

Timely access to vaccination history during an outbreak investigation

Sukhesh Sudan, MPH; Taylor Olsabeck, MS; Dhruvil Shah; Krista Dunger, MHI; Ryan Malosh, PhD,
MPH

Breakout Topic for Standard Presentation: Data Quality, Use April 29, 2026



New measles outbreak confirmed in Michigan's Osceola County

[Laura Wethington](#)

Updated on: August 1, 2025 / 12:13 PM EDT / CBS Detroit

Oakland County child diagnosed with measles, ER possible exposure site



[Christina Hall](#)
Detroit Free Press

Updated Dec. 16, 2025, 5:52 p.m. ET

Measles outbreak: 3 confirmed cases in northern Michigan. Active sites, symptoms, vaccine

[Sarah Moore](#) Lansing State Journal

Updated: Aug. 25, 2025, 10:56 a.m. ET

Montcalm County has Michigan's first measles outbreak of 2025



[Kristen Jordan Shamus](#)
Detroit Free Press

Second measles case confirmed in Ingham County, Michigan, health officials say

[Katie Ingleton](#)

Updated: Aug. 25, 2025 / 12:40 AM EDT / CBS Detroit

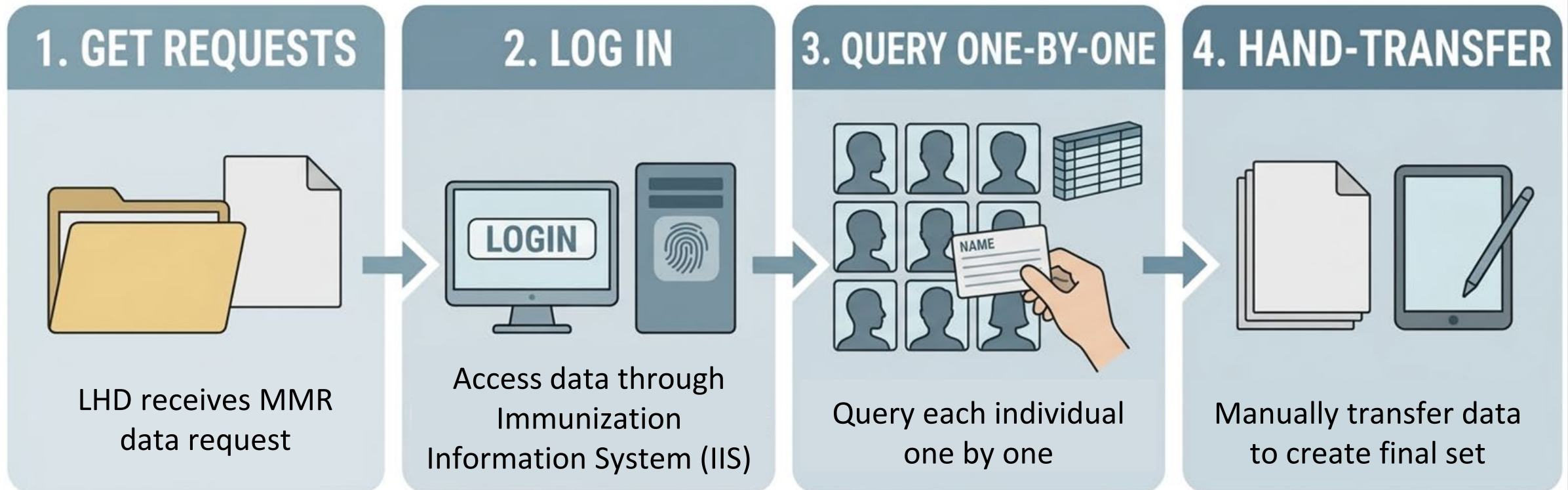
ANN ARBOR

Second measles case suspected in Washtenaw County

Updated: Mar. 12, 2026, 4:56 p.m. | Published: Mar. 12, 2026, 2:34 p.m.

Challenge: Data access

OLD LHD MMR DATA PROCESS



THIS PROCESS WAS VERY SLOW & LABOR-INTENSIVE

Challenge: Getting ahead of transmission



For batch lookup, **2** people in state department had the ability to query.

Measles moves faster than manual queries.

The goal: Optimizing the labor-intensive querying process by creating a self-serve batch lookup tool.

The Solution



The MI Lighthouse MMR Batch Lookup Tool

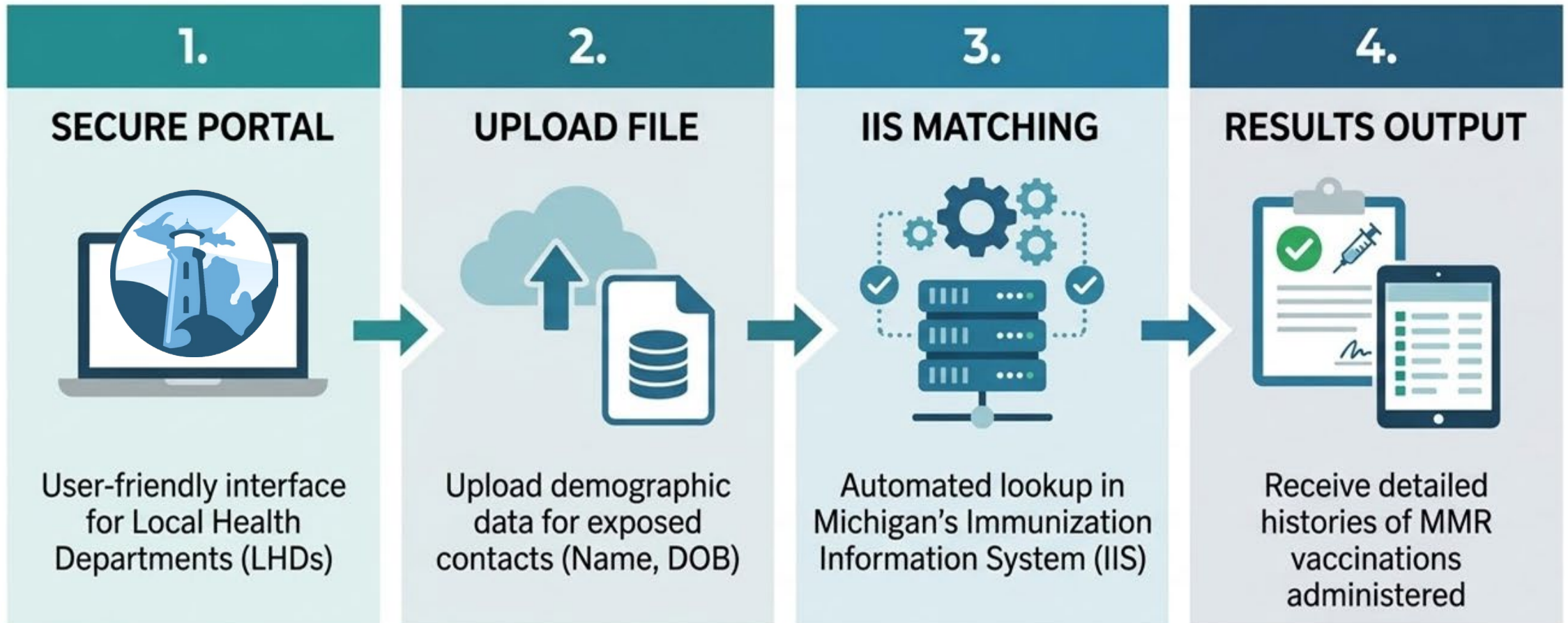


+



A collaboration between MDHHS and MICOM

4-Step Process



Immunity Status Logic

Determine MMR immunity status by matching patient records against MCIR vaccine data

Upload CSV (Name + DOB) → Match to MCIR Person → Lookup Vaccine Records → Determine MMR Status → Output CSV

MMR Status Decision Rules (evaluated in order)

#	Condition	Status	Rationale
1	No MCIR record found	Unknown	Cannot verify immunization history
2	Date of Birth ≤ Jan 1, 1957	<1957	Presumed immune (pre-vaccine era exposure)
3	2 or more MMR doses	Immune	Meets CDC full immunization requirement
4	1 dose, within last 28 days	Up-To-Date	Recently vaccinated, awaiting 2nd dose window
5	1 dose, age < 6 or age ≥ 18	Up-To-Date	Young children & adults on schedule with 1 dose
6	1 dose, age 6–17	Overdue	School-age children require 2nd dose
7	No MMR doses found	Unknown	MCIR record exists but no MMR documented

Output Flags

Flag	Description
MMR_FOUND	Whether any MMR vaccine record exists in MCIR
MCIR_FOUND	Whether the person exists in MCIR at all
MULTIPLE_MATCH	More than one MCIR person matched same name + DOB

Matching Criteria

Matched on: First Name + Last Name + Date of Birth

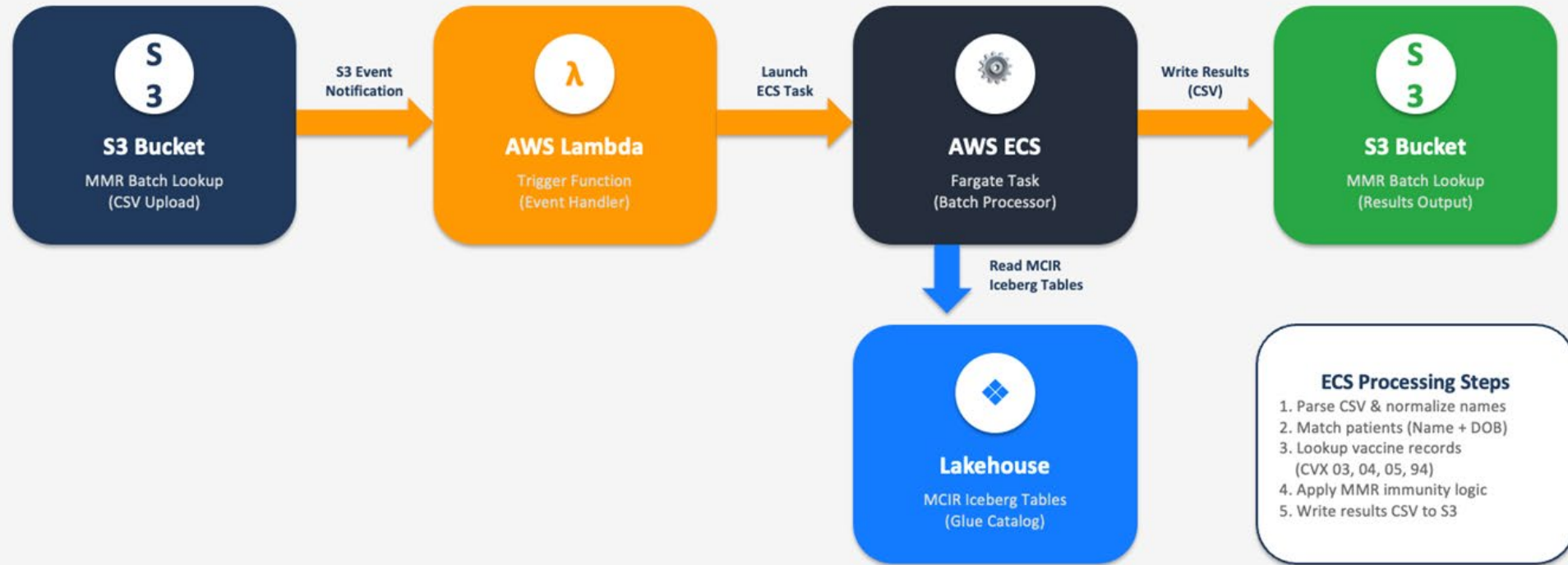
Names normalized: Uppercase, special characters removed

Vaccine filter: CVX codes 03, 04, 05, 94 (MMR-related)

Excluded: Deleted vaccine records filtered out

Architecture Overview

End-to-end serverless pipeline: S3 event triggers Lambda, which launches an ECS task to process vaccine records



Iterative Process

The batch lookup tool was created using an iterative process with feedback from state, local, and academic partners at different stages of the process: requirement gathering, testing, leading to launch.

Data Format & Usability

- Improved **upload instructions** and standardized **DOB/Admin Date formats**.
- Renamed columns for clarity and reordered key output variables.

Data Clarity & Completeness

- Improved **data dictionary** and **CVX code definitions**.
- Added **MCIR_FOUND**, **MULTIPLE_MATCH**, and **CENSUS_RACE** fields.
- Investigating occasional **missing county values from geocoding**.

Logic & Processing

- Fixed logic to return the **most recent vaccination date**.
- Clarified **MMR status categories** and measles-containing vaccine recognition.

Search for counties and census tracts

Updated: 03/08/2026

View: General Immunizations

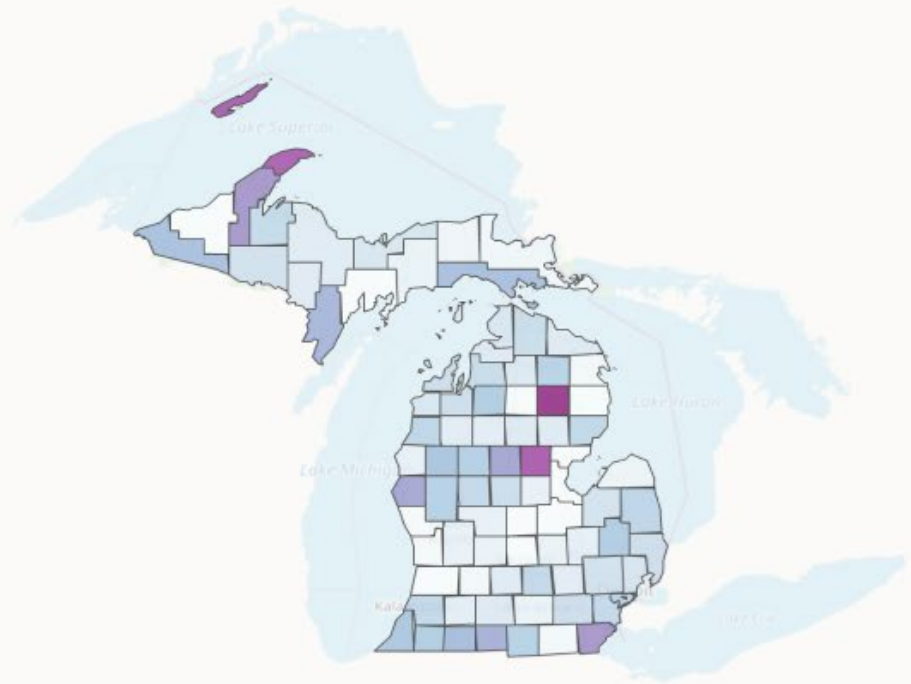
Vaccine: MMR

Download

MMR Coverage in the State of Michigan

Age: All (0-17)

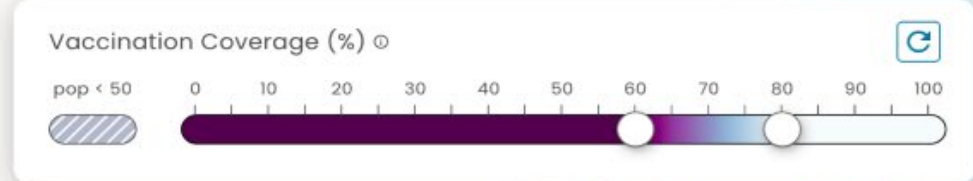
State of Michigan



State of Michigan
(Age: All (0-17))

Recipients \odot **1.7M** Coverage \odot **74.3%**

County	Coverage
Alcona County	79.1%
Alger County	74.6%
Allegan County	78.0%
Alpena County	77.2%





MMR Batch Lookup Tool

Securely and directly retrieve MCIR records.

[Lighthouse Homepage](#)

The MMR Batch Lookup Tool is a secure, user-friendly application that enables authorized local health departments to upload participant lists and retrieve matched MCIR immunization records—no data request to MDHHS required. Built within the MI Lighthouse ecosystem, the tool delivers key vaccination data within about an hour.

For instructions on how to use the batch lookup tool, enjoy [this helpful manual](#).

Upload

Upload a new file. Once we've processed it, your data will be available in the download list below. (Processing may take up to 1 hr.)

Choose File

No file chosen

Upload

Download

Upload your files above. Once we've processed them, you'll be able to download them here.

Sample Data



Input

Sample data:

OMS ID	Last Name	First Name	DOB
99999999	Doe	Jane	03/15/2022

Output

OMS ID	MCIR_ID	RECIP_DOB	RECIP_LAST	RECIP_FIRST	COUNTY	MMR_STATUS
	1689844212	1/9/82	SMITH	JOHN	Washtenaw	Unknown
	30017705786	10/4/94	DOE	JANE	Macomb	Immune

MMR_FOUND	MCIR_FOUND	MULTIPLE_MATCH	ADMIN_DATE	CVX_CODE
NO MMR RECORD FOUND	MCIR RECORD FOUND	FALSE		
MMR RECORD FOUND	MCIR RECORD FOUND	FALSE	9/1/99	03

TOTAL_DOSE	VACCINE_MFR_ID	CURRENT_AGE	FIPS_GEOID	TRACTCE	COUNTYFP	SEX
0			1111111111	405200	161	M
2	304	31	2222222222	231700	099	F

CENSUS_RACE	RACE	ETHNICITY	STREET_1	STREET_2	CITY
White	White	Not Hispanic or Latino	1 Place Dr		Ann Arbor
Asian	South Asian	Not Hispanic or Latino	2 Place Street		Plymouth

POSTAL_CODE	SITE_ID
48000	
48000	1E+10

Putting it to the test

The MMR Batch Lookup tool was successfully tested by one LHD, which used it to verify vaccination status for 331 exposed contacts.

266 individuals were matched to an IIS record, accounting for 77% of the contact list

222 individuals were confirmed as not susceptible to measles.

By identifying the 222 safe individuals instantly, staff could focus 100% of their energy on the remaining 109 high-risk or unmatched individuals.

Impact

The MMR batch lookup tool went live to all LHDs on September 30, 2025.

It improved resources around measles case investigation and preparedness, and has been used by multiple LHDs since it's pilot.

The tool enables LHDs to rapidly determine the vaccine status of susceptible contacts, supporting timely containment of measles outbreaks.

It reduces manual IIS lookups, increases efficiency, and allows staff to focus on other critical public health response activities, ultimately strengthening Michigan's immunization infrastructure and outbreak preparedness.

Future Work

We hope to expand the Batch Lookup tool to be used for a range of other immunization lookup use cases, enabling LHDs to rapidly access individual-level immunization status.

Thank you!
OlsabeckT1@michigan.gov

- **MDHHS:**
Sukhesh Sudan, Taylor Olsabeck, Ryan Malosh
- **MI Lighthouse Team:**
Krista Dunger, Dhruvil Shah, Mohammed Abouzahr, Trevor Harkness, Jiming Song, Michael Hayashi, Prajakta Bonde, Veronica Ma, Michael Hess, Emily Martin, Marisa Eisenberg
- This project/study/publication was made possible by the Insight Net cooperative agreement with University of Michigan (5 NU38FT000002-02-00) from the CDC's Center for Forecasting and Outbreak Analytics (CDC-RFA-FT-23-0069). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the Centers for Disease Control and Prevention.

Extra slides

Tech Stack and Backend Workflow Process

- Used existing secure Django server for the UI.
- User-specific input and output, stored securely with restrictive policies.
- Asynchronous workflow supports heavy loads and processing.
- Steps:
 - a. A user provides a query input file.
 - b. We validate the format and store it.
 - c. The data system processes the input and stores the result.
 - d. The result is available for download.