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# Advancing Public Health Through Interoperable and Connected Data Systems

BY PHIG PARTNERS

astho™ NNPHI™ PHAB

SHAPING TOMORROW'S PUBLIC HEALTH TODAY.

IDPH
Illinois Department of Public Health

# Connecting Data, Empowering Health: IDPH's Platform for Scalable Data Sharing

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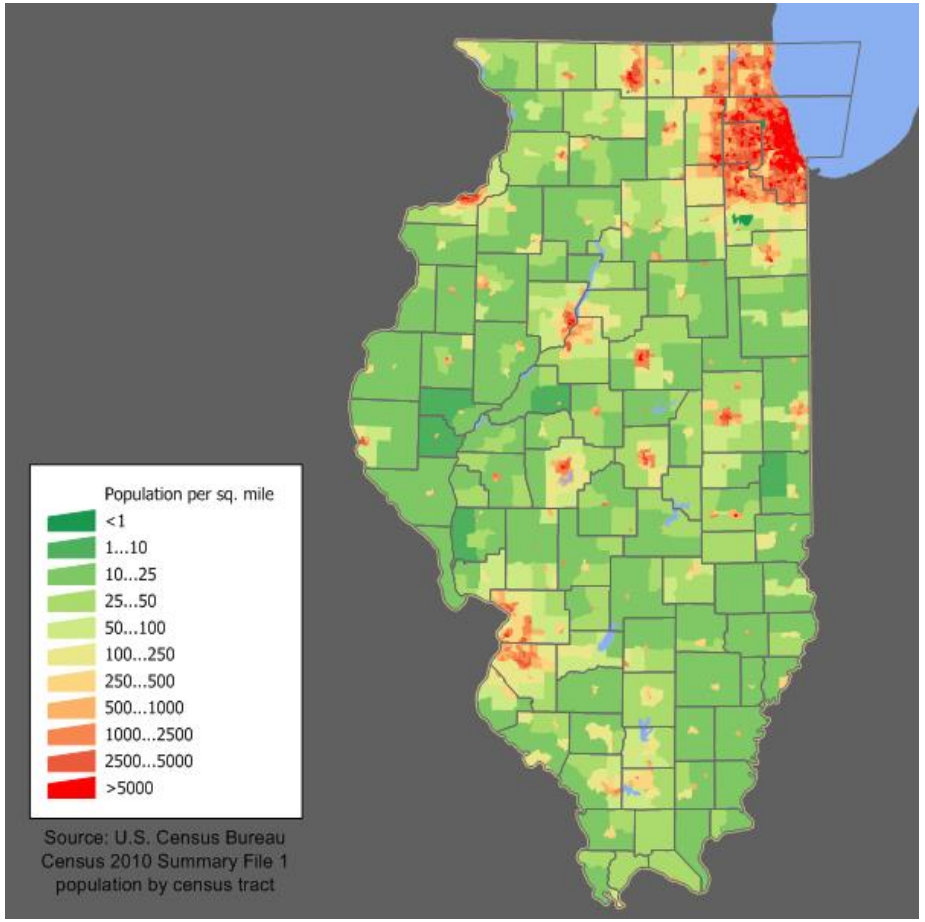
Illinois Department of Public Health

# Illinois Public Health System

- 12.5 million residents
- 102 counties with 97 local health departments
- De-centralized PH system
- Vast differences in local public health capacity

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# Tier System:

- LHD Data Readiness Self-Assessment Form
- 3 Tiers
  - Tier I: Tableau Visualized Measures
  - Tier II: Aggregated Data Reports
  - Tier III: Raw Data Access

- Benefits of the Tiered Approach:
  - Improved accessibility
  - Enhanced data security
  - Increased efficiency
  - Empowered decision-making

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# Centralized data request management system

- Single access point for all data requests
- Standardized intake process for consistency
- Faster turnaround with clear routing
- Transparency through real-time tracking
- Prioritized requests and efficient resource use
- Audit trail for compliance and governance
- Improved data quality and governance alignment
- Analytics to monitor trends and improve processes

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# From Legacy Systems to Scalable Architecture

**Migration from data warehouse to data lake infrastructure**

- Access on-demand data without hardware dependencies
- Leverage improved storage and processing capabilities

**FHIR data exchange implementation**

- Accelerate data exchange using healthcare interoperability standards
- Enable standardized, secure, real-time data sharing across systems

**Cloud infrastructure expansion**

- Scale resources based on your analytical needs
- Reduce operational costs while improving performance

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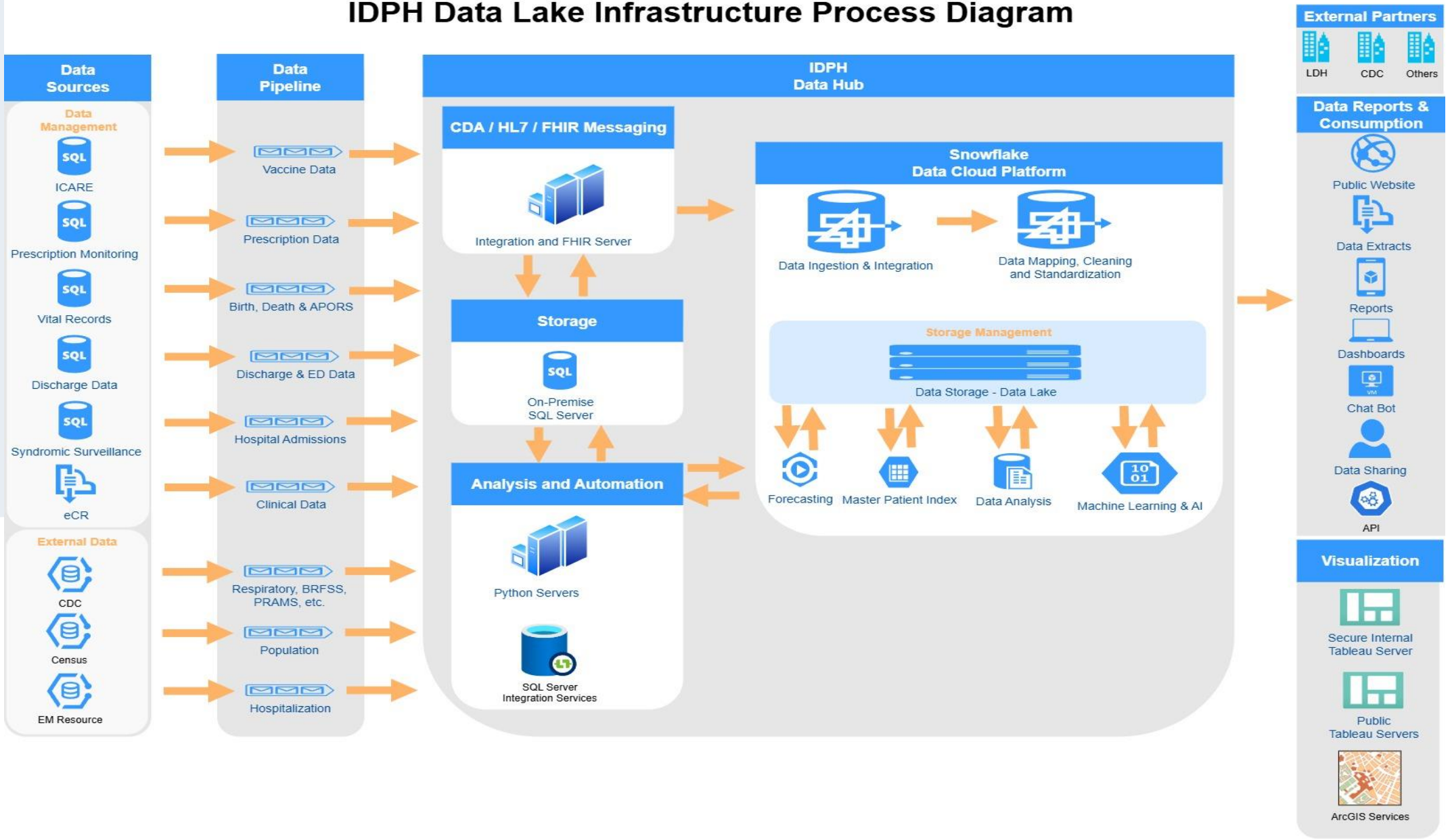
# IDPH Datahub

## IDPH Data Lake Infrastructure Process Diagram

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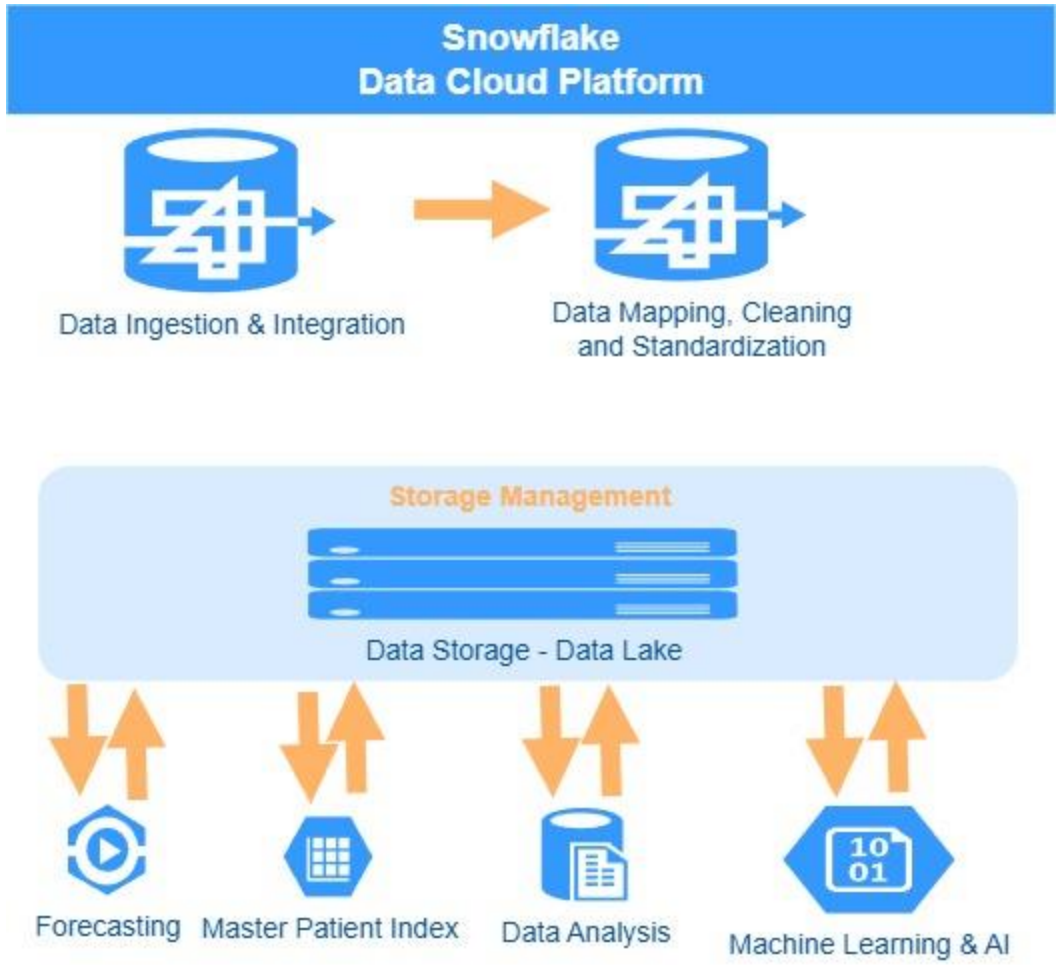
# Snowflake Data Lake for Public Health Data Sharing

- Scalable, centralized Snowflake data lake for Illinois Department of Public Health (IDPH).
- Supports ingestion, transformation, and sharing of public health datasets (e.g., vaccine, vital records, discharge).
    - Architecture includes:

      STAGING_LAYER: Raw data ingestion.

      ACCESS_LAYER: Cleaned, standardized data for distribution.

      LHD Databases: Over 90 county-specific databases, each securely isolated with standardized schemas.
    - Enables structured, analytics-ready data access for Local Health Departments (LHDs).

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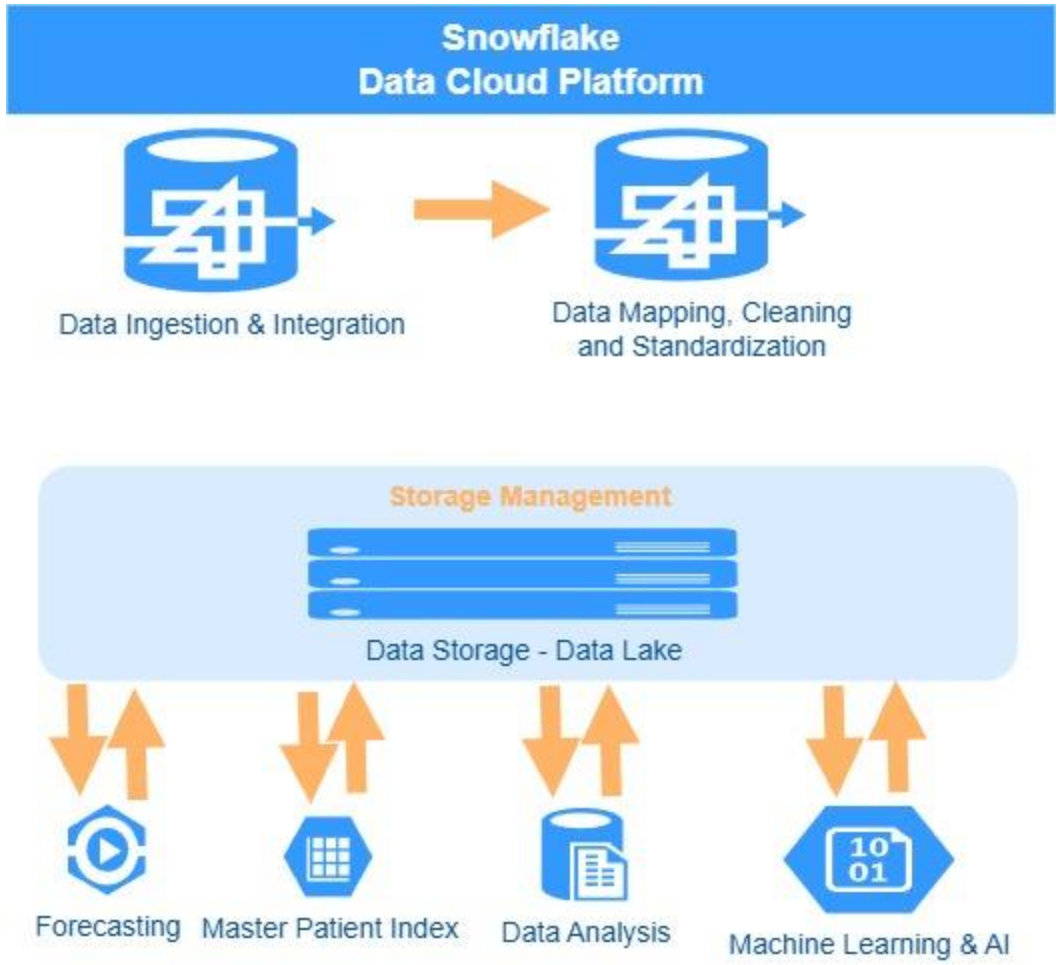
# Data Governance, Access Control, and Automated Delivery

- Role-Based Access Control (RBAC) enforces least-privilege access.
- Column-level masking protects PII (e.g., names, addresses, birthdates, coordinates).
- All data access is logged via Snowflake's ACCESS_HISTORY for full auditability.
- Compliant with HIPAA and state regulatory standards.
- Stored procedures filter by county and insert data into respective LHD databases.

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# Pilot with CDPH

- Pilot with 500 million ICARE records
  - Weekly full data refreshes
  - Daily incremental updates
  - Data exported from Oracle
- Instant access through API
- Saved weeks of manual work previously needed for exporting and re-importing data
- Enables linking with other datasets, such as IDSS, HDD, etc., using the state MPI

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# What's Next:

- Expand the range of available databases and measures.
- Leverage the system for both internal and external data sharing.
- Develop secure sandboxes for researchers and partner agencies.
- Enhance the Master Patient Index (MPI) to integrate Medicaid data.
- Advance AI capabilities and strengthen FHIR interoperability.

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## Questions?

Contact:

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IDPH
Illinois Department of Public Health

CDPH
Chicago Department of Public Health

# Public Health Interoperability: CDPH's Transformative Journey


***Aparna R. Priyadarshi,***

***Deputy Commissioner / Chief Informatics Officer***

***Public Health Informatics & IT Bureau***

***Chicago Department of Public Health***

February 2024

# How it started?

State Regulations

City Regulations

'Silo' limited real-time data management

Limited Data Set

On-premise servers

'Silo' Program level automation

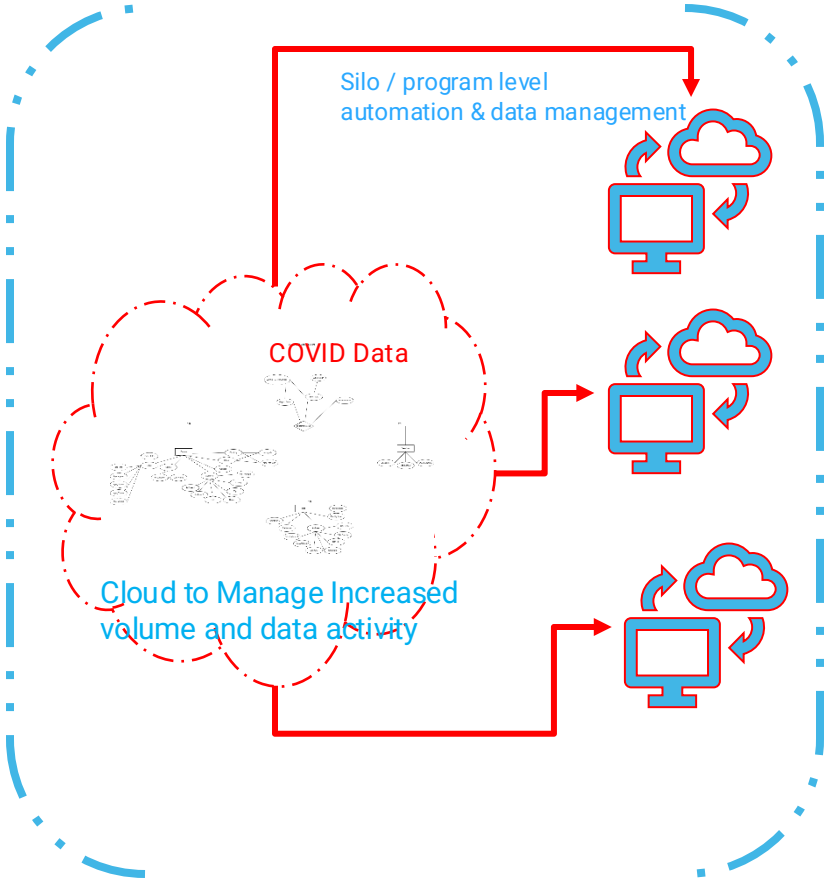
Data Use Agreements (DUA)

Dependency on State and CDS for surveillance data

On-premise workforce

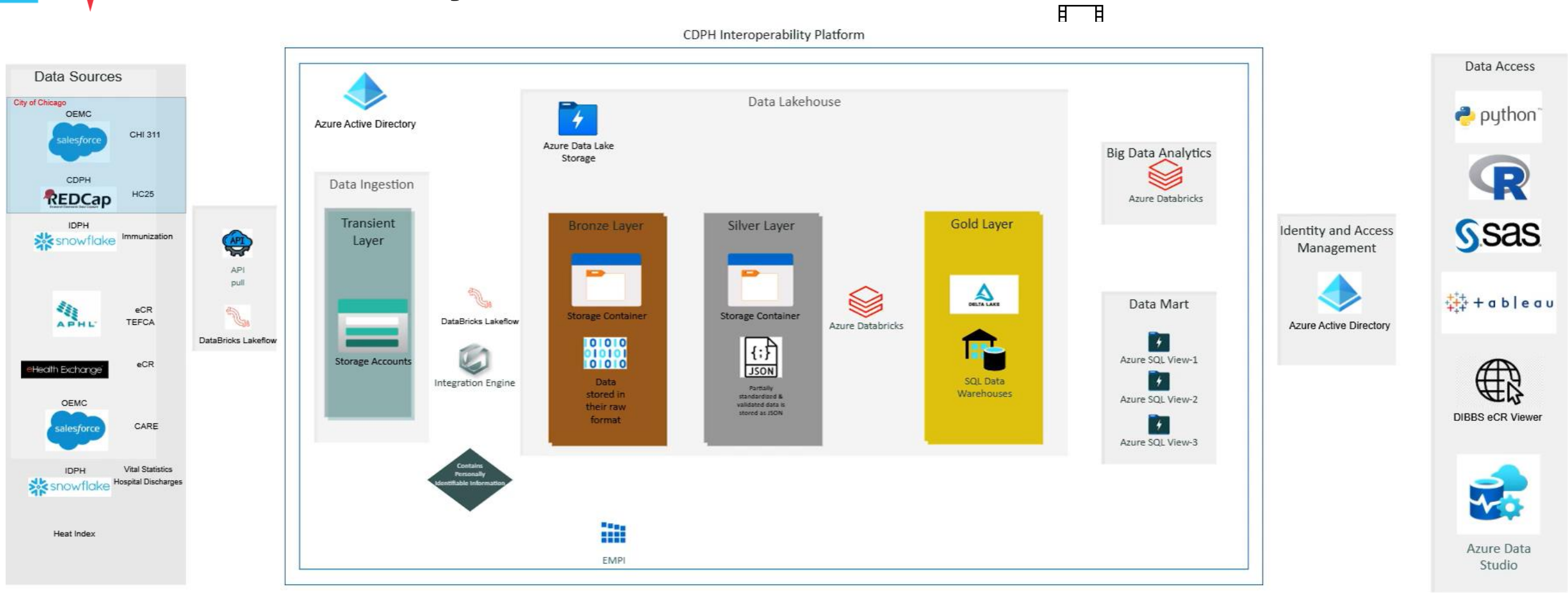
Pandemic

- 95% Remote workforce
- Increased real-time data management
- On-Premise servers not able to cater to data loads
- Increased data sharing
  - ✓ Intradepartmental
  - ✓ Interdepartmental
  - ✓ State
  - ✓ Federal

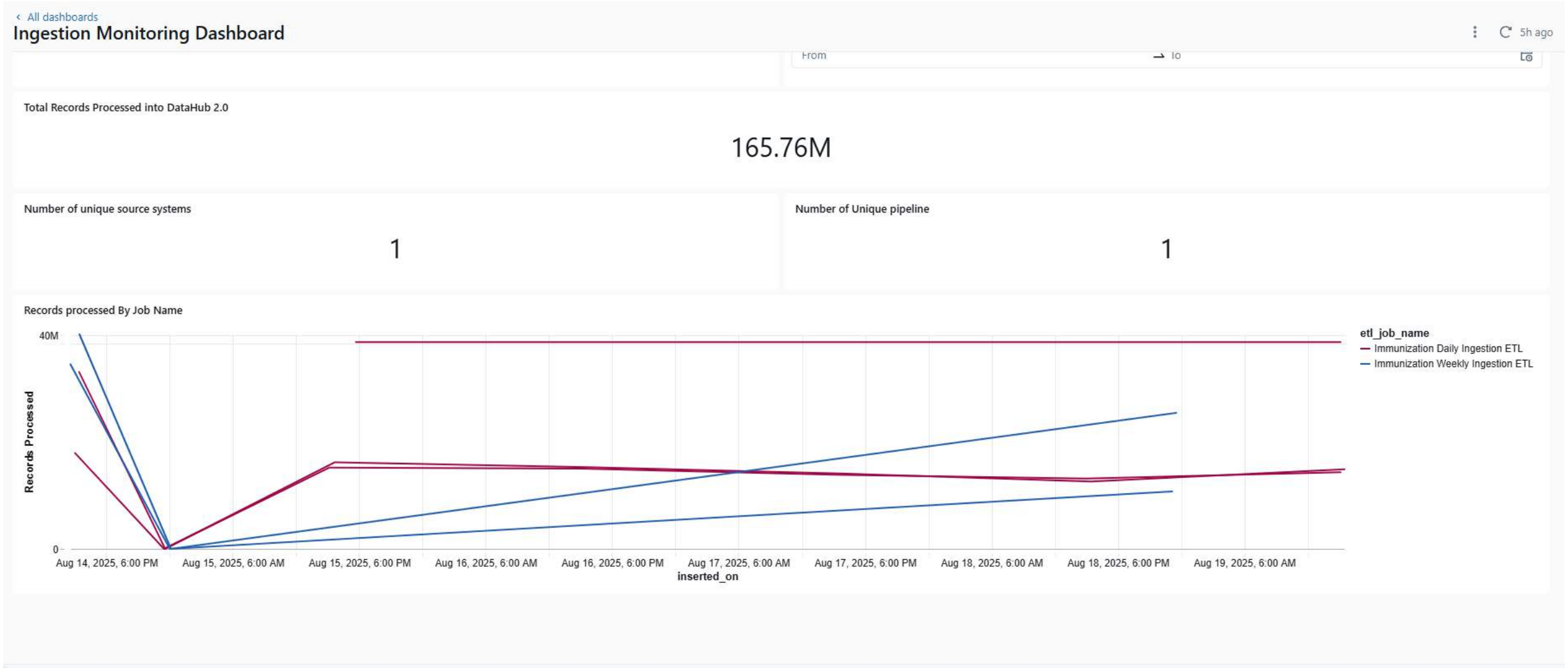


August 2025

# CDPH Today!



# Immunization Data Acquisition from IDPH



# CDPH Data Acquisition for all current sources

Total Records Processed into DataHub 2.0

583.46M

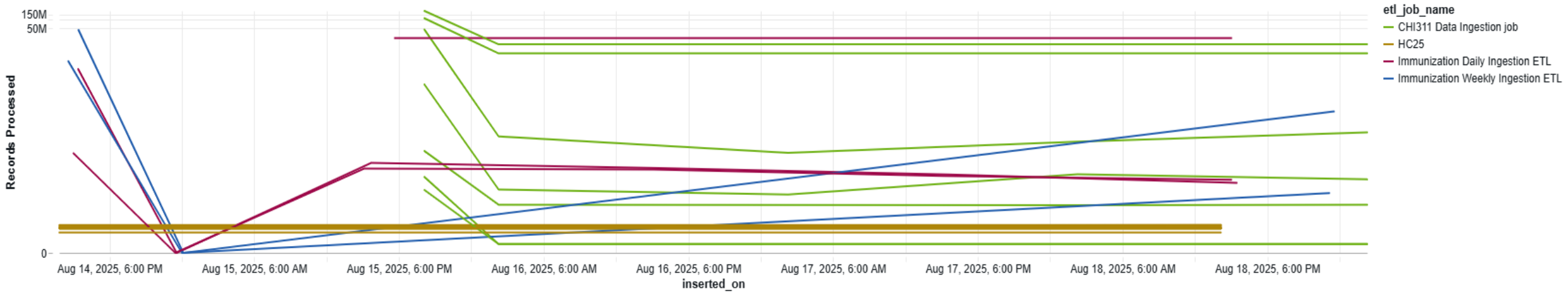
Number of unique source systems

3

Number of Unique pipeline

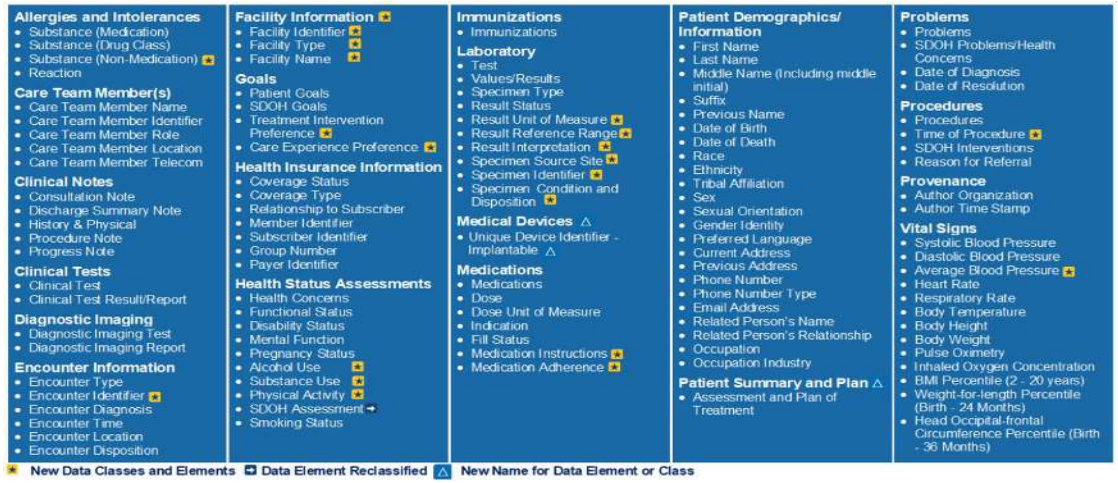
3

Records processed By Job Name



# Unified USCDI Longitudinal Data Model

- Uses the **USCDI standard** (US Core Data for Interoperability)
- Builds a **longitudinal health record** across:
  - Lab results, immunizations, encounters, social determinants and more
- Ensures data is **complete, interoperable and future-proof**
- Column-level security and role-based access control protect sensitive fields.



**Allergies and Intolerances**
- Substance (Medication)
- Substance (Drug Class)
- Substance (Non-Medication)
- Reaction

**Care Team Member(s)**
- Care Team Member Name
- Care Team Member Identifier
- Care Team Member Role
- Care Team Member Location
- Care Team Member Telecom

**Clinical Notes**
- Consultation Note
- Discharge Summary Note
- History & Physical
- Procedure Note
- Progress Note

**Clinical Tests**
- Clinical Test
- Clinical Test Result/Report

**Diagnostic Imaging**
- Diagnostic Imaging Test
- Diagnostic Imaging Report

**Encounter Information**
- Encounter Type
- Encounter Identifier
- Encounter Diagnosis
- Encounter Time
- Encounter Location
- Encounter Disposition

**Facility Information**
- Facility Identifier
- Facility Type
- Facility Name

**Goals**
- Patient Goals
- SDOH Goals
- Treatment Intervention Preference
- Care Experience Preference

**Health Insurance Information**
- Coverage Status
- Coverage Type
- Relationship to Subscriber
- Member Identifier
- Subscriber Identifier
- Group Number
- Payer Identifier

**Health Status Assessments**
- Health Concerns
- Functional Status
- Disability Status
- Mental Function
- Pregnancy Status
- Alcohol Use
- Substance Use
- Physical Activity
- SDOH Assessment
- Smoking Status

**Immunizations**
- Immunizations

**Laboratory**
- Test
- Values/Results
- Specimen Type
- Result Status
- Result Unit of Measure
- Result Reference Range
- Result Interpretation
- Specimen Source Site
- Specimen Identifier
- Specimen Condition and Disposition

**Medical Devices** △
- Unique Device Identifier - Implantable △

**Medications**
- Medications
- Dose
- Dose Unit of Measure
- Indication
- Fill Status
- Medication Instructions
- Medication Adherence

**Patient Demographics/ Information**
- First Name
- Last Name
- Middle Name (Including middle initial)
- Suffix
- Previous Name
- Date of Birth
- Date of Death
- Race
- Ethnicity
- Tribal Affiliation
- Sex
- Sexual Orientation
- Gender Identity
- Preferred Language
- Current Address
- Previous Address
- Phone Number
- Phone Number Type
- Email Address
- Related Person's Name
- Related Person's Relationship
- Occupation
- Occupation Industry

**Patient Summary and Plan** △
- Assessment and Plan of Treatment

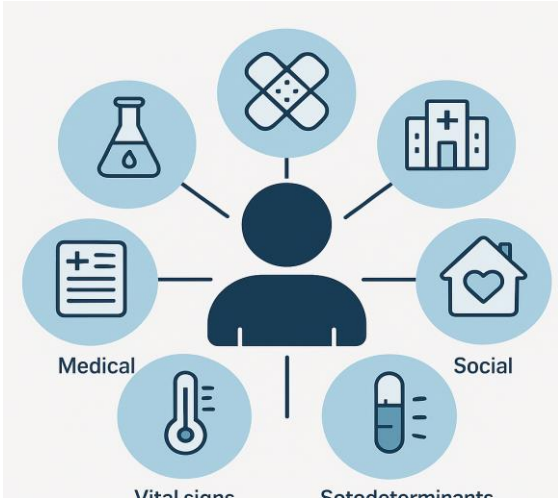
**Problems**
- Problems
- SDOH Problems/Health Concerns
- Date of Diagnosis
- Date of Resolution

**Procedures**
- Procedures
- Time of Procedure
- SDOH Interventions
- Reason for Referral

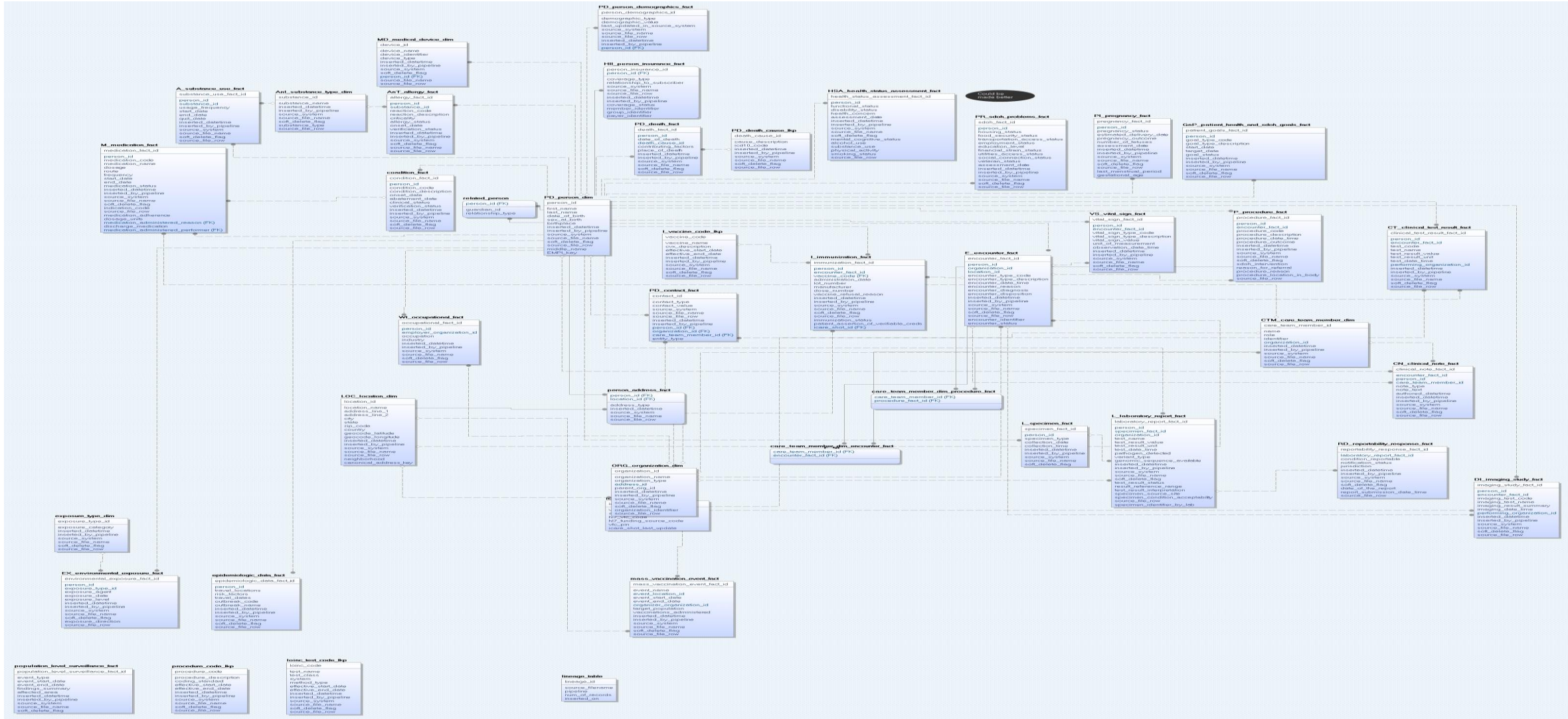
**Provenance**
- Author Organization
- Author Time Stamp

**Vital Signs**
- Systolic Blood Pressure
- Diastolic Blood Pressure
- Average Blood Pressure
- Heart Rate
- Respiratory Rate
- Body Temperature
- Body Height
- Body Weight
- Pulse Oximetry
- Inhaled Oxygen Concentration
- BMI Percentile (2 - 20 years)
- Weight-for-length Percentile (Birth - 24 Months)
- Head Occipital-frontal Circumference Percentile (Birth - 36 Months)

New Data Classes and Elements | Data Element Reclassified | New Name for Data Element or Class



# Data Model



# What does CDPH gain?

- **Faster data sharing with CDC, IDPH and partners** while ensuring secure, compliant message handling through Rhapsody.

- **Faster Outbreak Detection and Response**
  - We can see spikes in flu, COVID-19, STIs, or foodborne illnesses days or weeks sooner.
  - Example: Automated alerts from lab feeds + patient encounters.

- **Business-Focused Dashboards**
  - Visualize cases by ZIP code, race/ethnicity, or social needs.
  - Identify underserved areas to target interventions.

- **Streamlined Onboarding**
  - Onboarding new systems is **faster than ever**.
  - Agencies and partners can now be connected in a fraction of the time, ensuring that no critical data source is left behind.
  - Ability to **ingest and stream data in real time**, when needed.

# CDPH Interoperability Platform

CDPH
Chicago Department
of Public Health

CDPH-DataHub - Microsoft Azure

CDPH - DataHub - DataBricks

# The Team

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*Deputy Commissioner*

*Sri Hari Sivashanmugam*
*Data Scientist*

*Carmina Pena*
*Project Manager*

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Thank you for joining us today!

*What's Next*

- Take a movement break.
- Check the Schedule tab on the event platform for your next session.