Salt River Pima Maricopa Indian Community
Scottsdale | Arizona

Challenges & Lessons Learned from COVID-19 Pandemic
Data Collection | Analysis | Sharing
May 2023


Long Overview Video: https://vimeo.com/241915565

Our Story

- 1. Getting to know the SRPMIC tribe
- 2. Introducing the SRPMIC Data Team
- 3.A look at Data before Covid19
- 4. March 2020 .. Until present
- 5. Connecting data in the future
- 6. Data Hungry

The TEAM

Jennell Clark, MSN, RN, CDCES, WCC
Division Chief of Public Health Nursing
Salt River Pima-Maricopa Indian Community
p: 480.362.7624 | m: 480.241.5742
jennell.clark@srpmic-nsn.gov

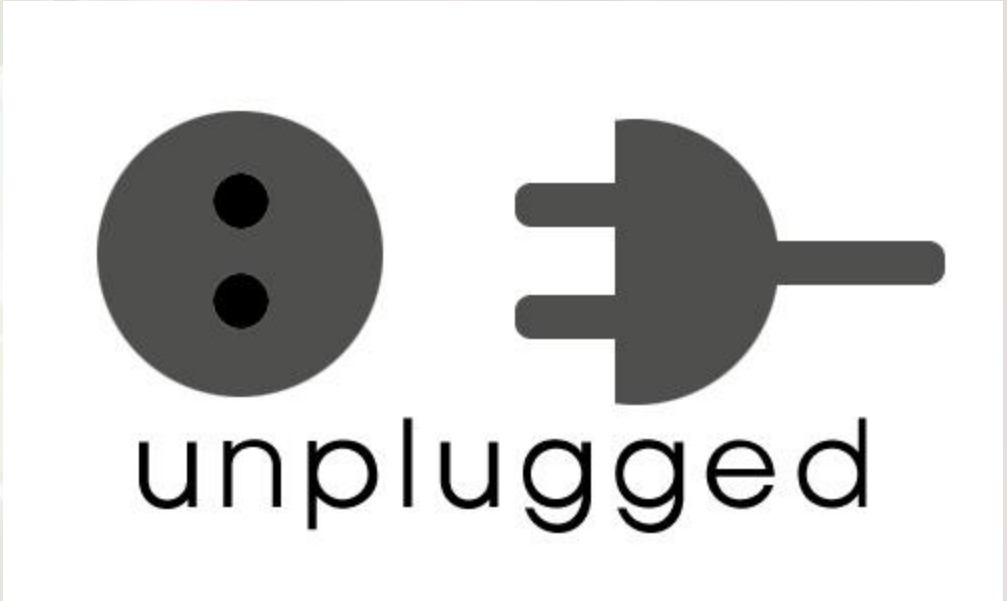
Nicholas Rolig, MPH, CPH, CHES
Healthcare Data Specialist II
Salt River Pima Maricopa Indian Community
10005 E Osborn Rd
Scottsdale, Arizona 85262
Nicholas.Rolig2@SRPMIC-nsn.gov
Office (480) 362-3081

Nancy L Mangieri DNP, MSN, RN, CPM,C-PHFP, NJ-HO
Chief Public Health
Salt River Pima Maricopa Indian Community
10005 E Osborn Rd
Scottsdale, Arizona 85262
Nancy.mangieri@srpmic-nsn.gov
Office (480) 362-7247
Cell (480) 332-3187

DATA BEFORE COVID 19

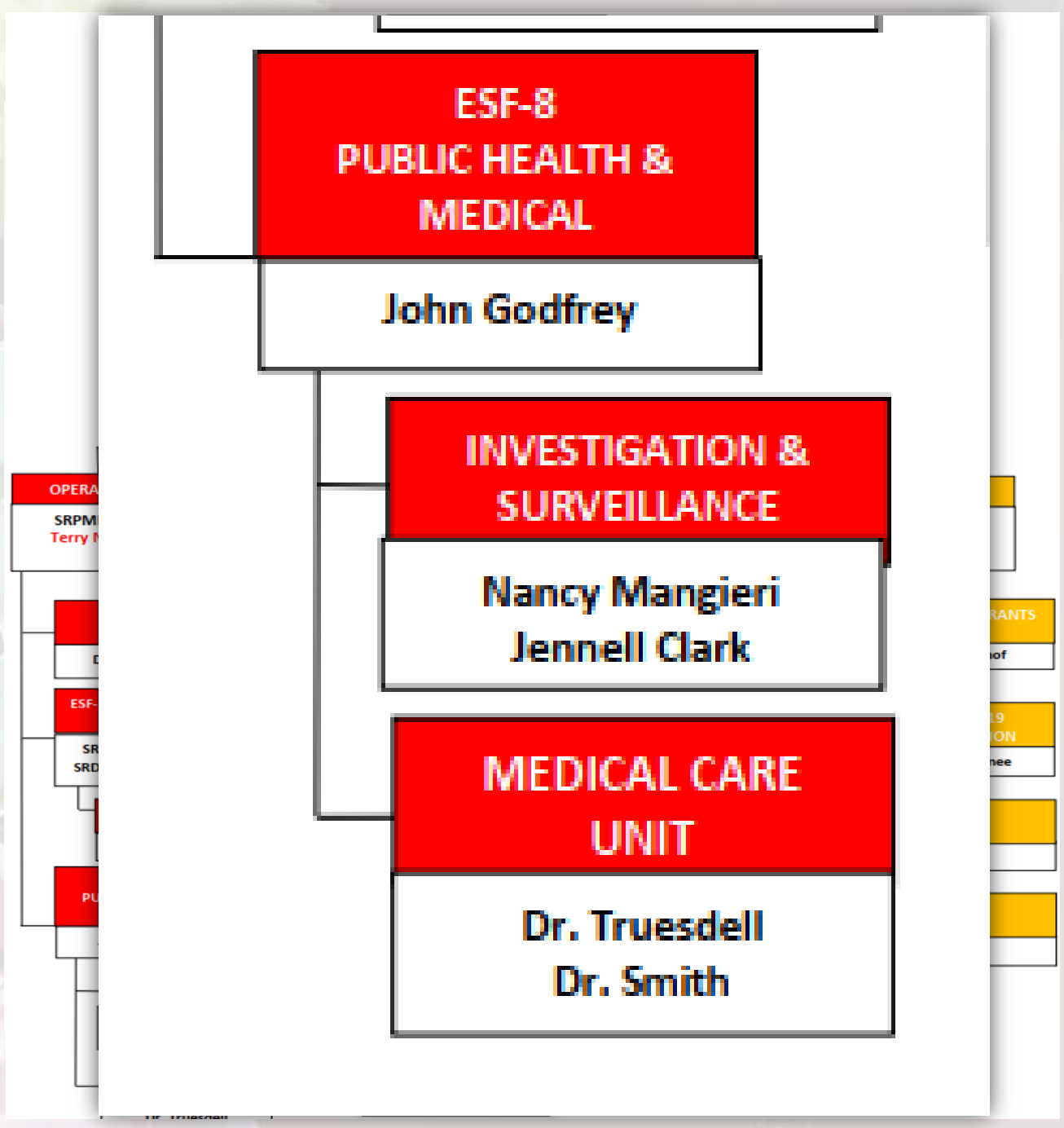
- Siloes internally
- ADHS MEDSIS
- ASIIS
- PRISM
- Data Sovereignty

  seeking control of our data
- Health System E H R access
- Data Communication Style



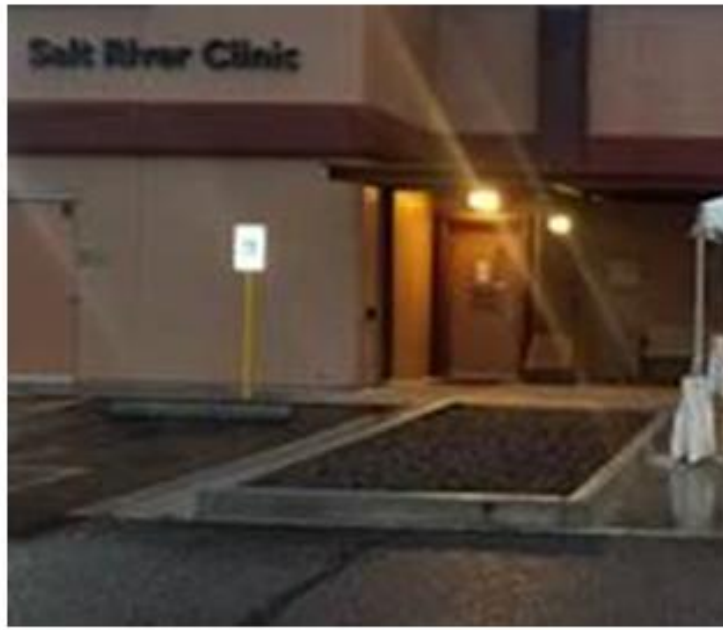
Emergency Operations Centers (EOC) March 2020

- First case 3.13.2020
- 3.19.2020 SRPMIC moves to essential services only



EOC – PUI

- Points of Entry
  - COVID-19 Hotline (24/7)
  - Public Health Nurse Line (24/7)
  - Walk-ins
    - Triage by Clinic Staff



Name: [redacted]
DoB: [redacted]

Internal use
CDC nCoV ID _____

Interim 2019 novel coronavirus (2019-nCoV) patient under investigation (PUI) form

As soon as possible, notify and send completed form to: 1) your local/state health department, and 2) CDC: email (eocreport@cdc.gov, subject line: nCoV PUI Form) or fax (770-488-7107). If you have questions, contact the CDC Emergency Operations Center (EOC) at 770-488-7100.

Today's date 3/31/2020 **State patient ID**_____ **NNDSS local record ID/Case ID**[1] _____ **State**___ **County**_____
Interviewer's name_____ **Phone**_____ **Email**_____
Physician's name _____ **Phone**_____ **Pager or Email**_____
Sex ☐ M ☑ F **Age** 63 ☐ yr ☐ mo **Residency** ☐ US resident ☐ Non-US resident, country_____

T: 98.9
P: 94
O_2: 93%

PUI Criteria

Date of symptom onset March 23 2020
Does the patient have the following signs and symptoms (check all that apply)?
☐ Fever[2] ☑ Cough ☑ Sore throat ☑ Shortness of breath
In the 14 days before symptom onset, did the patient:

Spend time in Wuhan City, China?	☐ Y ☐ N ☐ Unknown
Does the patient live in Wuhan City? ☐ Y ☐ N ☐ Unknown Date traveled **to** Wuhan City_____ Date traveled **from** Wuhan City_____ Date **arrived** in US_____	
Have close contact[3] with a person who is under investigation for 2019-nCoV while that person was ill?	☐ Y ☐ N ☐ Unknown
Have close contact[3] with a laboratory-confirmed 2019-nCoV case while that case was ill?	☐ Y ☐ N ☐ Unknown

Additional Patient Information

Is the patient a health care worker? ☐ Y ☑ N ☐ Unknown
Have history of being in a healthcare facility (as a patient, worker, or visitor) in Wuhan City, China? ☐ Y ☐ N ☐ Unknown
Is patient a member of a cluster of patients with severe acute respiratory illness (e.g., fever and pneumonia requiring hospitalization) of unknown etiology in which nCoV is being evaluated? ☐ Y ☐ N ☐ Unknown
Does the patient have these additional signs and symptoms (check all that apply)?
☐ Chills ☑ Headache ☐ Muscle aches ☐ Vomiting ☐ Abdominal pain ☐ Diarrhea ☐ Other, Specify_____
Diagnosis (select all that apply): Pneumonia (clinical or radiologic) ☐ Y ☐ N Acute respiratory distress syndrome ☐ Y ☐ N
Comorbid conditions (check all that apply): ☐ None ☐ Unknown ☐ Pregnancy ☐ Diabetes ☐ Cardiac disease ☐ Hypertension ☐ Chronic pulmonary disease ☐ Chronic kidney disease ☐ Chronic liver disease ☐ Immunocompromised ☐ Other, specify
Is/was the patient: Hospitalized? ☐ Y, admit date_____ ☐ N **Admitted to ICU?** ☐ Y ☐ N
Intubated? ☐ Y ☐ N **On ECMO?** ☐ Y ☐ N **Patient died?** ☐ Y ☐ N
Does the patient have another diagnosis/etiology for their respiratory illness? ☐ Y, Specify_____ ☐ N ☐ Unknown

Respiratory diagnostic results

Test	Pos	Neg	Pending	Not done
Influenza rapid Ag ☐ A ☐ B	☐	☐	☐	☐
Influenza PCR ☐ A ☐ B	☐	☐	☐	☐
RSV	☐	☐	☐	☐
H. metapneumovirus	☐	☐	☐	☐
Parainfluenza (1-4)	☐	☐	☐	☐
Adenovirus	☐	☐	☐	☐

Test	Pos	Neg	Pending	Not done
Rhinovirus/enterovirus	☐	☐	☐	☐
Coronavirus (OC43, 229E, HKU1, NL63)	☐	☐	☐	☐
M. pneumoniae	☐	☐	☐	☐
C. pneumoniae	☐	☐	☐	☐
Other, Specify_____	☐	☐	☐	☐

Specimens for 2019-nCoV testing

Specimen type	Specimen ID	Date collected	Sent to CDC?
NP swab		3/31/2020	☐
OP swab			☐
Sputum			☐
BAL fluid			☐
Tracheal aspirate			☐

Specimen type	Specimen ID	Date collected	Sent to CDC?
Stool			☐
Urine			☐
Serum			☐
Other, specify____			☐
Other, specify____			☐

[1] *For NNDSS reporters, use GenV2 or NETSS patient identifier.*
[2] *Fever may not be present in some patients, such as those who are very young, elderly, immunosuppressed, or taking certain medications. Clinical judgement should be used to guide testing of patients in such situations.*
[3] *Close contact is defined as: a) being within approximately 6 feet (2 meters) or within the room or care area for a prolonged period of time (e.g., healthcare personnel, household members) while not wearing recommended personal protective equipment (i.e., gowns, gloves, respirator, eye protection); or b) having direct contact with infectious secretions (e.g., being coughed on) while not wearing recommended personal protective equipment. Data to inform the definition of close contact are limited. At this time, brief interactions, such as walking by a person, are considered low risk and do not constitute close contact.*

Version 1.0 January 17, 2020

[redacted]
DoB [redacted]
Gen: Female Age: 62 YRS 3/31/2020 10:49 AM

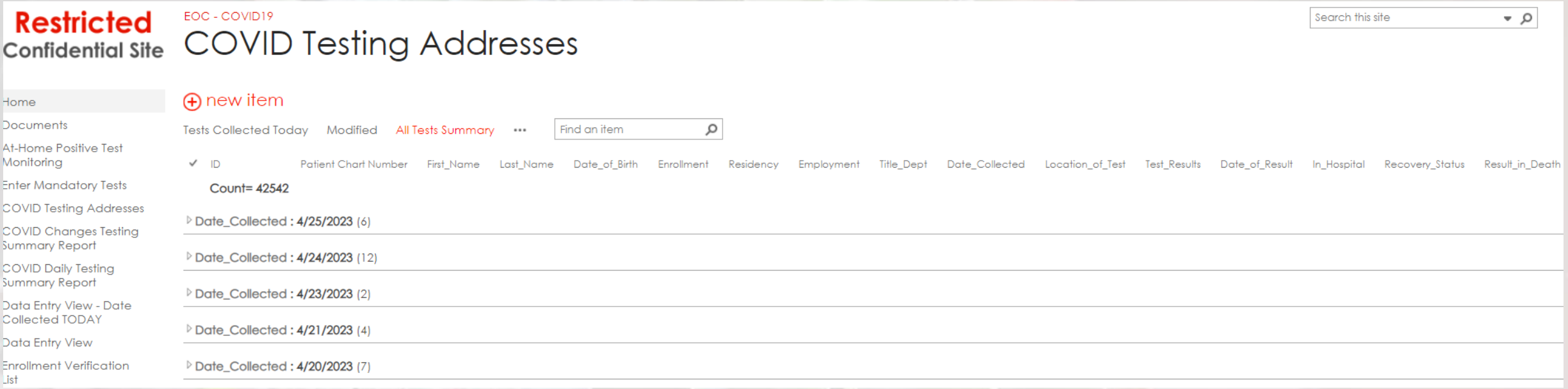
Simple beginnings

A	B	C	D	E	F	G	H
Last Name	**First Name**	**Date of Birth**	**Address**	**Date of Test**	**Location of Test**	**Result of Test**	**Date of Result**
[redacted]	[redacted]	8/8/1986	[redacted] Mesa, AZ 85208	3/20/2020	PIMC	Negative	3/21/2020
[redacted]	[redacted]	2/15/1949	[redacted] Mesa, AZ, 85203	3/16/2020	HH-Osborn/3209803	Negative	
[redacted]	[redacted]	4/26/1993	[redacted] Scottsdale, AZ 85256	3/16/2020	HH-Osborn/3823641	**Pending**	
[redacted]	[redacted]	12/21/1978	[redacted] Scottsdale, AZ 85256	3/20/2020	HH-Osborn	**Pending**	
[redacted]	[redacted]	3/31/2007	[redacted] St	3/23/2020	SR/PIMC	**Pending**	
[redacted]	[redacted]	10/29/2014	[redacted] Piccadilly	3/23/2020	SR/PIMC	**Pending**	
[redacted]	[redacted]	11/9/1984	[redacted] Piccadilly	3/23/2020	SR/PIMC	**Pending**	

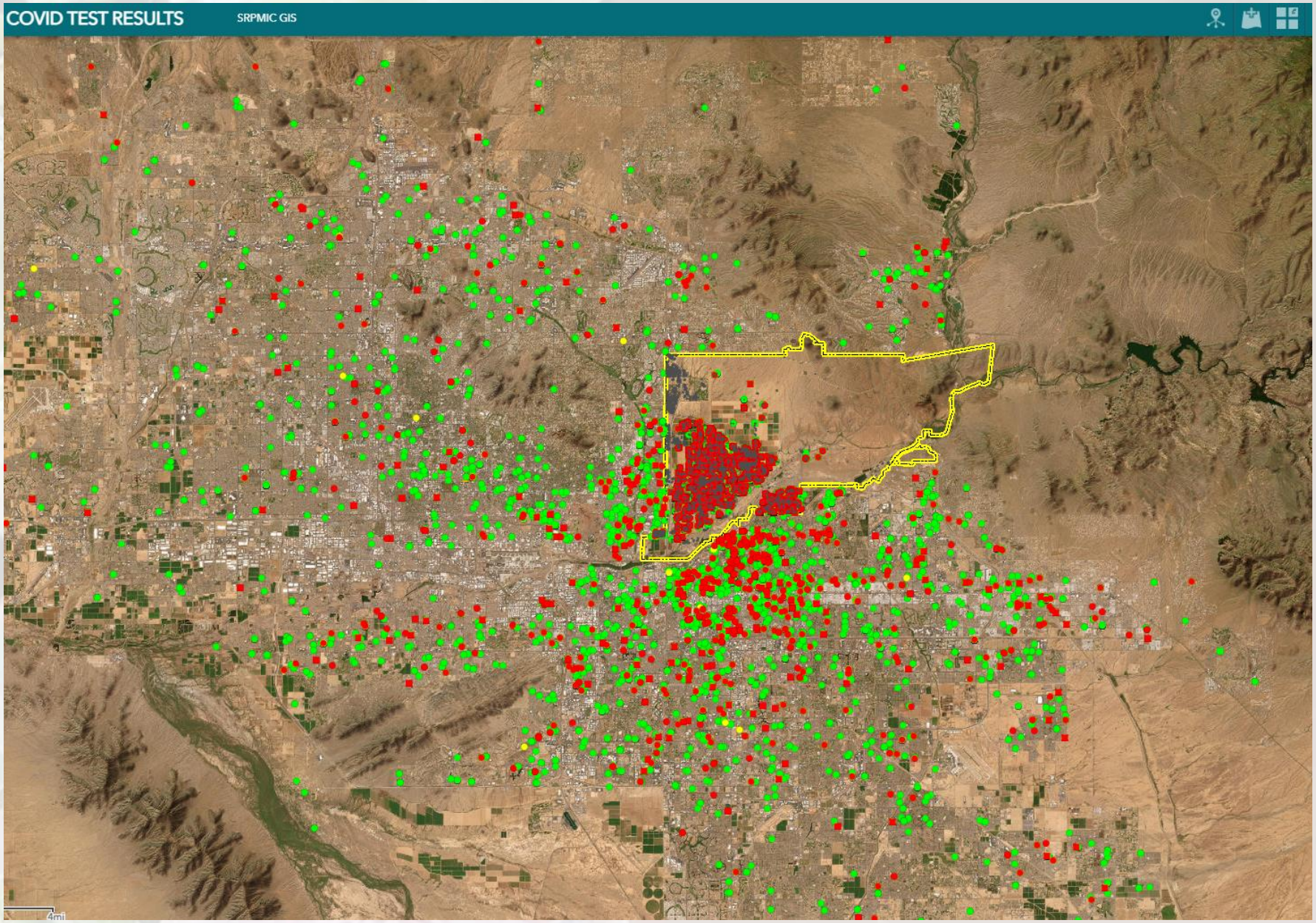
Manual calculations and reports lead to partnerships

- Community Manager
- GIS
- IT
- CDD
- HR

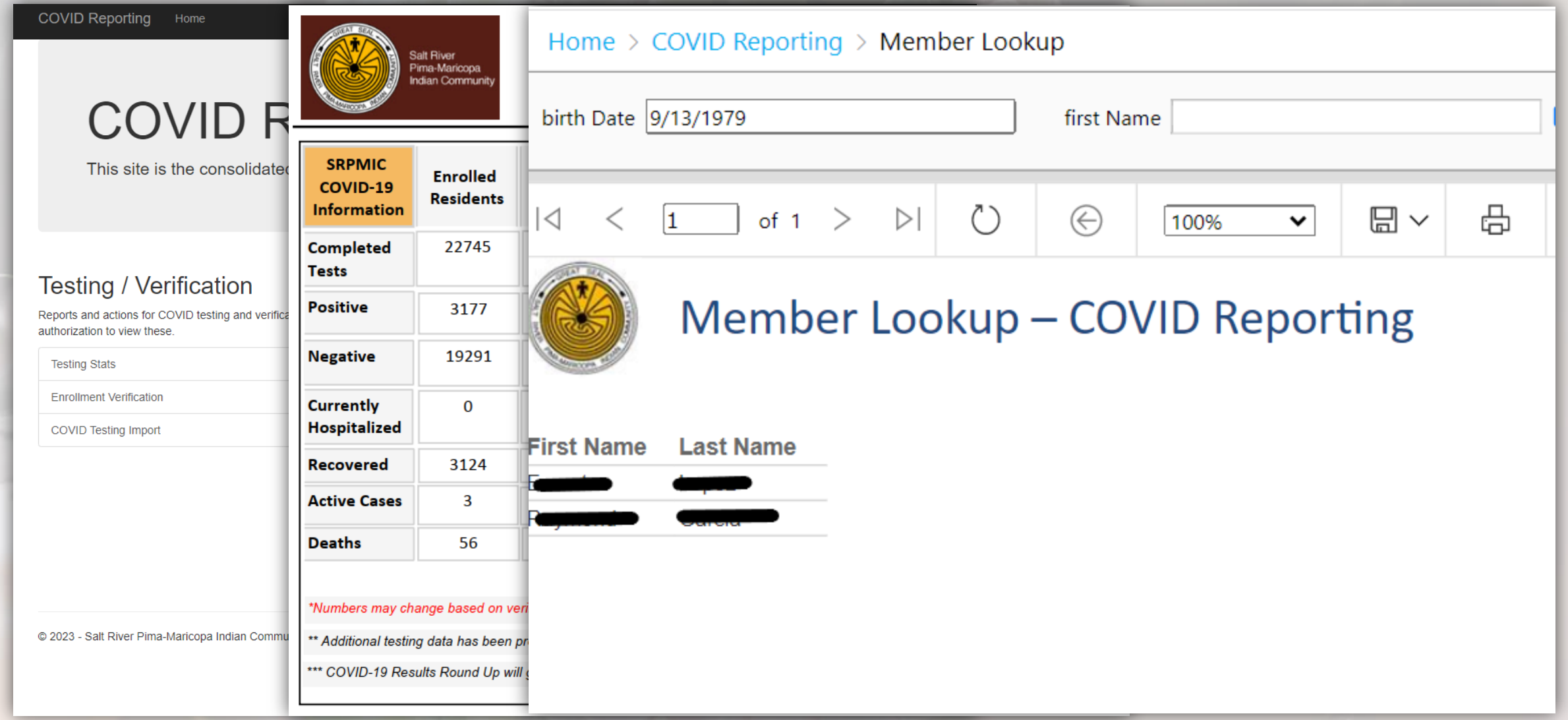
SharePoint


Restricted
Confidential Site
EOC - COVID19
COVID Testing Addresses
Search this site
Home
Documents
At-Home Positive Test Monitoring
Enter Mandatory Tests
COVID Testing Addresses
COVID Changes Testing Summary Report
COVID Daily Testing Summary Report
Data Entry View - Date Collected TODAY
Data Entry View
Enrollment Verification List
new item
Tests Collected Today
Modified
All Tests Summary
Find an item
ID
Patient Chart Number
First_Name
Last_Name
Date_of_Birth
Enrollment
Residency
Employment
Title_Dept
Date_Collected
Location_of_Test
Test_Results
Date_of_Result
In_Hospital
Recovery_Status
Result_in_Death
Count= 42542
Date_Collected : 4/25/2023 (6)
Date_Collected : 4/24/2023 (12)
Date_Collected : 4/23/2023 (2)
Date_Collected : 4/21/2023 (4)
Date_Collected : 4/20/2023 (7)

GIS – Case Tracking

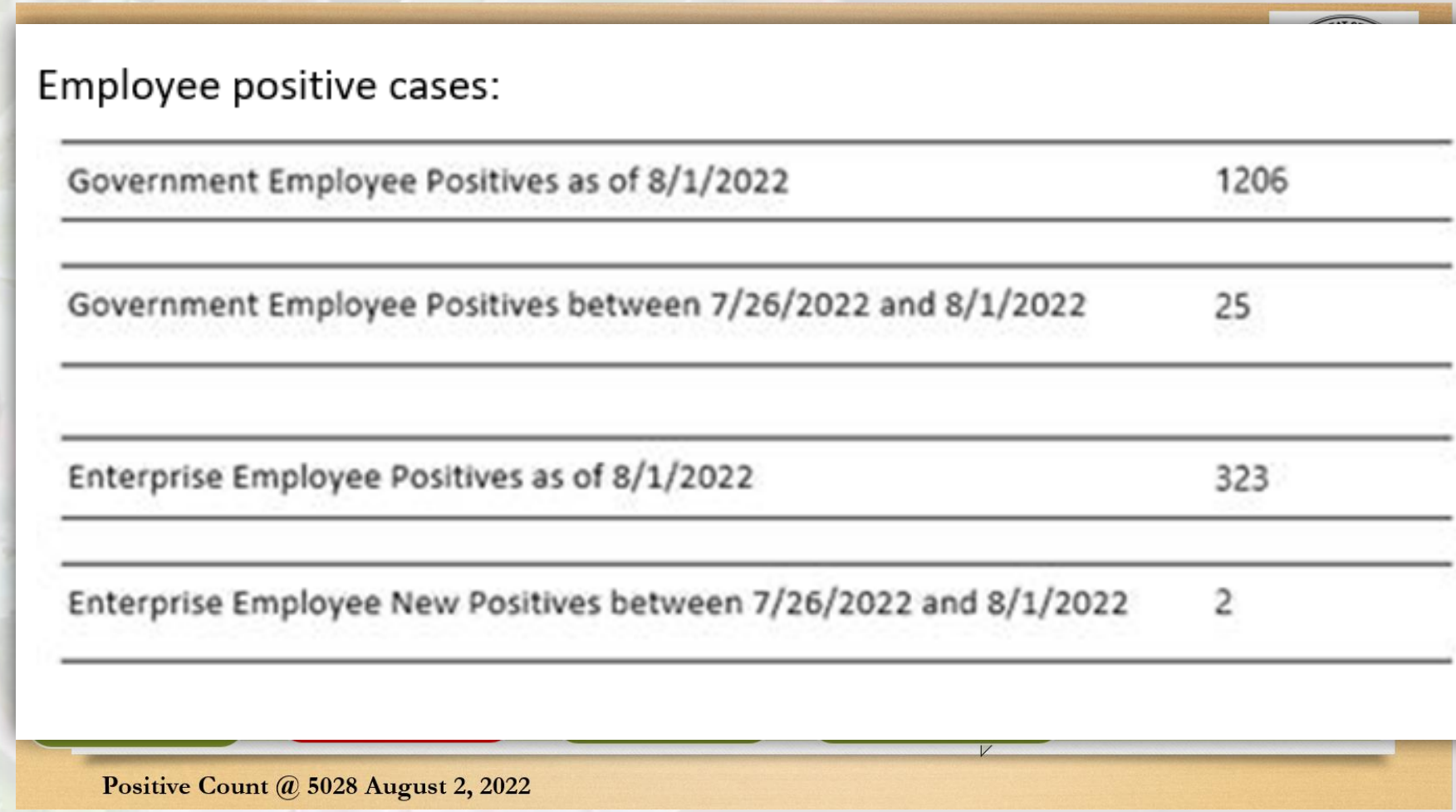


Auto-magic reports



Auto-magic reports

- Community Manager
  - Support decision making



Employee positive cases:

Government Employee Positives as of 8/1/2022	1206
Government Employee Positives between 7/26/2022 and 8/1/2022	25
Enterprise Employee Positives as of 8/1/2022	323
Enterprise Employee New Positives between 7/26/2022 and 8/1/2022	2

Positive Count @ 5028 August 2, 2022

Information Sharing

Alarm Room List

List Item Id	Address	City	Zip Code	Date Collected	Test Results
39074	[redacted]	SCOTTSDALE	85256	9/29/2022	Positive
42320	[redacted]	Scottsdale	85256	1/9/2023	Presumptive Positive
29969	[redacted]	Scottsdale	85256	2/2/2021	Positive-EF
42318	[redacted]	Scottsdale	85256	1/9/2023	Presumptive Positive
29970	[redacted]	Scottsdale	85256	7/27/2021	Positive-EF
27284	[redacted]	Scottsdale	85256	1/5/2022	Positive
38740	[redacted]	Scottsdale	85256	9/19/2022	Positive
29971	[redacted]	Scottsdale	85256	10/9/2021	Positive-EF
42277	[redacted]	Scottsdale	85256	1/5/2023	Presumptive Positive

Behavioral Health

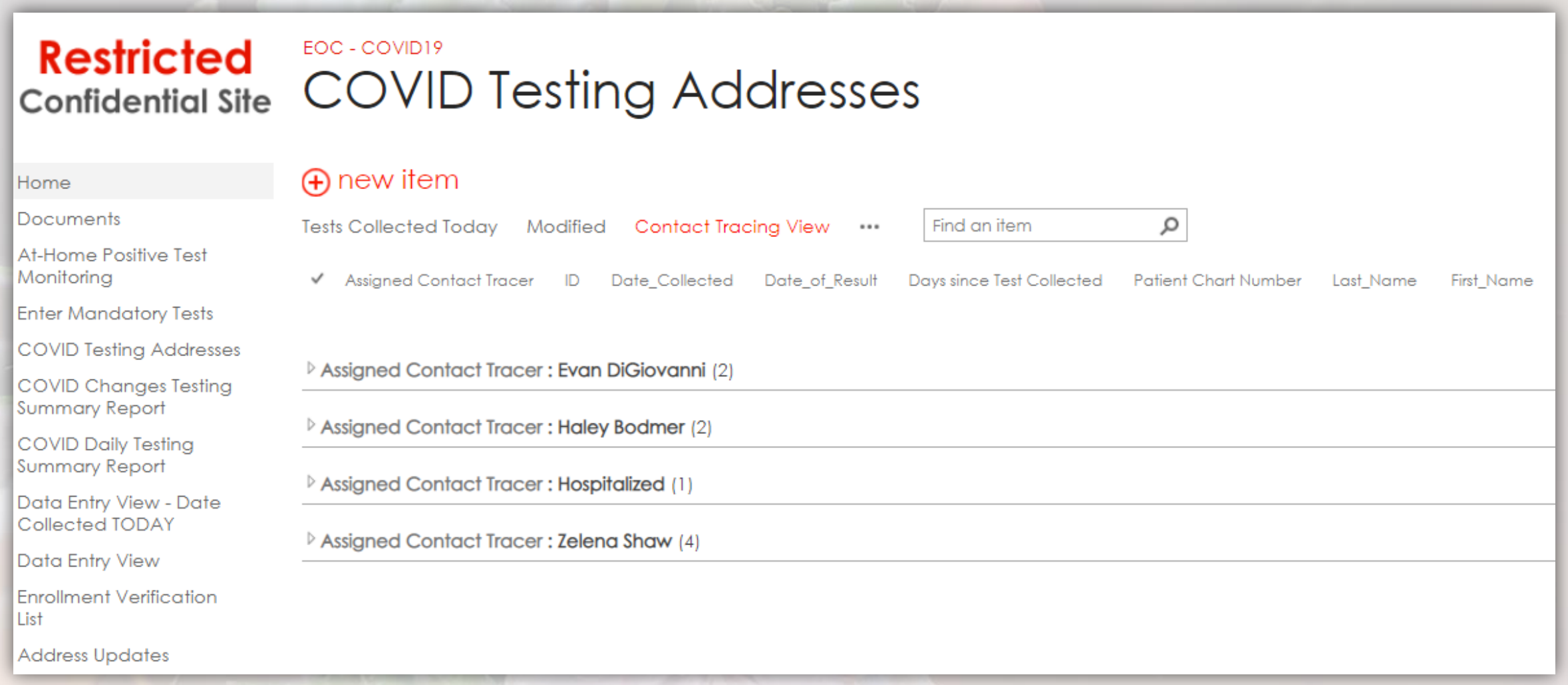
Care bundle

Dispatch

PD

Fire

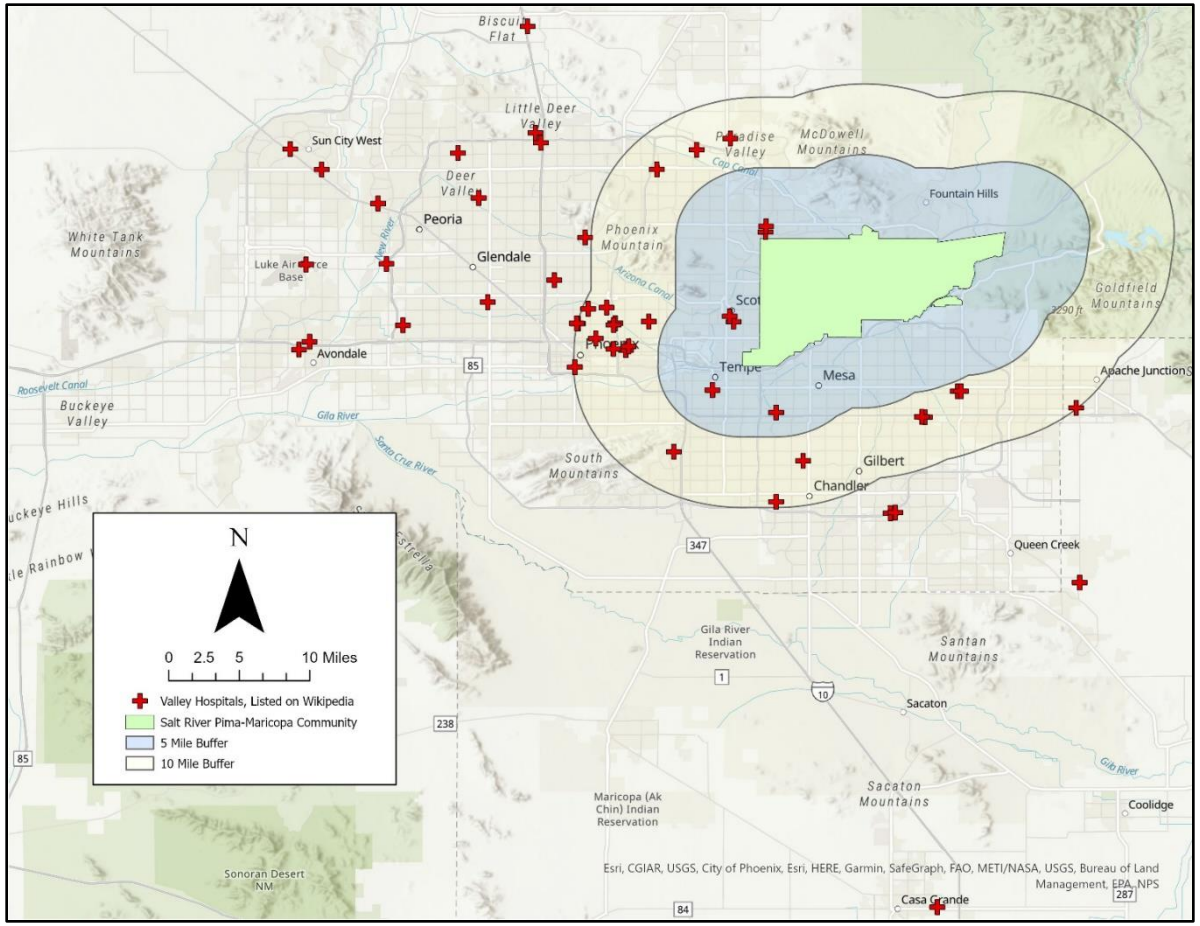
SharePoint – Contact Tracing



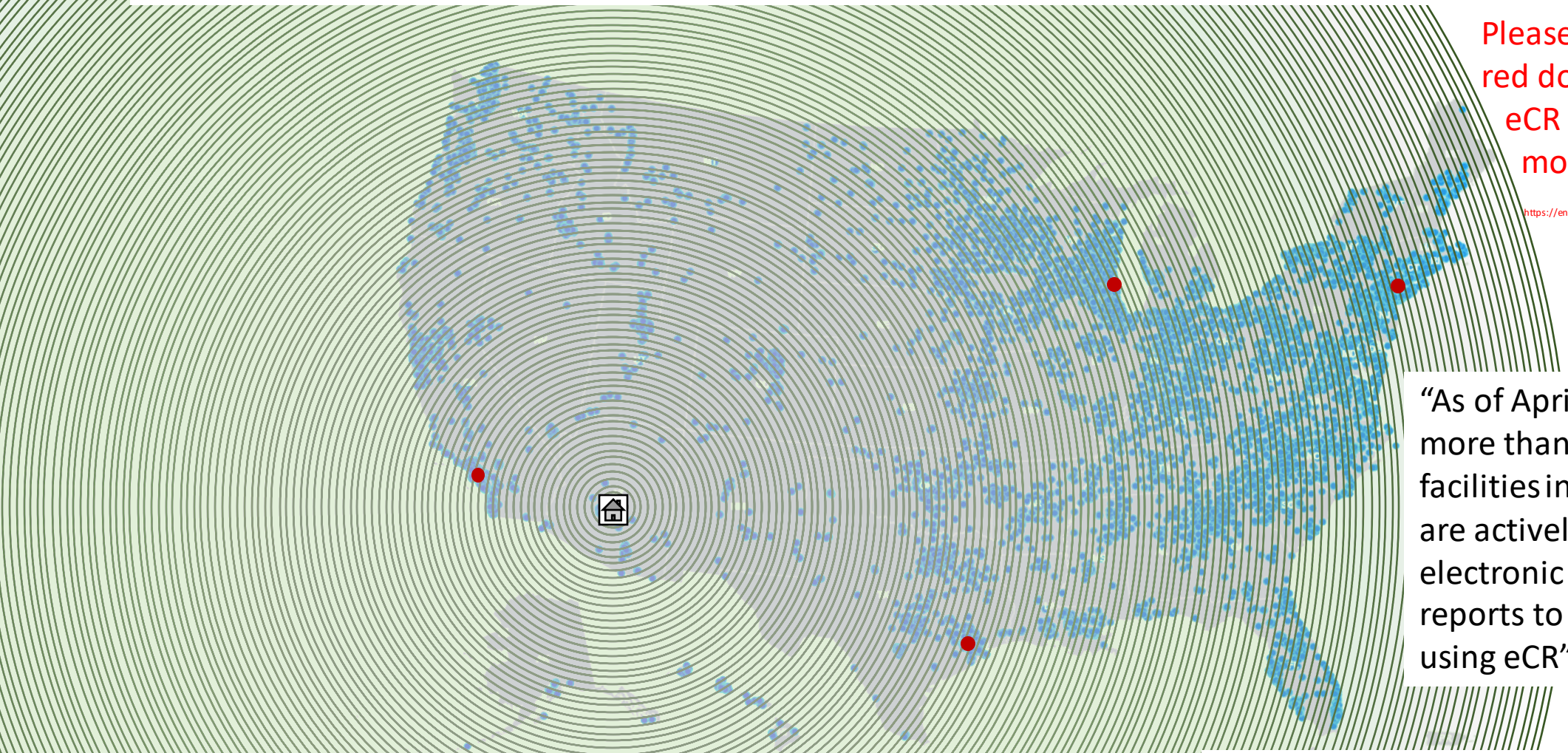
Other solutions…

- ARC GIS
- Salesforce
- Microsoft solutions
- State Solutions-Contact Tracing

The Idea of Electronic Case Reporting: Thinking Locally



The Idea of Electronic Case Reporting: Thinking Nationally-eCR is like a radar



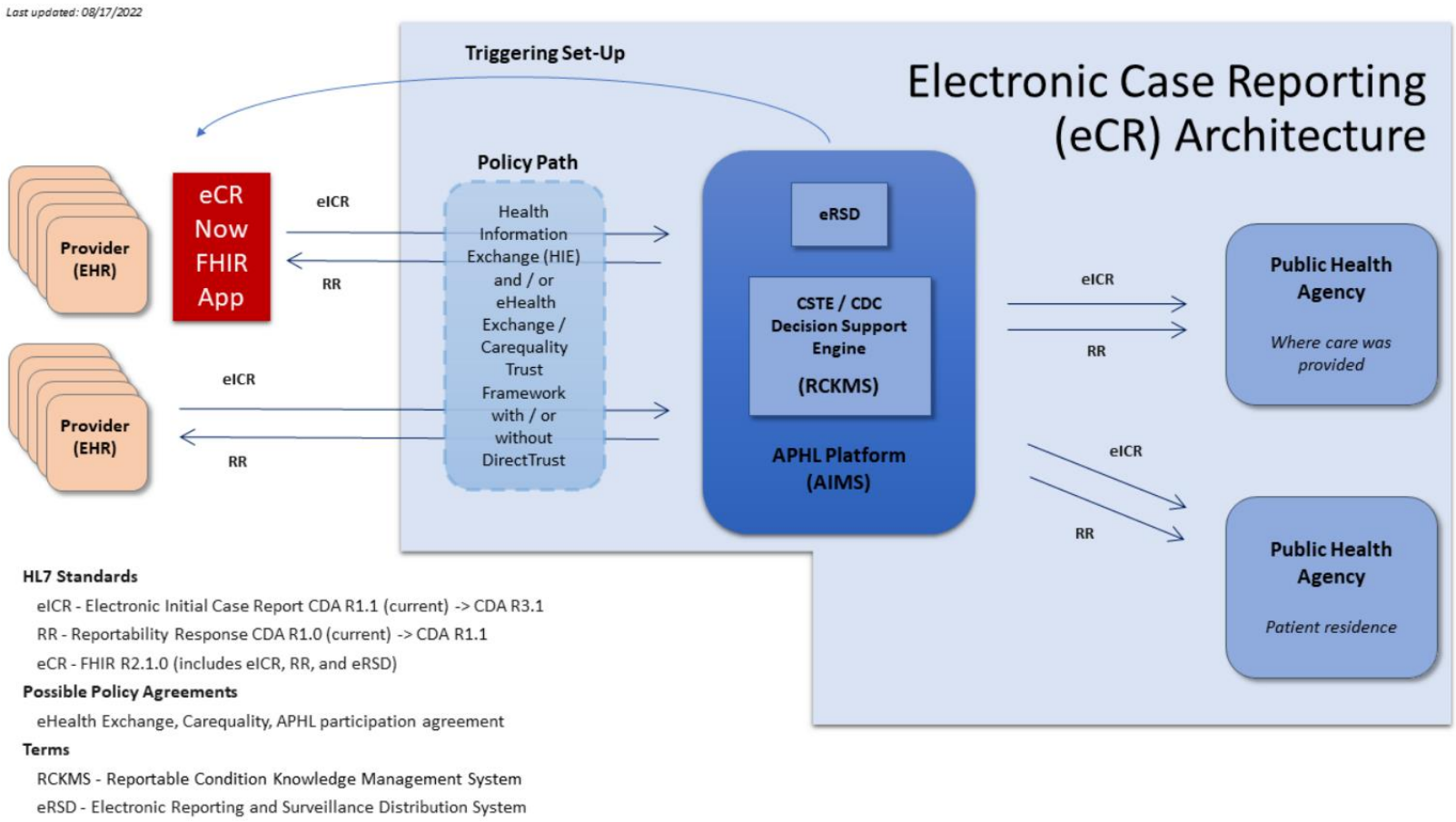
Please note,
red dots represent fictional eCR cases in the USA's most populous cities

https://en.wikipedia.org/wiki/List_of_United_States_cities_by_population

"As of April 11, 2023, more than 24,200 facilities in all 50 states are actively sending electronic initial case reports to public health using eCR"

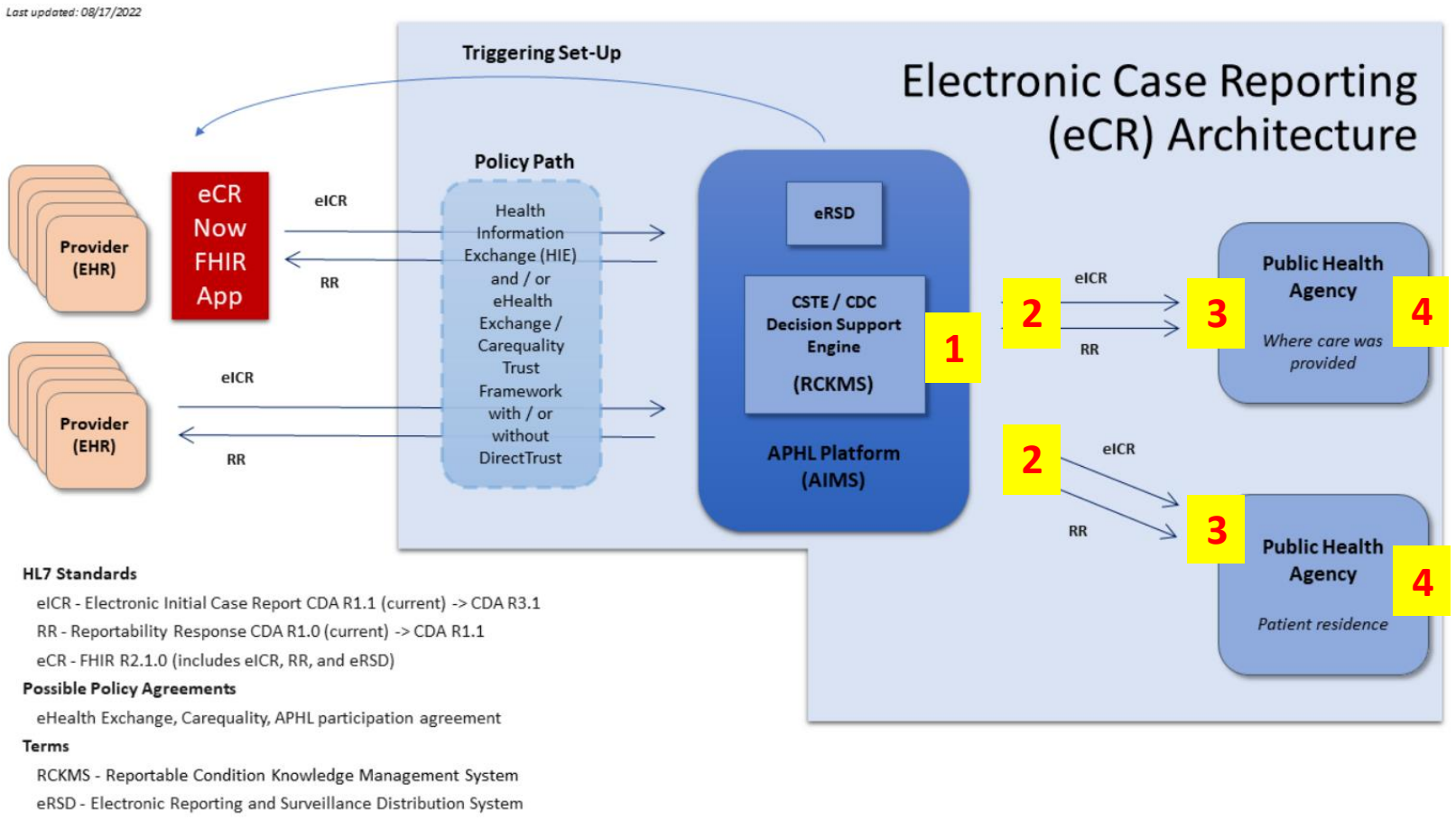
https://www.cdc.gov/ecr/facilities-map.html

How Electronic Case Reporting Would Look



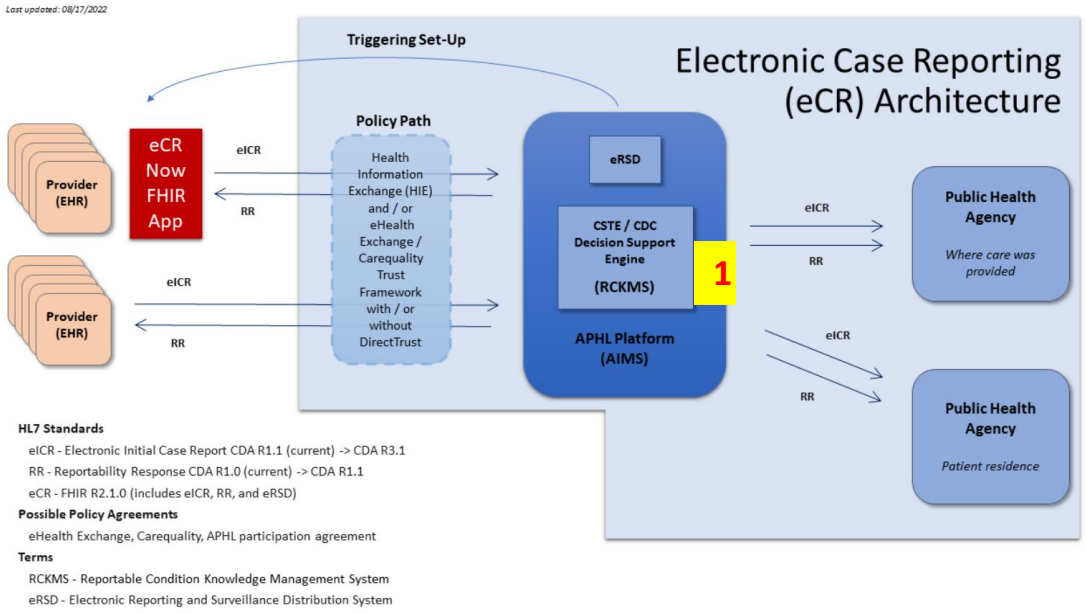
https://ecr.aimsplatform.org/cms/resources/blocks/introduction-to-electronic-case-reportingfor-ehr-and-health-it-vendors.pdf

Four Points of Interest



https://ecr.aimsplatform.org/cms/resources/blocks/introduction-to-electronic-case-reportingfor-ehr-and-health-it-vendors.pdf

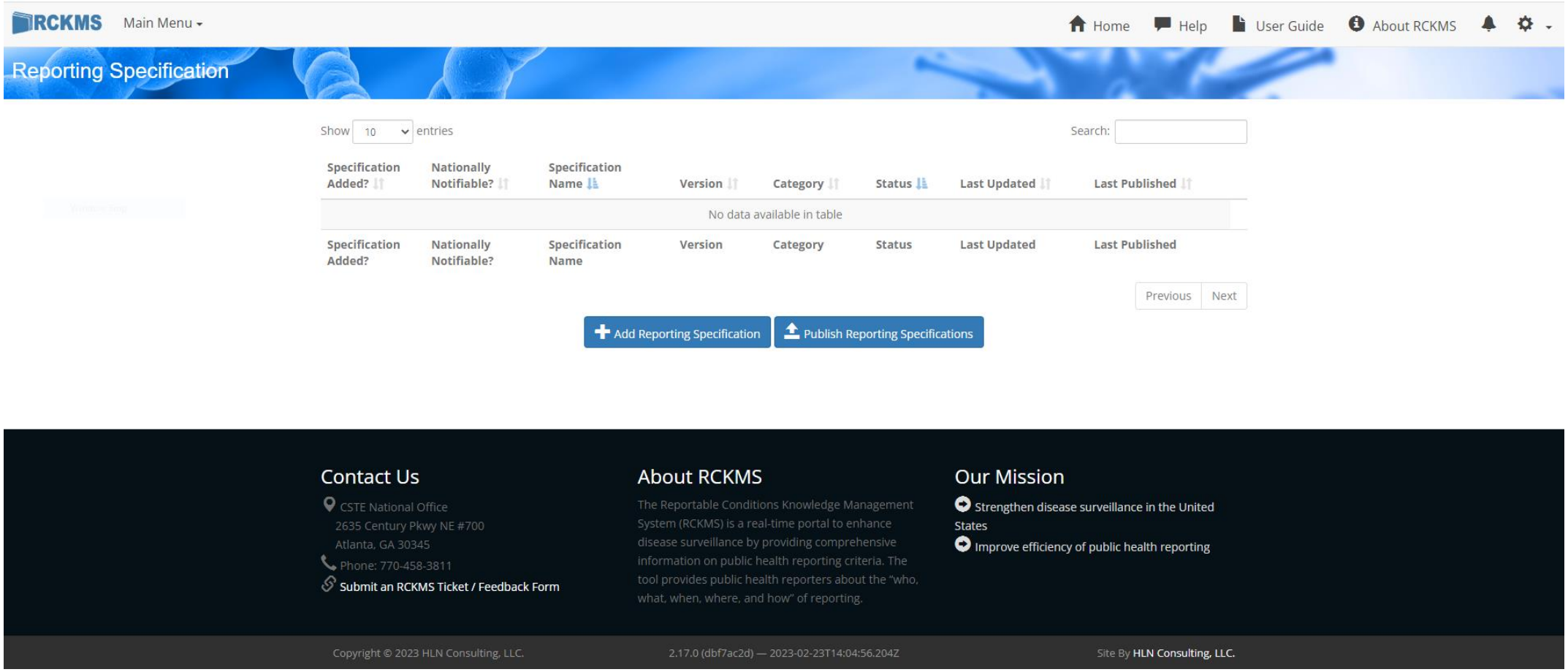
Point 1: Set Up RCKMS Account



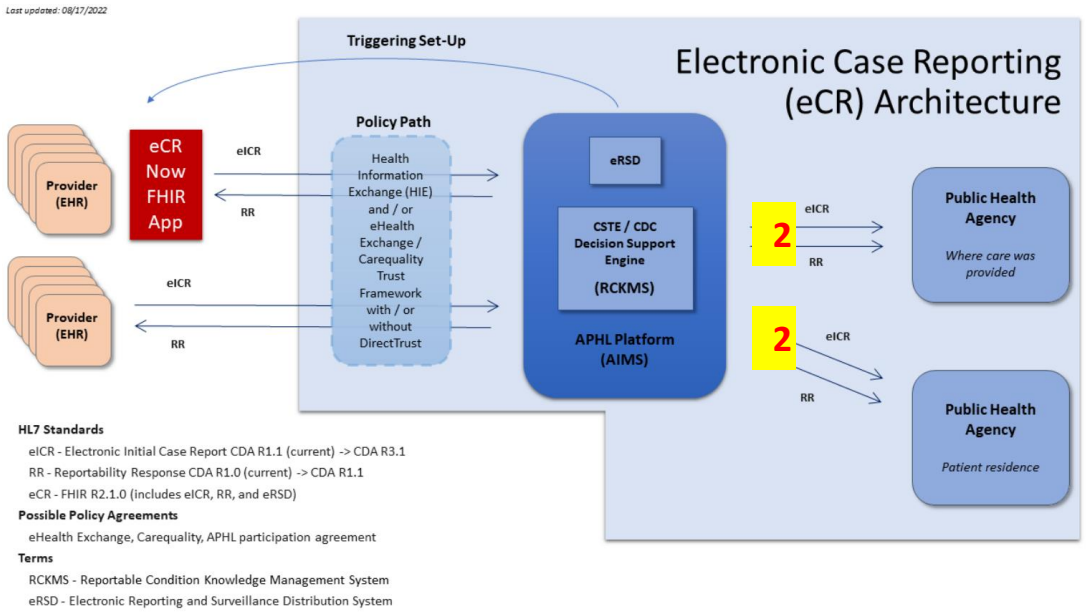
- Work with CDC/CTSE to create an account
- "Select" and "publish" reporting specifications

https://ecr.aimsplatform.org/cms/resources/blocks/introduction-to-electronic-case-reportingfor-ehr-and-health-it-vendors.pdf

Point 1: Set Up RCKMS Account (Continued)



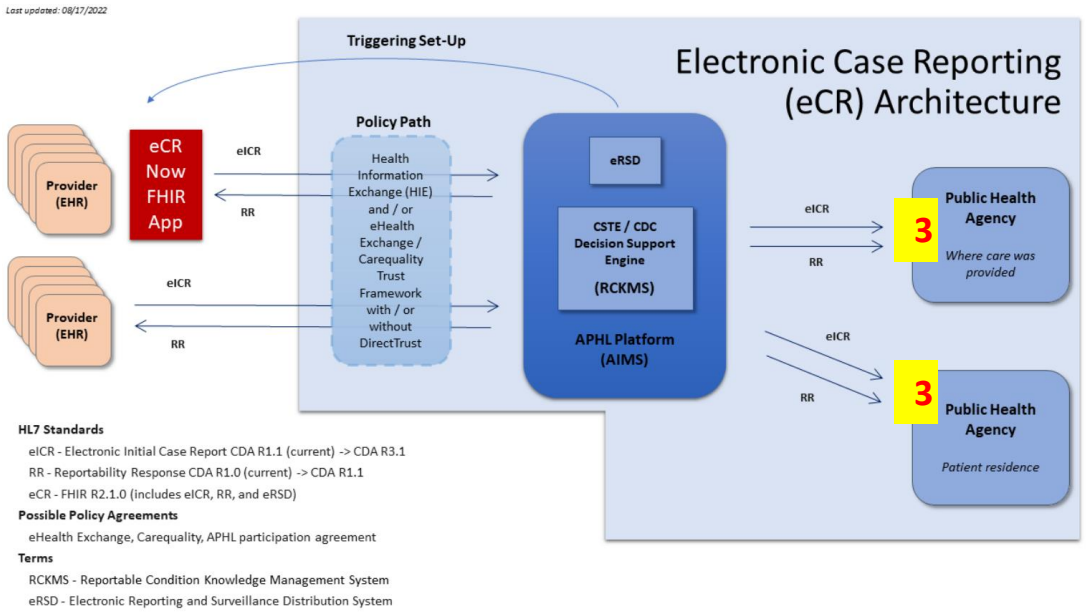
Point 2: Identifying or Procuring an Integration Engine Software Solution



- Work with your IT to determine your tribe/community's integration engine software
  - One popular option/product is called Rhapsody from Orion Health
  - SRPMIC uses an in-house custom development product
    - Unfortunately, I do not have a representative picture for this

https://ecr.aimsplatform.org/cms/resources/blocks/introduction-to-electronic-case-reportingfor-ehr-and-health-it-vendors.pdf

Point 3: Establishing a Connection with AIMS



- A good resource I highly recommend visiting and reviewing the resources found at
  - https://ecr.aimsplatform.org/public-health-agencies/

https://ecr.aimsplatform.org/cms/resources/blocks/introduction-to-electronic-case-reportingfor-ehr-and-health-it-vendors.pdf

Public Health Agencies

Overview

Every public health agency (PHA) has the legal authority to receive case reports on conditions of interest to them, and these conditions and criteria for reporting can vary greatly from agency to agency. While historically this type of reporting has been done by paper-based submission, electronic case reporting (eCR) is moving this process into a more automated process.

Automating the submission of case reports from healthcare providers reduces the burden of meeting the legal requirement to report, while improving the timeliness, accuracy, and completeness of data for public health action. Manual reporting processes can stall the public health response required to manage case investigations, contain outbreaks, or plan interventions to protect a population's health. eCR allows reports to be sent automatically from a healthcare provider's electronic health record (EHR) system to the PHA in near real time, alleviating manual reporting burden.

It is a time-and-cost-efficient tool that leads to rapid productivity in disease case reporting and data collection, improving routine outbreak management.

Included here is information relevant to PHAs as they begin to implement the eCR functionality. The items include:

- Understanding the standards used for eCR messages (electronic initial case report (eICR) and Reportability Response (RR))
- How a PHA should prepare in order to implement eCR
- Where the Reportable Condition Knowledge Management System (RCKMS) decision support and authoring fit in with the eCR process
- How to handle onboarding and implementation

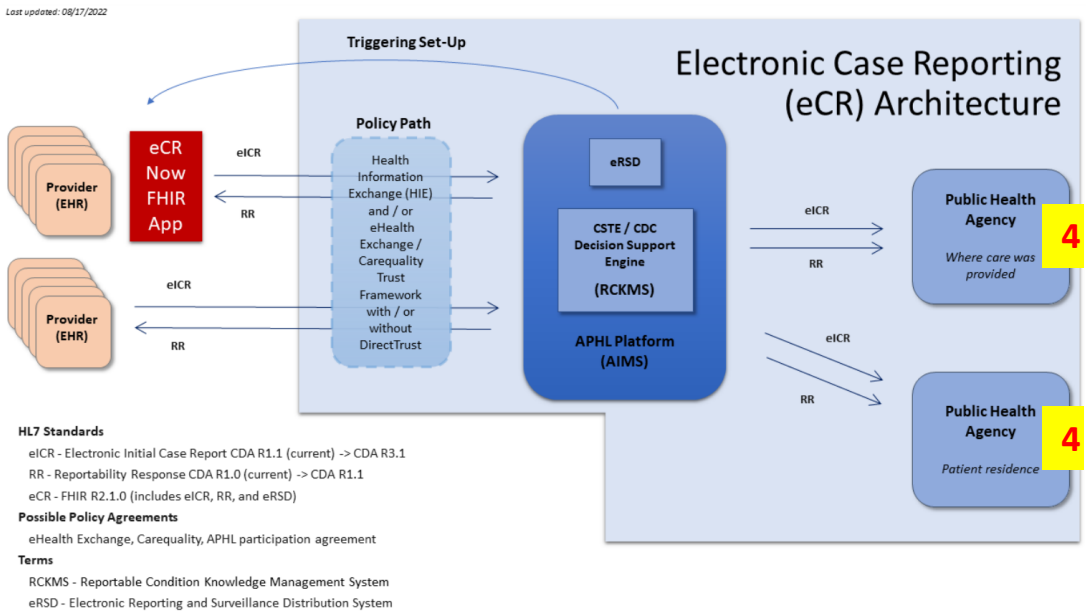
Contact Us:

For general eCR inquiries, contact eCR-Info@aimsplatform.org.

For eCR connection technical problems and support, contact the eCR Support Team at Informatics.Support@aphl.org. Include "eCR" in the subject line.

For technical questions about the eCR Now FHIR App, use the eCR Now Zulip Thread.

Point 4: Connecting the eCR Files to Your Public Health Surveillance System or Standing Up a Database (e.g. SQL)



- Currently, SRPMIC does not have a public health surveillance system, aside from the COVID-19 SharePoint previously discussed
- Since beginning this project, we have conducted research, to avoid not reinventing the wheel

https://ecr.aimsplatform.org/cms/resources/blocks/introduction-to-electronic-case-reportingfor-ehr-and-health-it-vendors.pdf

Webpa olic
Health

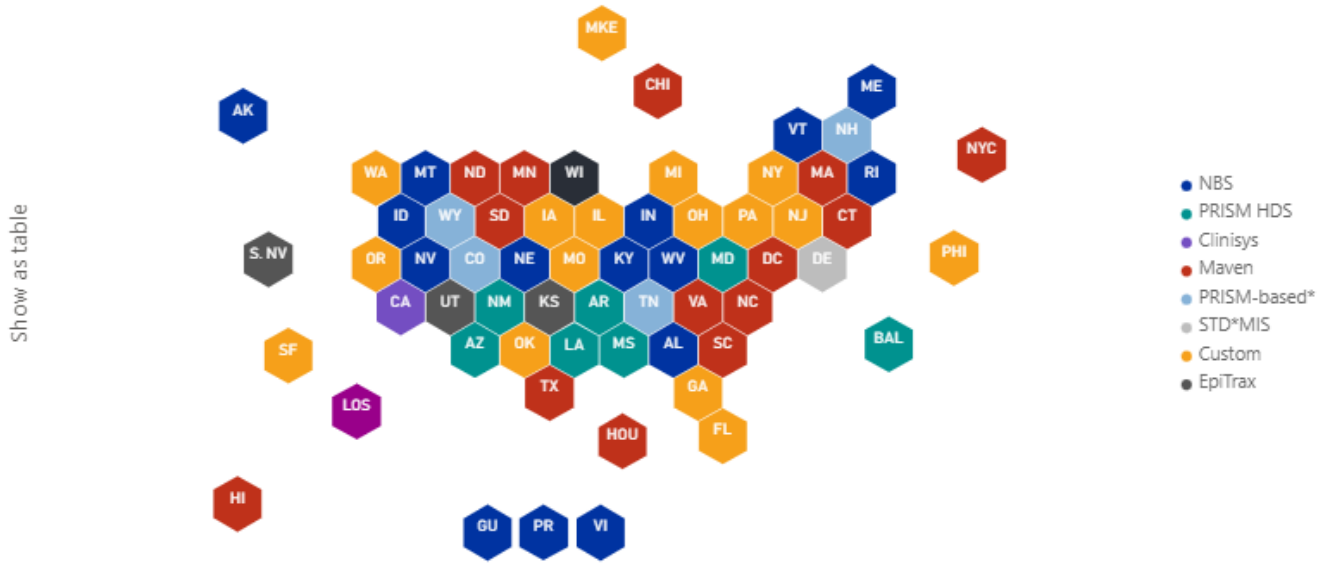
Public Health Information Systems (PHIS)

Print

Public Health information systems (PHIS) are used by public health agencies (PHA) to collect, manage, store, and transmit STD data. CDC is leveraging HIS to better understand the impact of STDs in the United States and improve disease surveillance reporting.

In the United States, there are seven main information systems currently used by states, territories, and project areas. All the systems are web-based.

PHIS Used by Each State, Territory, and Project Area



*PRISM-based refers to customized systems based on a version of PRISM HDS.
Hover over a state to see which STD Information System it is using, contact information for that system, and its associated brochure.
Accessibility: Click on "Show as table" to display data in table format.

Data as of 02/24/2022

Public Health Surveillance System Literature Review Research

- Research Question:
  What surveillance system PHAs ingesting eCR data?
- Search Term: “Electronic Case Reporting” AND “eCR”
- Methodology: Reviewed articles
- Databases used:
  - Clinical Key
  - EBSCOhost
  - Embase
  - Google Scholar
  - Web of Science

Public Health Surveillance System Literature Review Results (Continued)

- **Illinois** receives eCR data via the Illinois National Electronic Disease Surveillance System (I-NEDS)
- **Oregon** receives eCR data via the Oregon Public Health Epidemiology User System (Orpheus)
- **Washington** receives eCR data via the WA Disease Reporting System
- **Minnesota** receives eCR data via the Minnesota Electronic Disease Surveillance System
- **Utah** Department of Health receives eCR data via **EpiTrax**
- **Iowa** receives eCR data via their **National Electronic Disease Surveillance System Base System (NBS)**

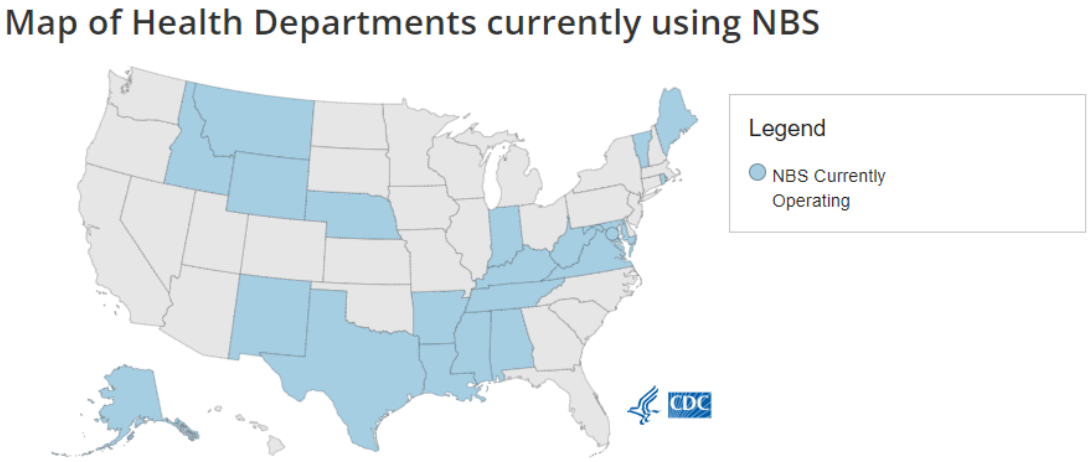
EpiTrax, by End Point Dev

- “End Point has developed a suite of solutions that builds upon the EpiTrax project and supports public health jurisdictions in electronic laboratory reporting (ELR) and electronic case reporting (eCR).”-End Point Dev

https://www.endpointdev.com/expertise/epitrax/

https://www.endpointdev.com/videos/epitrax-thumbnail.jpg

National Electronic Disease Surveillance System Base System (NBS), by CDC



- "Currently, 27 health departments (21 states; Washington, DC; CNMI; Guam; Puerto Rico; RMI; and U.S. Virgin Islands) use NBS to manage public health investigations and transfer general communicable disease surveillance data to CDC."
  - https://www.cdc.gov/nbs/overview/index.html
- Features of NBS includes:
  - "automated receipt of electronic case reports from healthcare providers, other health information systems, and other public health jurisdictions"
  - https://www.cdc.gov/nbs/features/index.html

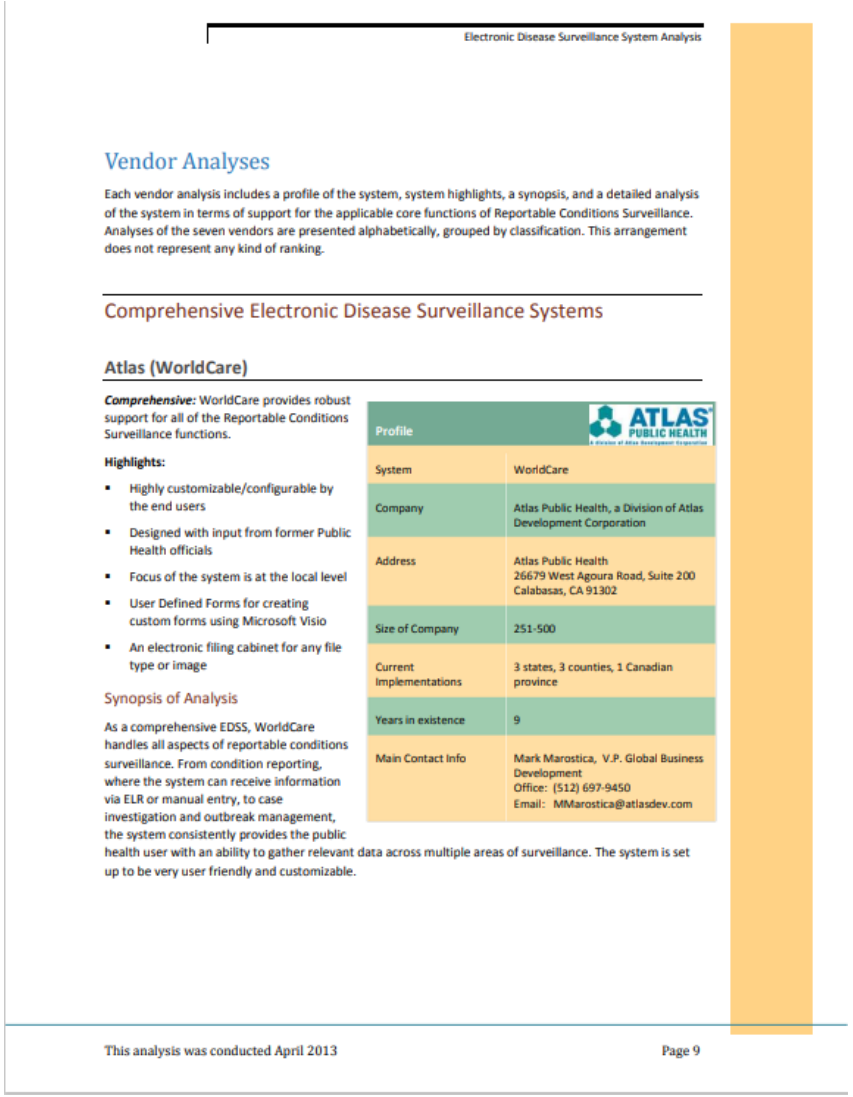
Other Notable Documents:

Table 4: Characteristics of Digital Bridge eCR Demonstration Sites

Digital Bridge eCR Demonstration Sites

Site Characteristics	California Department of Public Health	Houston Health Department	Kansas Department of Health and Environment	Massachusetts Department of Public Health	Michigan Department of Health and Human Services	New York City Department of Health and Mental Hygiene	New York State Department of Health	Utah Department of Health
Type of Jurisdiction	STATE	LOCAL	STATE	STATE	STATE	LOCAL	STATE	STATE
Public Health Surveillance System	CalREDIE	MAVEN	EpiTrax	MAVEN	CUSTOM SYSTEM	CUSTOM SYSTEM	CUSTOM SYSTEM	EpiTrax
EHR Vendor	EPIC	EPIC	CERNER	EPIC	NETSMART/ HIE-MiHIN	EPIC	EPIC	CERNER
Transport mechanism with AIMS platform	AWS S3	PHINMS	PHINMS	To be determined	RESTFUL + VPN	AWS S3	AWS S3	AWS S3
Experience Using CDA Documents in Public Health Surveillance System	✓	✓	✓	✓	✓	✓	✓	✓
Prior Experience Using RCTC or Standardized Codes for Reportable Conditions	✓	✓	✓	✓	✓	✓	✓	✓
Existing AIMS Interface	⊗	✓	✓	✓	✓	✓	⊗	✓
Prior ECR Experience	⊗	unknown	unknown	✓	unknown	unknown	unknown	✓
Healthcare Facility is Outpatient (☀) or Inpatient (☾)	☀ ☾	☀ ☾	☀ ☾	To be determined	☀	☀	☀ ☾	☀ ☾

Other Notable Documents (Continued):



Vendor Analyses

Each vendor analysis includes a profile of the system, system highlights, a synopsis, and a detailed analysis of the system in terms of support for the applicable core functions of Reportable Conditions Surveillance. Analyses of the seven vendors are presented alphabetically, grouped by classification. This arrangement does not represent any kind of ranking.

Comprehensive Electronic Disease Surveillance Systems

Atlas (WorldCare)

Comprehensive: WorldCare provides robust support for all of the Reportable Conditions Surveillance functions.

Highlights:

- Highly customizable/configurable by the end users
- Designed with input from former Public Health officials
- Focus of the system is at the local level
- User Defined Forms for creating custom forms using Microsoft Visio
- An electronic filing cabinet for any file type or image

Profile	ATLAS PUBLIC HEALTH
System	WorldCare
Company	Atlas Public Health, a Division of Atlas Development Corporation
Address	Atlas Public Health 26679 West Agoura Road, Suite 200 Calabasas, CA 91302
Size of Company	251-500
Current Implementations	3 states, 3 counties, 1 Canadian province
Years in existence	9
Main Contact Info	Mark Marostica, V.P. Global Business Development Office: (512) 697-9450 Email: MMarostica@atlasdev.com

Synopsis of Analysis

As a comprehensive EDSS, WorldCare handles all aspects of reportable conditions surveillance. From condition reporting, where the system can receive information via ELR or manual entry, to case investigation and outbreak management, the system consistently provides the public health user with an ability to gather relevant data across multiple areas of surveillance. The system is set up to be very user friendly and customizable.

Salt River Pima-Maricopa Indian Community eCR Implementation

Point of Interest	Status
Set Up RCKMS Account	✓
Identifying or Procuring an Integration Engine Software Solution	?/✓
Establish a Connection to AIMS	X
Connecting the eCR Files to Your Public Health Surveillance System or Standing Up a Database	X

Lessons Learned

- IT solutions for small public health departments are too expensive
  - May need cooperatives and sustainable financial support
- Technical support and education is essential for both public health and technical staff
  - SME led eCR training team may need to be deployed

https://navigatemc.com/wp-content/uploads/2018/12/Lessons-Learned.jpg

Way Forward for eCR

- After establishing a connection to AIMS, SRPMIC will most likely create a database, to make sense of the eCR data, before standing up a public health surveillance system
  - My hope is to do this using either Microsoft Access (2016) or R
- Currently, SPRMIC is still exploring public health surveillance systems
- SRPMIC IT is fully aware of the eCR project and is currently reviewing documents submitted

What Data Modernization would mean to SRPMIC !

- Improving data quality
- Data modernization
  > can reduce the risk of errors.
    >Improve the overall reliability of databases
- Allows tribal leadership to make better decisions based on accurate information.
- Implementing cloud technologies as a solution for data storage, management, and analytics.


The story
continues...