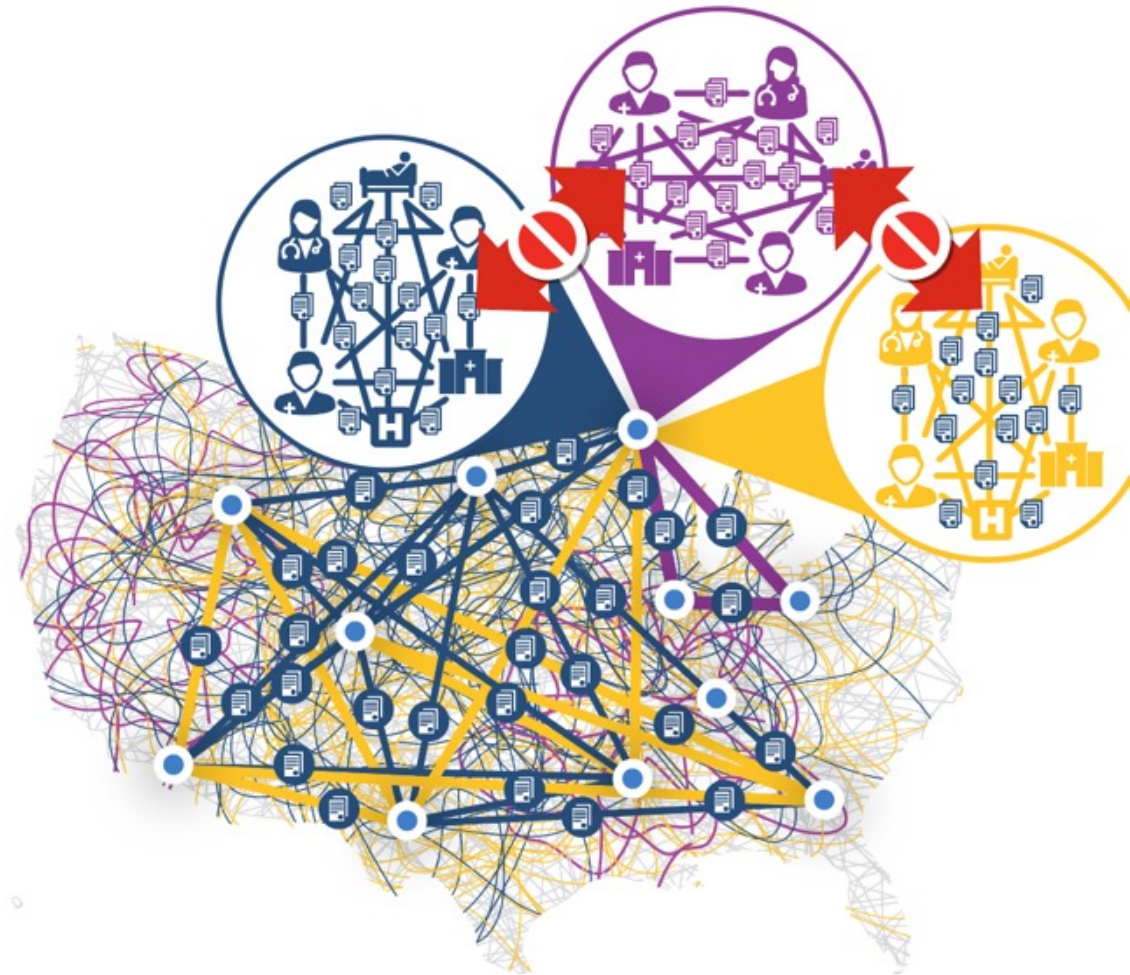
Networks provide governance, policy, legal, organizational, and technical infrastructure to standardize and share approaches to these issues

Existing networks are great...but not enough

While there has been growth in nationwide networks, there is much unfinished business

- Public health
- Less well-resourced providers, behavioral health, LTPAC
- Payers (government and commercial)
- Social services
- Research

Public-private partnership is now needed to advance nationwide interoperability to the next level



21st Century Cures Act of 2016

Section 4003(b)

*“[T]he National Coordinator shall convene appropriate public and private stakeholders to **develop or support a trusted exchange framework** for trust policies and practices and for a **common agreement** for exchange between health information networks.”*

[emphasis added]



Exchange Purposes

- The exchange purpose identifies the reason for which information could be requested or shared through QHIN-to-QHIN exchange
- Only these six exchange purposes are currently authorized under the Common Agreement.
- Additional exchange purposes may be added over time

Permitted Exchange Purposes



Treatment



Payment



Health Care Operations



Public Health



Government Benefits Determination



Individual Access Services

Organizations who intend to become QHINs

NextGen Healthcare aims to become a Qualified Health Information Network (QHIN)



As an important step to ensure providers have the best access to essential health data, NextGen Healthcare is applying to become QHIN under the Trusted Exchange Framework and Common Agreement (TEFCA). The announcement of this application was made in the summer of 2022.

eHealth Exchange

Is Your Organization Ready for TEFCA?

Organizations are preparing for the launch of the Office of the National Coordinator for Health IT's (ONC) Trusted Exchange Framework and Common Agreement, also known as TEFCA, in 2022.

NEWS FROM EPIC



© June 20, 2022

Epic Announces Plan to Join TEFCA, Champion Next Step in Evolution Toward Universal Interoperability



CommonWell newest to pledge TEFCA participation

The interoperability alliance, whose EHR vendor members include Oracle Cerner, athenahealth, Greenway, Meditech and others, says it will sign on as a Qualified Health Information Network.

By Mike Miliard | September 02, 2022 | 09:58 AM



Kno2 To Apply for QHIN Designation Under TEFCA

September 7, 2022

Kno2®, the company leading the future of healthcare communication, publicly announces the intention to apply to become a Qualified Health Information Network (QHIN) under the **Trusted Exchange Framework and Common Agreement (TEFCA)**, demonstrating its continued commitment to enable health information exchange for all.

From its inception, Kno2 has connected every meaningful network and endpoint involved in the exchange of patient information and, in turn, makes this broad connectivity available through a single **Communication API** to partners and providers. This commitment and hard work resulted in Kno2 becoming the most expansive and comprehensive communication network available in healthcare today, unifying and centralizing complete clinical exchange workflows into a single solution.

ORACLE Cerner



News release

TEFCA: A leap toward achieving nationwide interoperability

by Oracle Cerner
Published on August 31, 2022



KONZA is seeking Qualified Health Information Network designation to further broaden its ability to exchange and share critical healthcare information. For over 12 years, KONZA has been a trusted and strategic partner for providers, patients and health plans that need to share health data. If accepted, QHIN designation would allow KONZA to further extend this capability nationwide.

Health Gorilla's Pursuit of a Qualified Health Information Network (QHIN) Designation Under TEFCA

Health Gorilla intends to apply to become one of the first designated QHINs in the U.S. under the Trusted Exchange Framework and Common Agreement (TEFCA).





Agenda

Overview of Shared Priorities

USCDI & USCDI+

Helios FHIR Accelerator

What is TEFCA and why is it important?

How to Get Involved

Questions & Discussion



How to Get Involved: Shared Priorities

Continue to participate in listening sessions, i.e. Industry Day, and targeted follow up conversations about priority data elements

Provide feedback about current challenges and perspectives tied to data exchange, work with partners / customers / providers across the health ecosystem

Surface best practices and bright spots, either through the abstract submission process led by the CDC Foundation or to ONC directly (Ryan.Argentieri@hhs.gov)

Participate in external working groups, for example those made available via HL7



How to Get Involved: TEFCA

Any interested parties should:

- Review the Common Agreement and the educational materials on the RCE's website
- Identify potential changes to state and local programmatic requirements that will be necessary to participate in TEFCA
- Consider existing health information exchange infrastructure and technical capabilities
- Understand the capabilities QHINs and how public health might benefit from exchanging data through QHINs
- Participate in TEFCA information sessions and ask questions!

More information available here: <https://rce.sequoiaproject.org/>



Agenda

Overview of Shared Priorities

USCDI & USCDI+

Helios FHIR Accelerator

TEFCA Preview

How to Get Involved

Questions & Discussion

Agenda

1. Welcome and Introductions Joe Gibson, CDC Foundation
2. Data Modernization Overview Jen Layden, CDC: DDPHSS
3. Data Modernization Initiatives CDC: DDPHSS & OCIO Area Leads
4. Policies, Standards and Technology Ryan Argentieri, ONC
5. **Forecasting and Analytics** **Dylan George, CDC: CFA**
6. Q & A Joe Gibson, CDC Foundation
7. Closing Remarks Joe Gibson, CDC Foundation





Center for Forecasting & Outbreak Analytics (CFA)

Better Data, Better Analytics, Better Response



Early Warning Saves Lives

Galveston Hurricane

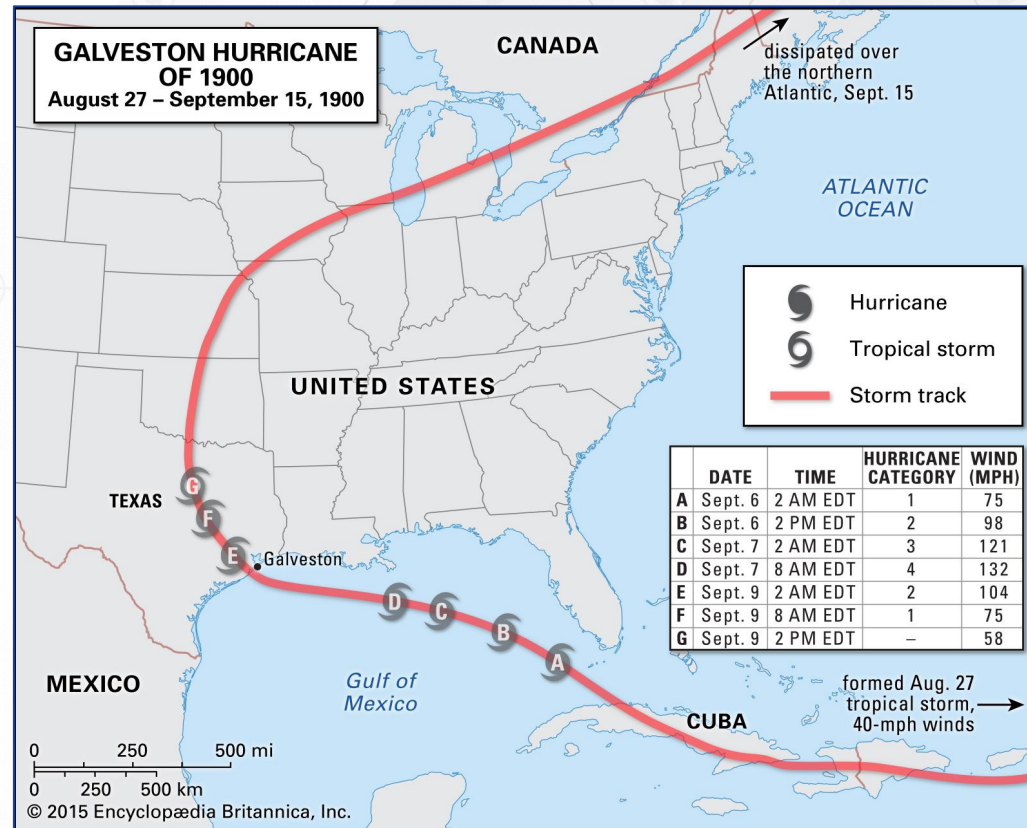
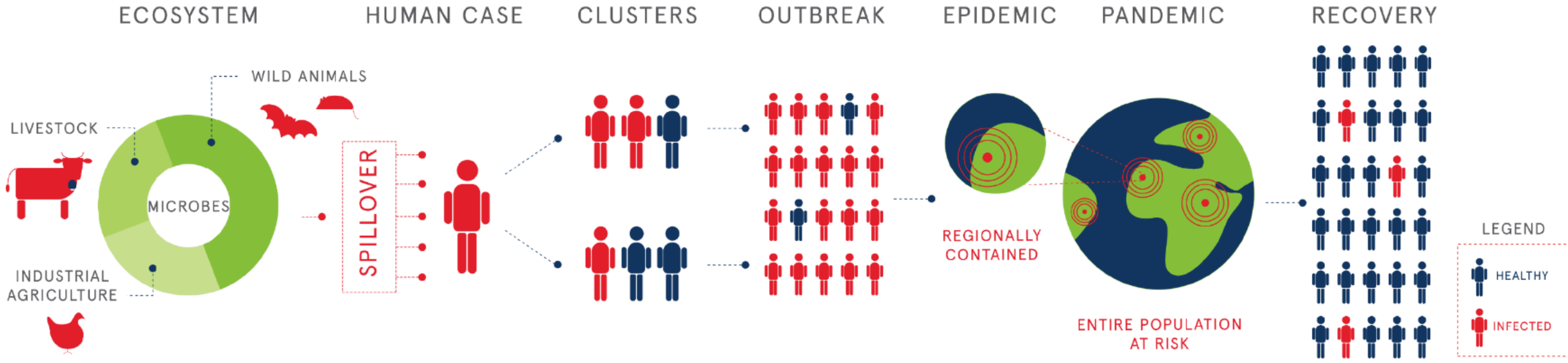


Image courtesy of Encyclopedia Britannica

Analytics Inform Response Efforts Across an Epidemic



Examples of Outbreak Analytics

Prospective Scenario Analyses	Risk Assessment Tools	Parameter Estimations	Vaccine Effectiveness
Pathogen Characterization	Disease Risk Mapping	Burden, Impact Assessments	Therapeutic Effectiveness
Phylogenetics	Disease Forecasting	Outbreak Management Scenario Analyses	

Early Accomplishments: Evaluation of Omicron Surge

Scenarios developed in November/early December 2021 as South African surge was under way

Potential Rapid Increase of Omicron Variant Infections in the United States

Updated Dec. 20, 2021 [Print](#)

Summary

The Centers for Disease Control and Prevention (CDC) has identified the potential for a rapid increase in infections of the new variant of SARS-CoV-2, the Omicron variant, in the United States. Plausible scenarios include steep epidemic trajectories that would require expedient public health action to prevent severe impacts on the health of individuals and the healthcare system. The CDC Center for Forecasting and Outbreak Analytics developed this finding as a synthesis of scenario models conducted by U.S. government, academic, and international partners. The models assess the range of plausible scenarios for the epidemic trajectory based on what is currently known about the Omicron variant. Recent case data of the Omicron variant from South Africa, Botswana, the United Kingdom and elsewhere are consistent with the faster growth scenarios that were modeled.

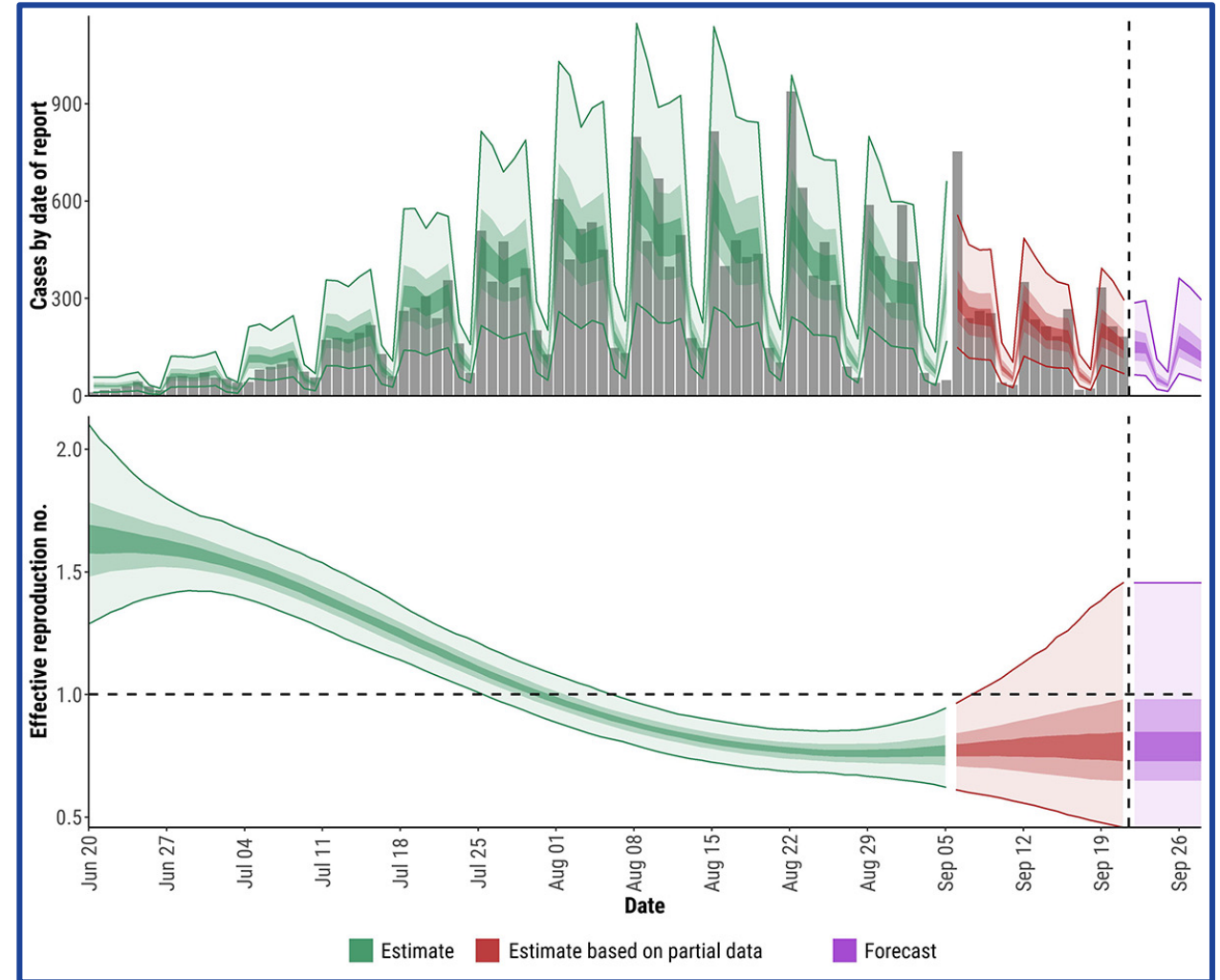
Scenario *	Inherent transmissibility relative to Delta	Immune escape relative to all prior strains
Faster growth (Higher transmission**. Mid escape)	1.6x	43%
Slower growth (Higher transmission. Low escape)	1.5x	10%
Faster growth (Unchanged transmission. High escape)	1.0x	85%
Slower growth (Lower transmission. Mid escape)	0.8x	50%

*Parameters were chosen to span a range of apparent growth rate advantage for Omicron over Delta of ~2-3.5x in an environment where 75% of the population has immunity to infection due to vaccination or prior infection.

**Relative to Delta

Current Forecasting: U.S. mpox Outbreak, 2022

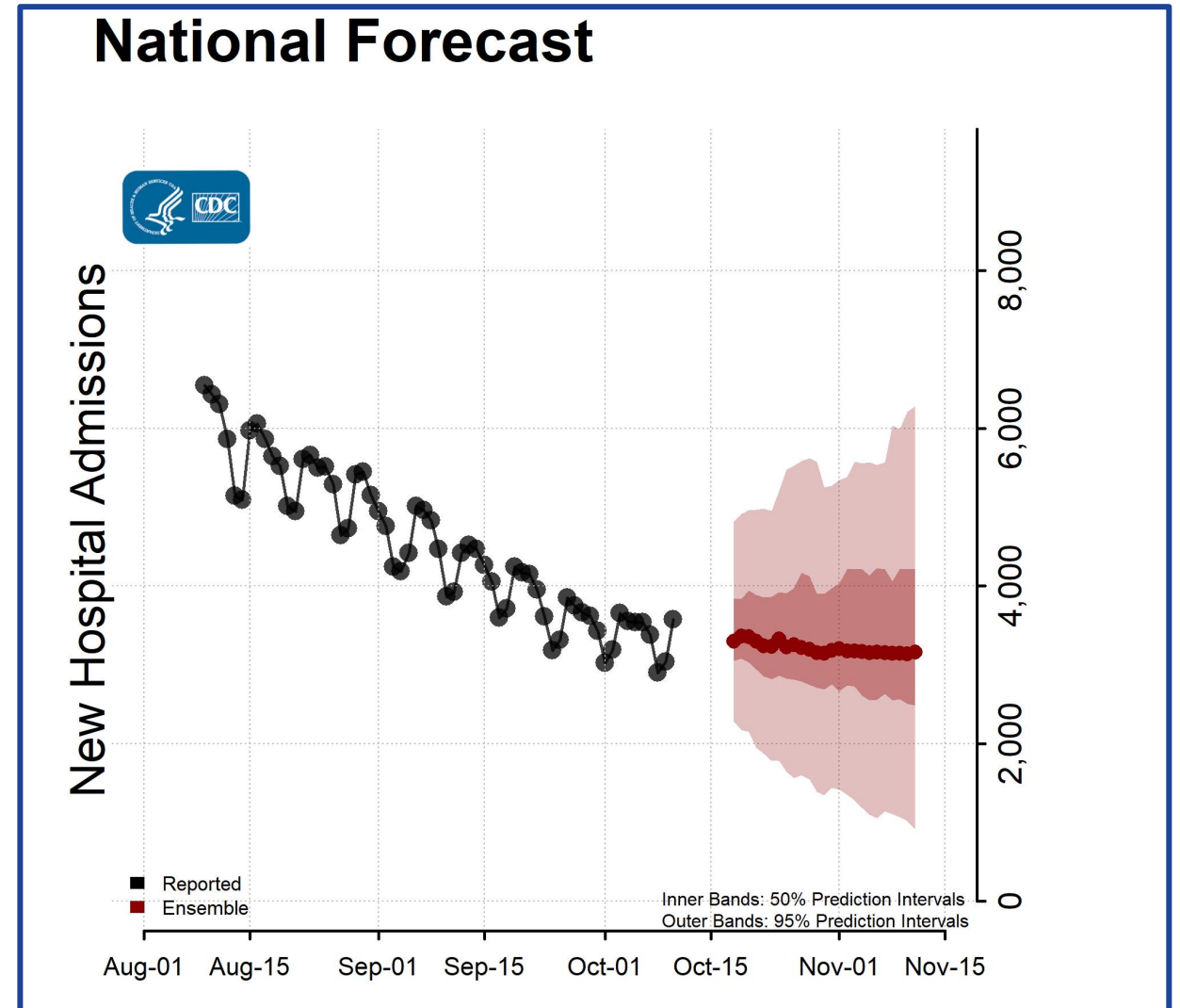
- Estimated transmissibility over time
 - Provided insight – outbreak had likely stopped growing by end of July/early August
 - Vaccine coverage was low
 - Suggested dominant role of behavior change and potentially network effects
- Key parameter estimates developed with jurisdiction-contributed data



CDC Monkeypox Technical Report 3; Fig 7

Current Forecasting: COVID-19 Forecast Ensemble

- Aggregates forecasts from multiple teams to predict hospitalizations and deaths over the next 4 weeks
 - Using multiple models has been repeatedly demonstrated to improve performance
- CFA is taking over responsibility for managing the COVID-19 forecast ensemble process



Inform Communications Products: Technical Reports

The screenshot shows the CDC website page for a technical report titled "Technical Report: Acute Hepatitis of Unknown Cause". The URL is <https://www.cdc.gov/ncird/investigation/hepatitis-unknown-cause/technical-report.html>. The page header includes the CDC logo and the text "Centers for Disease Control and Prevention CDC 24/7: Saving Lives. Protecting People™". Below the header is a search bar and an "Advanced Search" link. The main navigation bar identifies the page as part of the "National Center for Immunization and Respiratory Diseases (NCIRD)". The breadcrumb trail reads "CDC > NCIRD Home > Investigations > Children with Hepatitis of Unknown Cause". A left sidebar contains a "Technical Report" link under the "Investigations" section. The main content area features the title "Technical Report: Acute Hepatitis of Unknown Cause" and a sub-header "Executive Summary". A text box states: "This is a technical report intended for scientific audiences. For additional information, including materials targeted to the general public, see [Children with Acute Hepatitis of Unknown Cause](#)." The executive summary text reads: "This report reviews what is currently known about acute hepatitis with unknown cause in children under the age of 11 years, and describes the investigations that CDC and state, local, tribal, and territorial partners are conducting. As of June 22, 2022, 305 patients under investigation (PUIs) have been reported in 42 states and territories, with dates of onset on or after October 1, 2021. The median age of PUIs is 2 years. To date, 20 (6%) PUIs have required a liver transplant, and 11 (4%) have died; cause of death is under investigation. Since June 14, 15 additional PUIs were reported. However, only 7 PUIs experienced symptom onset between June 7–21, 2022." A highlighted box defines "Current patients under investigation (PUI) definition: Children <10 years of age with elevated (>500 U/L) aspartate aminotransferase (AST) or alanine aminotransferase (ALT) who have an unknown etiology for their hepatitis (with or without any adenovirus testing results, irrespective of the results) since October 1, 2021." Below this, it states: "CDC is investigating several etiological hypotheses, notably a possible association with any adenovirus infection, and specifically type 41 infection. Of the 252 PUIs for whom adenovirus testing was conducted on any specimen type (blood, respiratory specimens, stool), 45% were found to be positive for adenovirus. Additional hypotheses, including a possible..."

The screenshot shows the CDC website page for a technical report titled "Technical Report: Multi-National Monkeypox Outbreak, United States, 2022". The URL is <https://www.cdc.gov/poxvirus/monkeypox/clinicians/technical-report.html>. The page header includes the CDC logo and the text "Centers for Disease Control and Prevention CDC 24/7: Saving Lives. Protecting People™". Below the header is a search bar and an "Advanced Search" link. The main navigation bar identifies the page as part of the "Monkeypox" section. The breadcrumb trail reads "CDC > Poxvirus > Monkeypox > U.S. Outbreak 2022: Situation Summary". A left sidebar contains a "Technical Report" link under the "U.S. Outbreak 2022: Situation Summary" section. The main content area features the title "Technical Report: Multi-National Monkeypox Outbreak, United States, 2022" and a sub-header "U.S. Outbreak 2022: Situation Summary". A text box states: "This is a technical report intended for scientific audiences. Additional information, including materials targeted to the general public, are available on the [monkeypox site](#)." The main text reads: "The purpose of this report is to provide timely updates regarding CDC's ongoing response to the monkeypox outbreak in the United States, and to share preliminary results of new analyses that can improve understanding of the outbreak and inform further scientific inquiry. This report is intended for a technical audience; each report features a combination of standing topics and the results of special analyses. Additional information about the status of the outbreak, guidance, and information for the general public can be accessed at CDC's [monkeypox outbreak response page](#)." Below this is the "Executive Summary" section, which states: "Scientists at the U.S. Centers for Disease Control and Prevention (CDC), along with state and local public health partners, are tracking 3,487 cases of monkeypox in the United States as of July 25, 2022. CDC is also tracking multiple clusters of..."

Partnerships to Advance Disease Forecasting

CFA has awarded more than \$52 million to academic, federal, and private partners to advance:

Advancing science of forecasting, outbreak analytics

Developing technology architecture, compute power

Data science **workforce** & skill development

Supporting decision-makers modeling needs at federal, state, local levels

Data collection & sharing mechanisms

Real-time, USG disease modeling and analytic capability to support decision-making needs at the federal, state, and local levels

CFA Functions in Detail



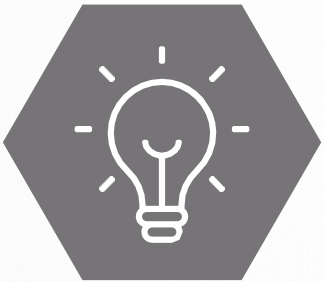
PREDICT

- Forecasting and scenario modeling
- Outbreak analytics
- Critical data collection



INFORM

- Decision support for federal and STLT partners
- General public risk communication
- Data visualization



INNOVATE

- Science / contract management
- Product development – applications, enterprise
- Test beds – STLT, payer/provider

Predict Functions & Needs



Predict has several **key functions**:

- Performing **real-time monitoring** of outbreak evolution
- Developing **forecasts** and **scenario-based projections** to consider the future
- Supporting decisions with direct **analytic response**
- Providing **critical data collection** to fill gaps in knowledge



These functions have several **common needs**:

- **Enterprise-grade open-source software tools** for **efficient** and **flexible** model implementation
- **Cloud-agnostic platforms** for **data science** with **data**, **code**, **artifact**, and **reproducible workflow** sharing
 - Developing a microservices architecture for infectious disease modeling
- Prepositioned agreements for **rapid data and analysis sharing**
 - Considering privacy-preserving and federated learning approaches

Inform Functions & Needs



The Inform Division *complements and amplifies the work of the Predict and Innovate Divisions* through sharing timely and actionable information and products with Federal, State, Local and Territorial (STLT) public health and policy makers as well as the public. *Doing so through:*

- **Utilizing data visualization tools** to explain and contextualize models and analytical results
- **Building and nurturing relationships with target audiences** to identify and support needs on how best to make use of modeling and forecasting data
- **Developing approaches for visualizing and communicating uncertainty** and employing a multi-channel strategy to support the equitable distribution and application of tools and findings



These functions have *several common needs:*

- **Work routinely and collaboratively with Predict and Innovate Divisions**
- **Share information needs of audiences**
- **Recruit multidisciplinary staff and develop collaborative work processes**
- **Establish agreements** with leading organizations within sectors
- **Foster engagement** with private sector and academia

Innovation and Technology Functions & Needs

 Innovation and Technology *integrates* with Predict and Inform by:

- Providing **science and contract management** to drive a **portfolio** of innovative **research and development**
- Supporting **test beds** for application of **innovations** in the field with **STLT partners**
- **Developing applications and products** that enable Predict and Inform functions

 *Partners can help* Innovation and Technology with:

- Platforms for **analytics** and **decision support**
- **Software development, data engineering, and cloud engineering** support to help building products and pipelines
- Supporting and integrating with the broader **Data Modernization Initiative**
- Tools that enable **sharing of data and products** between CDC and **STLT** partners

Technology Requirements



- **Analytical languages**
- **Source code management/codebase repository/CICD Pipelines**
- **Data tools:**
 - Storage
 - Ingest (ETL) capabilities
 - Unified data foundation
 - Sharing
- **Decision-support tools**
 - Visualization capabilities
 - Bespoke support tools
 - Publishing tools



- **Automation / workflow management**
 - Financial governance
 - Multicloud and intercloud deployment
 - Reliable, dynamic elasticity
- **Access management**
- **"On prem/back up" capabilities of key systems**
- **Misc requirements:**
 - Cloud environment dev / access capabilities, workforce
 - Web hosting and public access management

Staffing

- Actively recruiting for positions in CFA – data scientists, comms, technologists, epidemiologists, etc.
- Rotator program
- Software development and engineering support
- Analytical, modeling support including surge capacity
- Administrative support

Potential Upcoming Funding Opportunities

- Opportunity in development to create network focusing on innovation, implementation, and integration of data science capabilities for outbreak response
- Testing commercial software
- Training staff on cutting edge modeling, data science, and cloud computing techniques

Questions?

Learn more: cdc.gov/cfa

Get in touch: cfa@cdc.gov



Agenda

1. Welcome and Introductions Joe Gibson, CDC Foundation
2. Data Modernization Overview Jen Layden, CDC: DDPHSS
3. Data Modernization Initiatives CDC: DDPHSS & OCIO Area Leads
4. Policies, Standards and Technology Ryan Argentieri, ONC
5. Forecasting and Analytics Dylan George, CDC: CFA
6. **Q & A** **Joe Gibson, CDC Foundation**
7. Closing Remarks Joe Gibson, CDC Foundation



Questions?



CDC-ONC Industry Day

February 27-28, 2023

Washington, D.C.

Attend virtually or in-person

For registration, call for abstracts and more information:

fbcinc.com/cdcid

