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Open-Source Solutions for Public Health Innovation: Practical Tools and Lessons from the Field

Aug. 19, 2025 | 2025 ARC Preconference

SHAPING TOMORROW'S PUBLIC HEALTH TODAY.

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Session Objectives

- Share and highlight how grantees are using open-source data tools to advance modernization efforts.
- Leave attendees with actionable tools.
- Attendees could provide input on which tools would be helpful to have as open source.

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Session Outline

- Welcome
- Lessons from the Field – Jurisdiction Spotlight
- Audience Q&A

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Meet the Speakers

Dan Paseltiner	Melody Brown, MPH, MHSA, A-CSPO	Jennifer Rico, MA
Lead DIBBS Engineer, Skylight (CDC Contractor)	Acting Branch Chief & DMI Co-Director, LA County Dept. of Public Health	Surveillance and Informatics Section Supervisor, Montana Dept. of Public Health and Human Services

DIBBs Products

Data Integration Building Blocks (DIBBs)

April 2025

DIBBs

Data Integration Building Blocks

DIBBs are **modular, open-source** software that **empower jurisdictions to make the most of their data.**

Electronic Case Reporting (eCR) is the automated, real-time exchange of case report information between electronic health records and public health agencies

eCR Viewer

Improve eCR access and readability for PHAs

eCR Refiner

Tune the size and content of your eCRs

Query Connector

Get data from HCOs with a single search

Record Linker

Control how patient records are matched and merged

eCR Refiner

Discovery | Build

Tune the size and content of your eCRs

Problems

- eCRs often contain multiple reportable conditions and large amounts of patient data that may or may not be relevant to those reportable conditions, complicating case confirmation and eCR automation
- Inclusion of sensitive data poses legal/privacy issues
- Size of eCRs often causes processing and storage issues

Solution

An application where users can define the desired content of their eCRs and refine accordingly

Outcomes

- Increased number of reportable conditions utilizing eCRs
- Reduced time to identify cases
- Reduced incidence of legal/privacy issues
- Reduced performance and storage issues

eCR Refiner Overview

As it exists today:

- Jurisdiction-hosted
- Cloud-based, containerized API & command line tool
- Takes an eICR and section/condition codes & returns an eICR with only relevant content

Where we're potentially headed:

- Intermediary-hosted (e.g. AIMS)
- Now: split and filter based on reportable conditions & APHL Terminology Exchange Service (TES)
- Next: split and filter based on optional templates or custom, user-defined filters

We are looking for STLT partners to work with and get feedback from – please reach out to us at dibbs@cdc.gov if you are interested in the eCR Refiner!

Record Linker

Reduce duplicative patient data

Build

Problem

Public health agencies routinely grapple with fragmented, incomplete, and duplicate patient records

These discrepancies are compounded when records span multiple systems or providers.

Linking disparate patient records together can be a complex and time-consuming process that often relies on manual effort, leading to inefficiencies in disease tracking, inaccurate case counts, and delays in public health response.

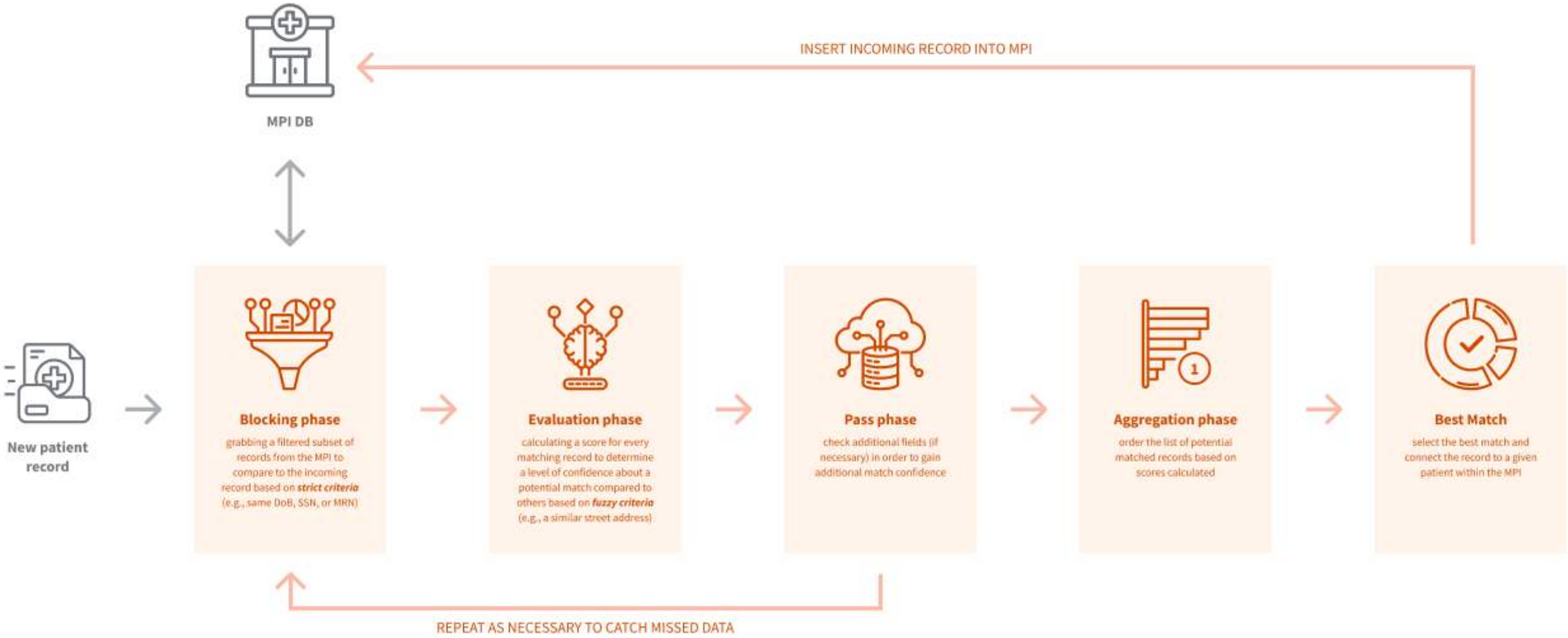
Solution

A stand alone master patient index (MPI) that is compatible with many systems, is flexible, accurate, and provides transparency into the algorithm used to match patient records. This tool will deduplicate records, match incomplete patient records, and provide the ability to review "possible matches."

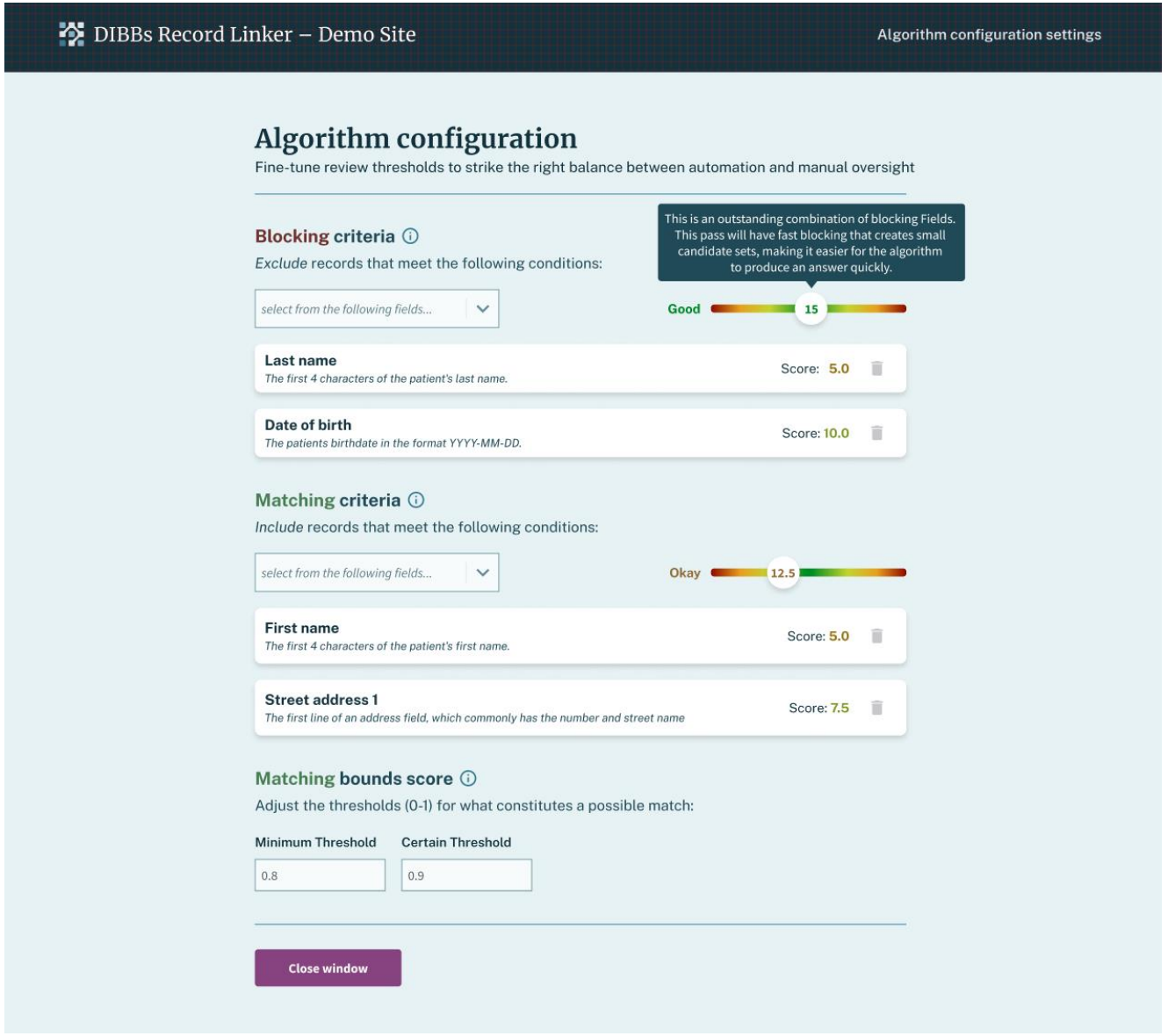
Outcomes

- More complete and accurate records
- Greater efficiency in manual review
- Improved workload management

Record Linker Algorithm – Process Diagram



Record Linker Features: Highly Configurable Algorithm



Query Connector

Pilot

Get data from HCOs with a single search

Problems

Access to public health data is currently based on a model in which jurisdictions are pushed data via eCRs and ELRs. Supplemental data is often required to take public health action. Jurisdictions are burdened with finding the additional relevant data to take action on. The legal and technical burden to get set up to receive data is high.

Solution

A secure, robust FHIR client that can be accessed by UI or API to connect to Health Care Organizations and retrieve targeted patient data. The queries sent to HCO's are customizable to protect patient privacy and uphold the minimum necessary standard. Our connection to HCO's utilizes an HCO's exposed FHIR API. Query Connector can leverage existing Data Use agreements like DURSA and has first class support for TEFCA.

Outcomes

Faster access to patient data

More complete data for public health departments

Limit access to minimum necessary data

At a glance – HIE & Hospital connections

Health Information Exchange

User interface

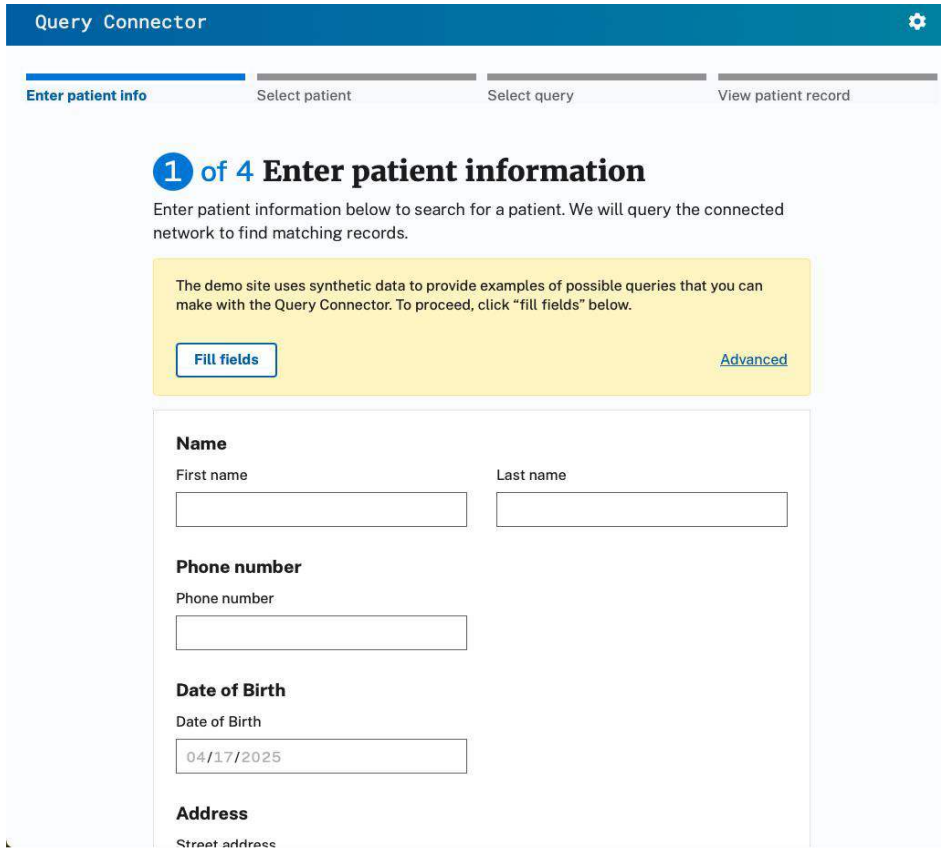
API

Query Connector
hosted by jurisdiction

Hospital EHR

Primary Care EHR

Query Connector: Two Ways



Web-based User Interface (UI)

- Conduct **individual** searches by inputting patient demographics
- Manage user access through **custom permissions**

API

- Can be automated to connect with a jurisdiction's own data system
- Works from anywhere in a jurisdiction's workflow (most commonly via Rhapsody)

Check it out yourself @ https://demo.queryconnector.dev/

eCR Viewer

Pilot

Improve eCR access and readability for PHAs

Problems

It's challenging for case investigators, epis, and others to **find the information they need** in an eCR.

Users need to **search through lengthy documents** for information relevant to a case.

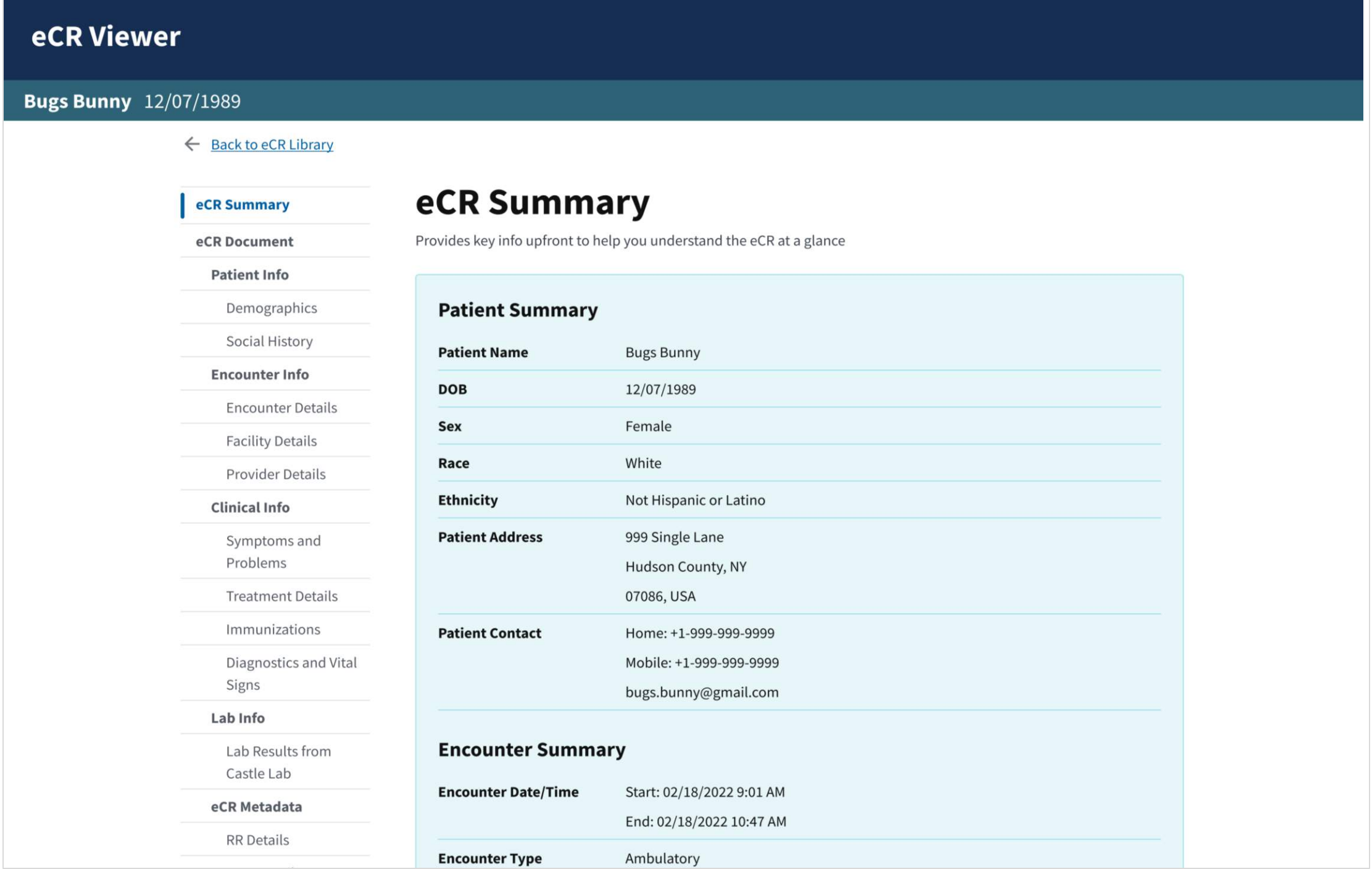
Solution

eCR Viewer provides...

- Unified view of eICR & Reportability Response (RR) documents
- Consistent format, regardless of provider
- Highlights important condition information up front

Outcomes

- Less manual effort to review eCRs
- Faster time to decision
- An efficient, delightful eCR experience for case investigators & epis in your jurisdiction


eCR Viewer
Bugs Bunny 12/07/1989
Back to eCR Library
eCR Summary
eCR Document
Patient Info
Demographics
Social History
Encounter Info
Encounter Details
Facility Details
Provider Details
Clinical Info
Symptoms and Problems
Treatment Details
Immunizations
Diagnostics and Vital Signs
Lab Info
Lab Results from Castle Lab
eCR Metadata
RR Details
eCR Summary
Provides key info upfront to help you understand the eCR at a glance
Patient Summary
Patient Name Bugs Bunny
DOB 12/07/1989
Sex Female
Race White
Ethnicity Not Hispanic or Latino
Patient Address 999 Single Lane
Hudson County, NY
07086, USA
Patient Contact Home: +1-999-999-9999
Mobile: +1-999-999-9999
bugs.bunny@gmail.com
Encounter Summary
Encounter Date/Time Start: 02/18/2022 9:01 AM
End: 02/18/2022 10:47 AM
Encounter Type Ambulatory

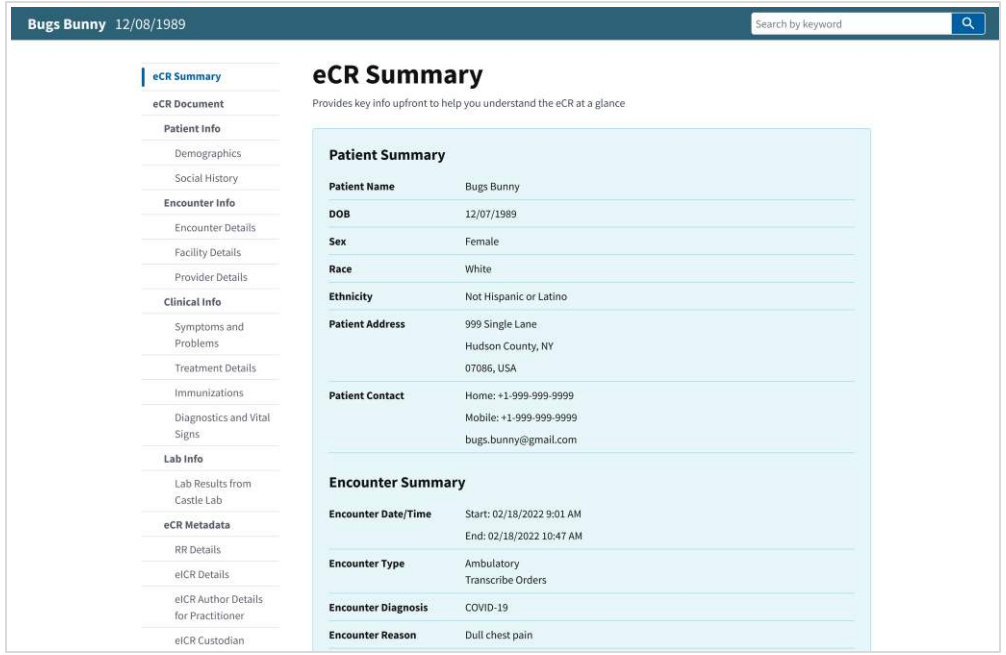
eCR Viewer Integrations

Two options offered:

1. Direct integration of core Viewer page within a surveillance system

   Currently available for NBS (6.0.16.2). EpiTrax integration coming later this year

NBS - "View eICR Document" Button

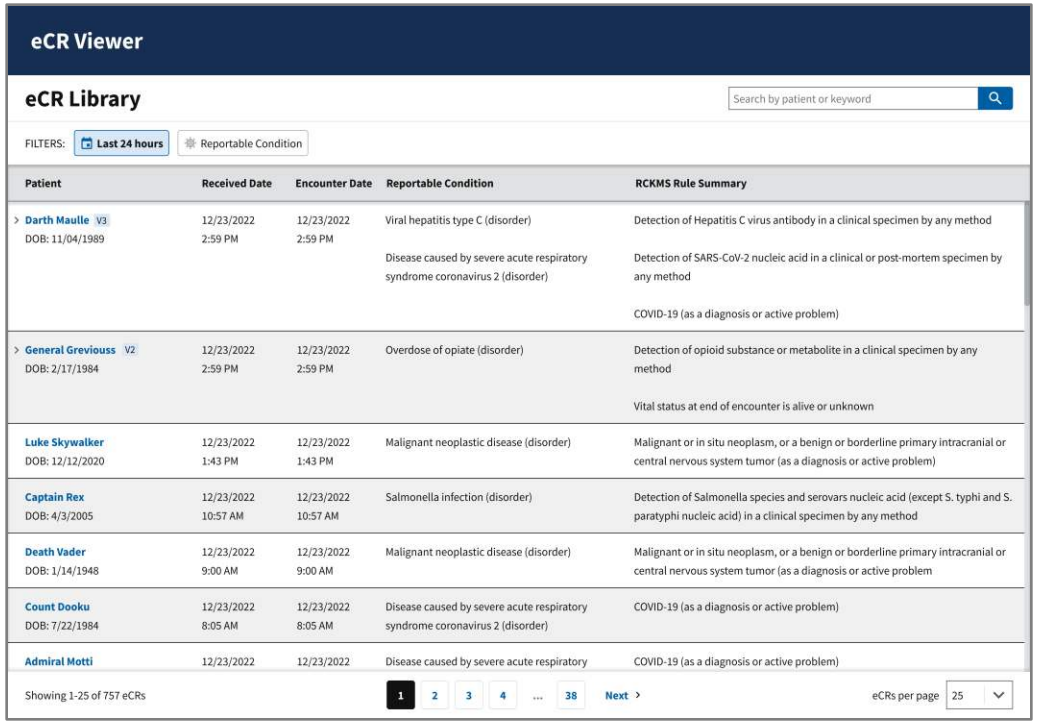


Individual eCR

eCR Viewer Integrations

Two options offered:

2. Standalone tool – the eCR Library



eCR Library

Individual eCR

Thank you!

For more information about all our products, see our Github repositories:

CDCgov/dibbs-ecr-viewer
CDCgov/dibbs-ecr-refiner
CDCgov/dibbs-query-connector
CDCgov/RecordLinker

August 18, 2025 | ARC Data Modernization in Motion Preconference

SaTScan™ Utilization for Electronic Lab Report Monitoring in Los Angeles County

Data Operations Unit
Disease Control Informatics Branch
Los Angeles County Dept of Public Health

County of Los Angeles Public Health

ELRs in Los Angeles County

1. Critical to disease surveillance
2. >1.6 million ELRs ingested into surveillance system so far in 2025
3. 830 unique lab connections into surveillance system
4. >420K disease incidents created by ELRs in surveillance system so far in 2025 (excl. COVID)

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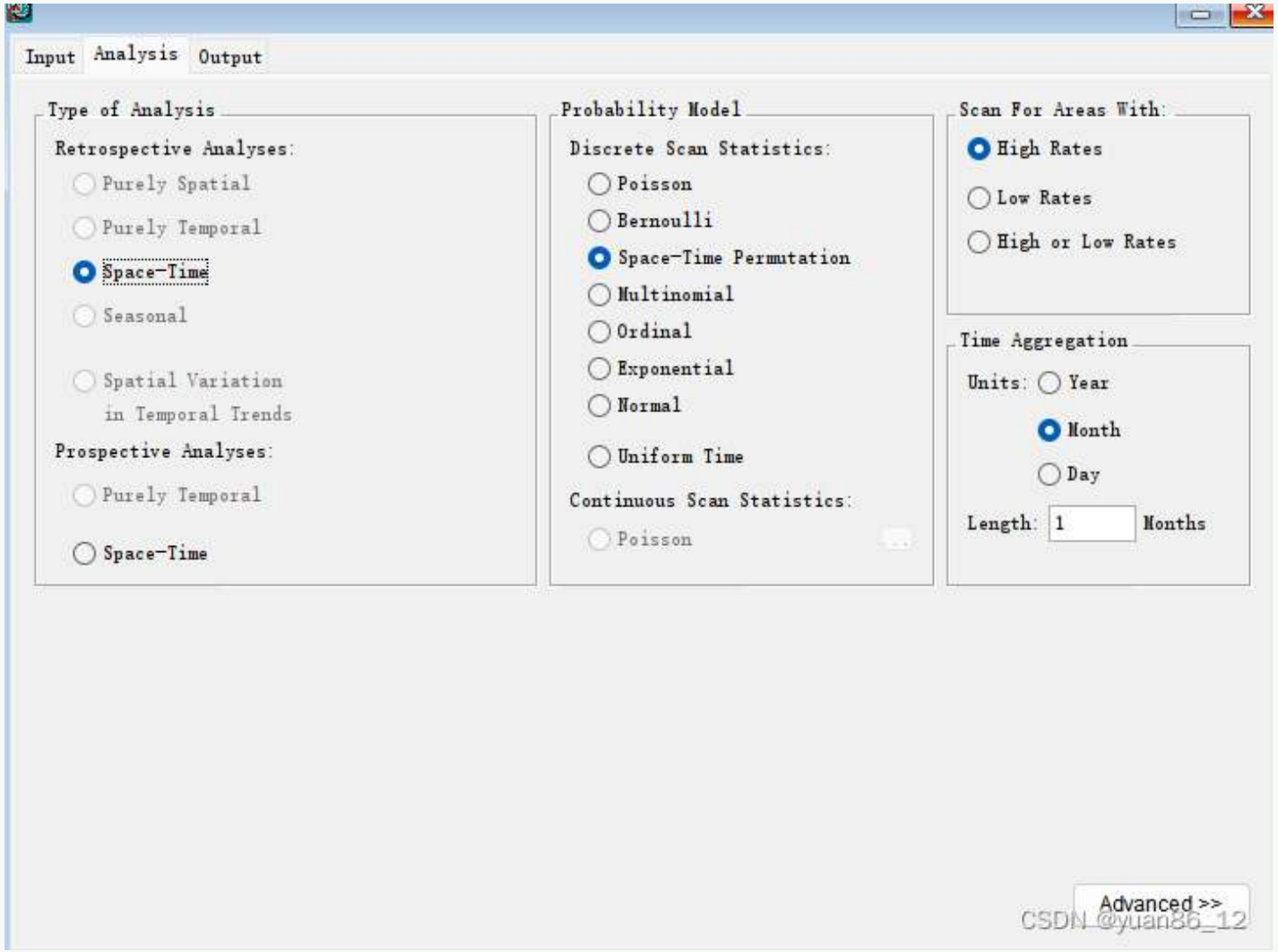
What is SaTScan?



Open-source tool to analyze spatial, temporal, and space-time data

Designed for public health and epidemiologists

Identifies clusters of cases in space and time; determines if differences over time are statistically significant.

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How do we leverage SaTScan for ELR monitoring?

Laboratory facilities are reconceptualized as “spaces” for the prospective space-time permutation scan statistic.

To detect unusual drops in reporting ELR volume by facility and by disease.

Adapted methodology used by NYC’s team and expanded:

- **Increased sensitivity for some diseases**
- **Checking by disease vs. all labs**

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How is SaTScan set up for ELR volume monitoring?

1. Part of volume monitoring (with zero submissions and turnaround time reports)
2. Limited to higher volume diseases (22 total) among higher volume senders
3. Monitored every weekday

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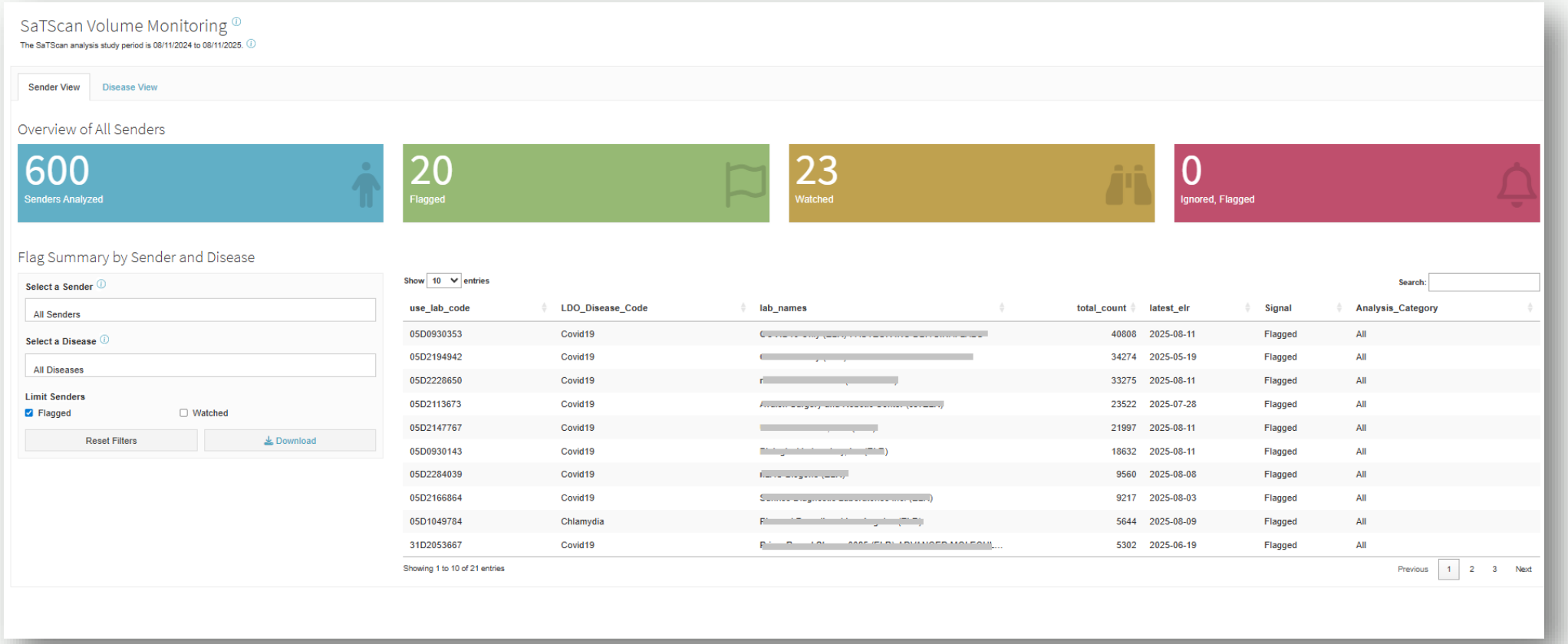
How is SaTScan set up for ELR volume monitoring?

1. Diseases are parameterized (differentiated between higher vs. lower volume senders)
2. Run in R through an installed rsatscan package
3. Scheduled R scripts prepare input files and exports data into a dashboard

ELR Monitoring Dashboard



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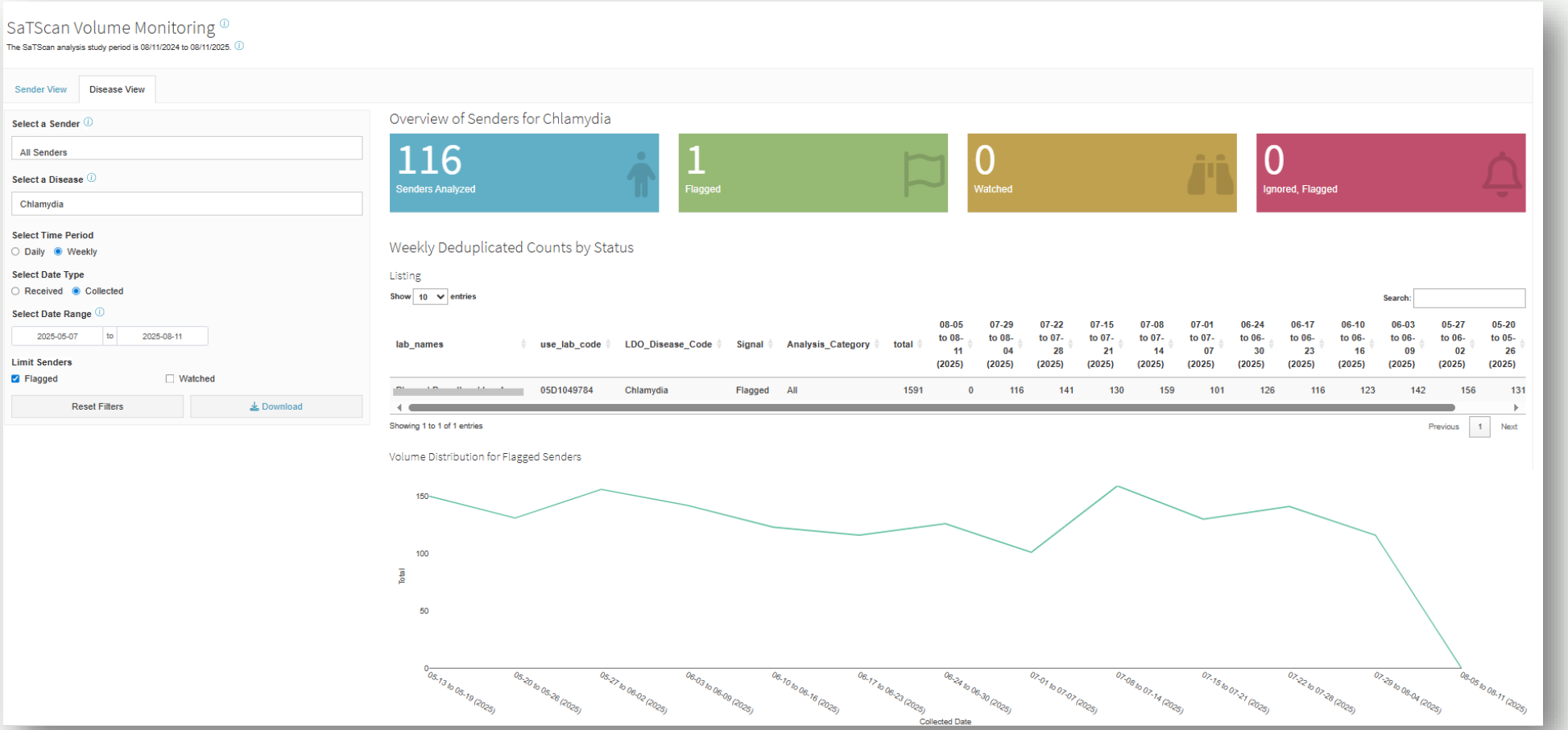
ELR Monitoring Dashboard



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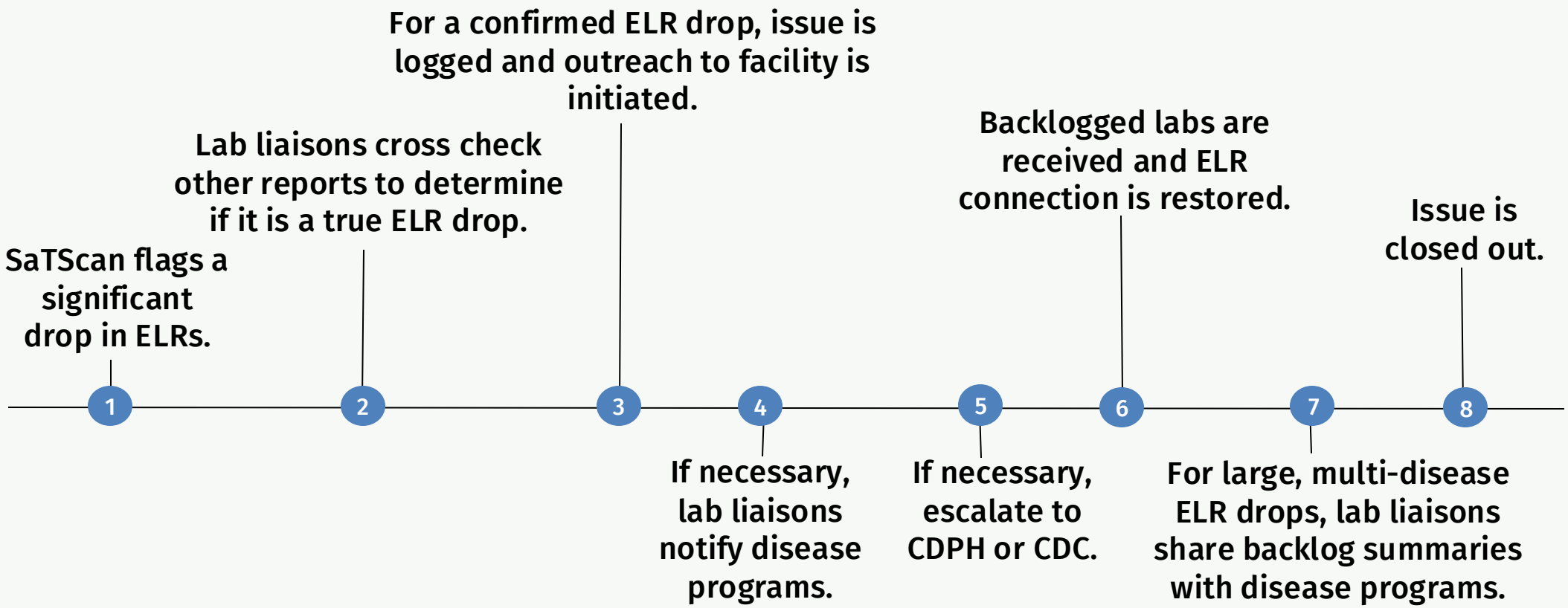
ELR Monitoring Workflow



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Future Plans

1. Expand to lower volume facilities and lower volume diseases
2. Further automate monitoring for efficient decision making
3. Continue to align monitoring to program priorities

Acknowledgements

SaTScan Methods adapted from the Bureau of Communicable Disease at the New York City Department of Health and Mental Hygiene:

- Greene, S. K., Andrews, E. M., Evans Lloyd, P., Baumgartner, J., & Peterson, E. R. (2020). Detecting drop-offs in electronic laboratory reporting for communicable diseases in New York City. *Journal of Public Health Management and Practice*, *26*(6), 570–580. https://doi.org/10.1097/PHH.0000000000000969
- GitHub Repo: https://github.com/CityOfNewYork/communicable-disease-surveillance-nycdohmh/blob/master/ELR_dropoffs/README_ELR_DROPOFFS.md

rsatscan package:

Kim, J., & Jung, I. (2020). *rsatscan: Tools, classes, and methods for interfacing with SaTScan stand-alone software* (R package version 0.3.9200) [Computer software]. Comprehensive R Archive Network (CRAN). https://CRAN.R-project.org/package=rsatscan

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Thank you!

If you have more questions, email:
LabDataMonitoring@ph.lacounty.gov

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MONTANA DPHHS

DEPARTMENT OF PUBLIC HEALTH & HUMAN SERVICES

Git'er done Montana Style:

How GitLab Saves Our Code (and Our Sanity)

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Pulse Check:

Quick show of hands, how many people are familiar with GitLab or GitHub?

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GitLab: when used to its full extent, it is a DevOps platform that enables:

Code repository + tracking

Group collaboration

Pipeline development

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Challenge

- Montana is a decentralized state (59 local and tribal public health departments)
- We have many core public health data to share: Behavioral Risk Factor Surveillance System (BRFSS); Vital Statistics; Communicable Disease data; Hospital Discharge; Syndromic Surveillance; Population Estimates
- Wanted to prevent the release of differential statistics while empowering public health professionals to perform independent data analysis

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Opprotunity

- Enterprise GitLab is available within the State of Montana
- Enabled us to centrally store and utilize common analytic code
- Aligned with Data Modernization Efforts

- [x] Support for implementation
- [x] Able to leverage existing infrastructure/technology
- [x] Had an advanced GitLab user to act as the Champion

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How we started

- Drafted how we wanted the Group organized
  - Enterprise → Agency→ Division → Surveillance & Informatics
- Worked with our State IT
- Defined the governance and administration
  - How would access be requested, reviewed, granted?
  - How would we ensure proper management and utilization?
- Collated all that information into a handy Instruction manual
- Socialized the GitLab Group!

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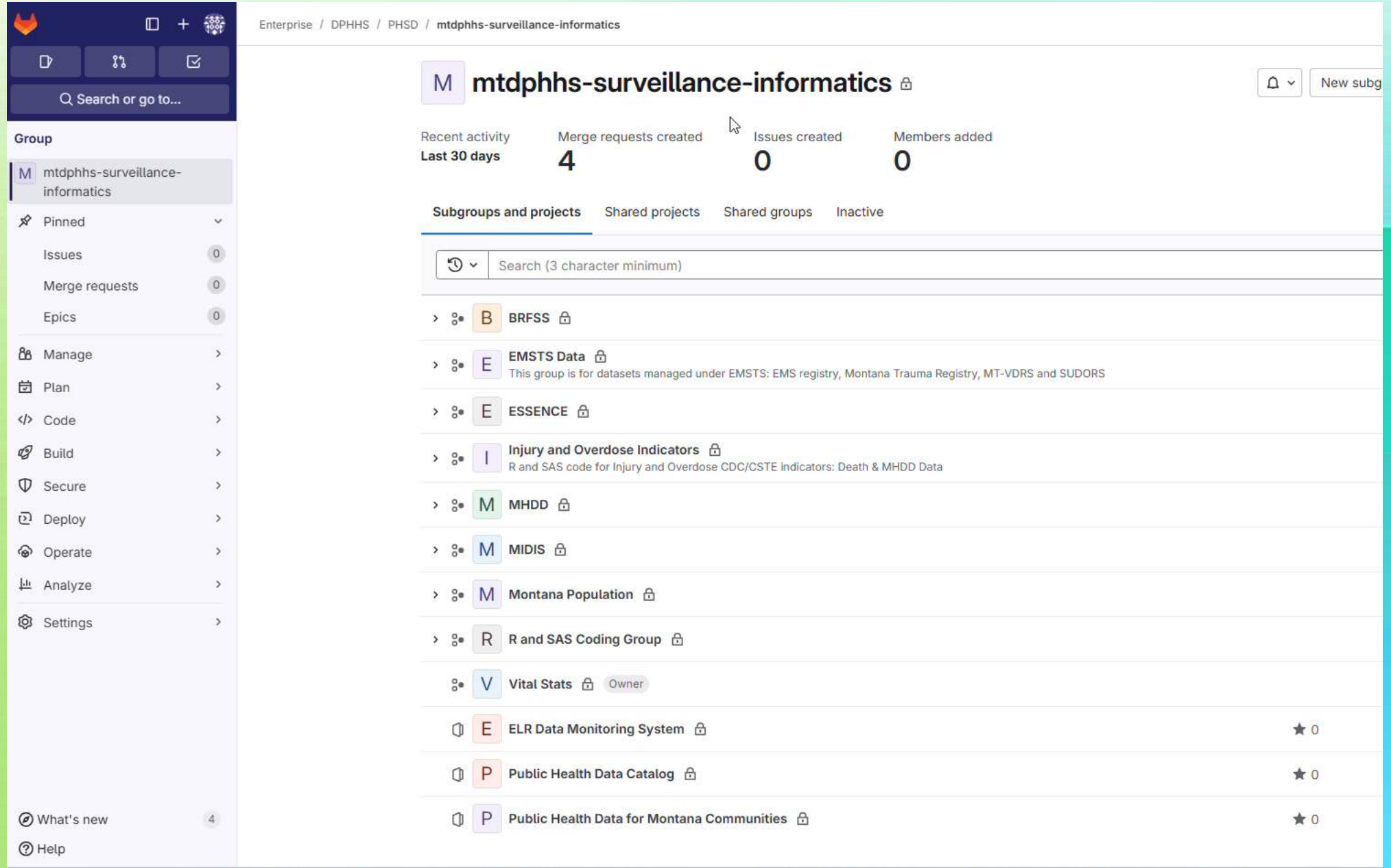

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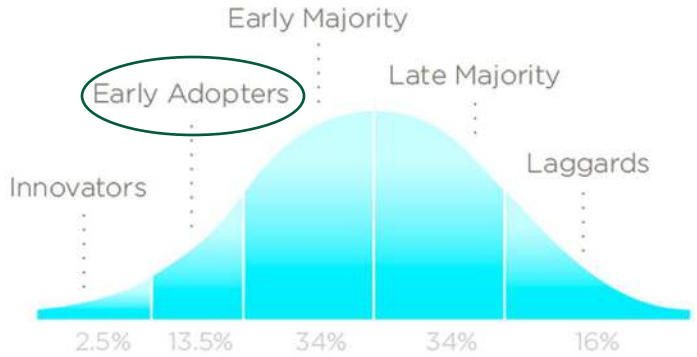
If you build it,

will they come?

Yes, And, we are still trying

- Utilization hasn't been what we had hoped
  - Currently have the "early adopters"
- Positive feedback from users
- Change management is hard
- Data Modernization "overwhelm"



Next Steps:

- Hands-on training
- More abbreviated instruction manual or short training tutorials
- GitLab is robust, so let's focus on the intended and immediate purpose
- Continue to socialize its use in our Montana Public Health Communities of Practice
- Consider the addition of more relevant code sets

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Thank You!

jennifer.rico@mt.gov

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Audience Q & A

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Thank You!

Up Next | Break

11am Central Time | **Regency C** Join us for our preconference closing plenary session –

Advancing Data Modernization Roadmaps with a Sustainability Lens

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Share Your Story!

IC Program Interviews: Wave 1 Participants

We Want to Hear from You!

Short, 5–7 minute interviews with **Wave 1 PHAs & IC Program partners**

When: Mon 8/18 – Thurs 8/21
Where: Sterling 5 (2nd floor)

Sign up by scanning the QR Code, or come find us during a break!

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