DMI
Data Modernization
INITIATIVE

A people-centered approach to data exchange

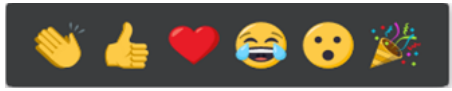
Moderator

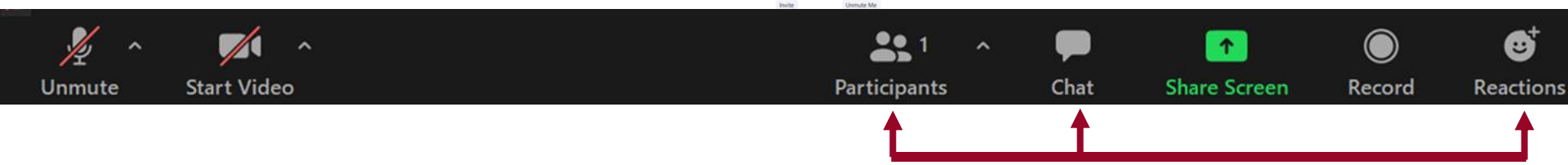
Benjamin Schram, Surveillance and Electronic Reporting System Coordinator, North Dakota Department of Health | May 26, 2022

Better data. Better decisions. Better health.

Finding your way around Zoom

- The audience is muted, type your questions into the chat or use reactions to communicate with panelists.





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A Contact Tracing-Health Information Exchange Partnership: An Effective Collaboration for a Data-Driven Response to COVID-19 in Maryland

Carly Babcock, Marcia Pearlowitz

Contact Tracing Unit, Maryland Department of Health

May 26, 2022

Contact Tracing and the COVID-19 Pandemic

- Early in the pandemic (April 24, 2020) our governor released a comprehensive plan to combat the COVID-19 pandemic, with a key component being a robust contact tracing program
- State leadership moved quickly to establish a virtual call center, and identified Salesforce as the platform we would use to build our contact tracing system called covidLINK

Contact Tracing and the COVID-19 Pandemic

- Our custom statewide system was developed and launched within 6 weeks - built to allow the virtual call center to seamlessly provide surge support to our 24 local health departments
- Recognizing that accurate and timely COVID-19 case reports were critical to the success of contact tracing, we turned to our state HIE, with whom we already had an established public health relationship

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CRISP is the State Designated Health Information Exchange (HIE) for Maryland.

CRISP

Regional Health Information Exchange (HIE) serving Maryland, West Virginia, and the District of Columbia; Maryland's State-Designated HIE

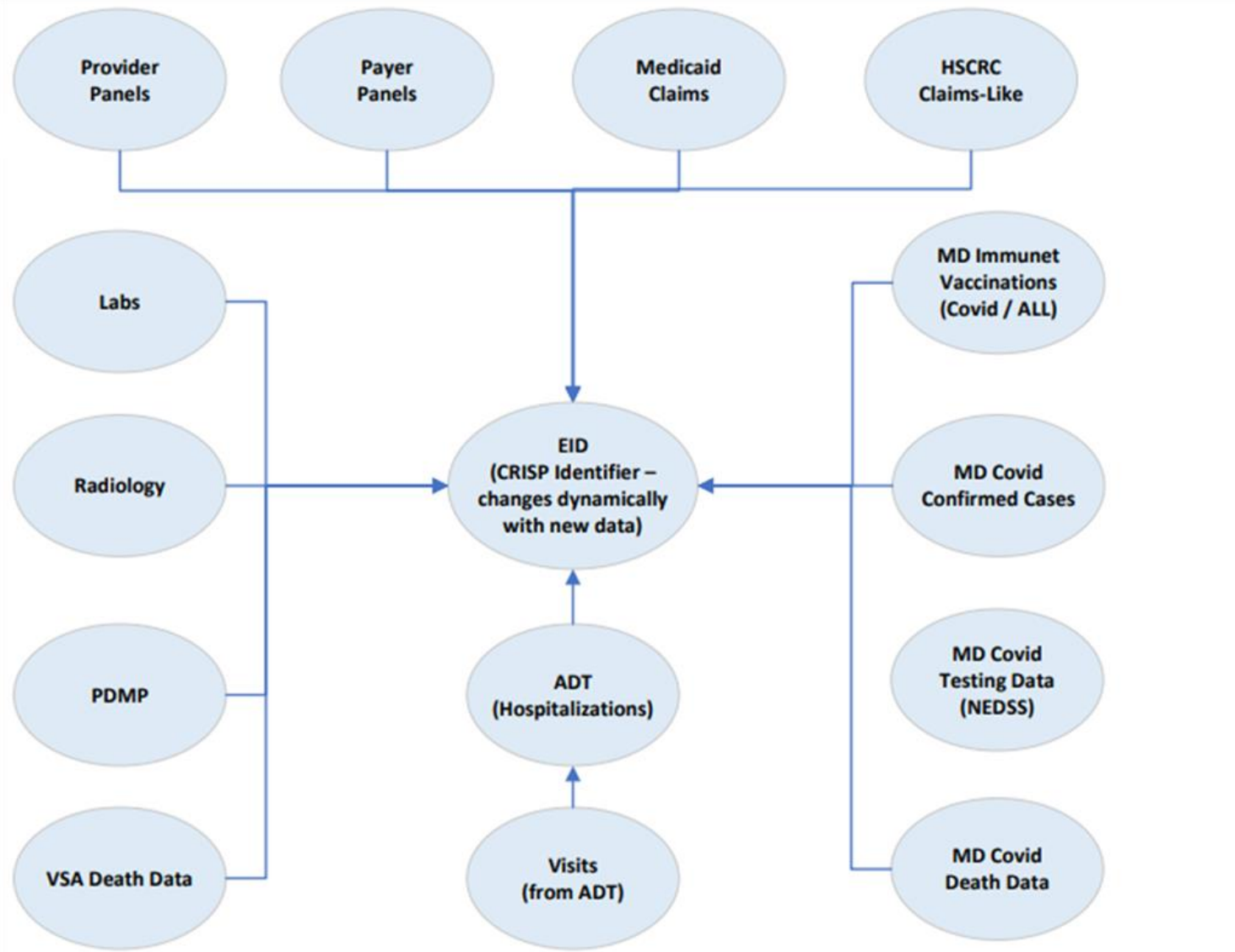
Vision: To advance health and wellness by deploying health information technology solutions adopted through cooperation and collaboration

Guiding Principles

1. Begin with a manageable scope and remain incremental.
2. Create opportunities to cooperate even while participating healthcare organizations still compete in other ways.
3. Affirm that competition and market-mechanisms spur innovation and improvement.
4. Promote and enable consumers' control over their own health information.
5. Use best practices and standards.
6. Serve our region's entire healthcare community.

https://www.crisphealth.org/

CRISP Data Sources



Maryland Department of Health - CRISP Collaboration

- MDH and CRISP partnered to build a system that efficiently feeds all COVID-19 positive results to and through CRISP and then to covidLINK
- This team effort required regular and frequent meetings to identify, discuss and resolve new issues as the pandemic evolved
- Both sides continued real time monitoring of any data flow issues and ad hoc availability to troubleshoot and respond to emergencies

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Timeline

- June 2020 - covidLINK launched
- Sept 2020 - Antigen tests added
- Nov 2020 - MD COVID Alert (ENX) launched
- Jan 2021 - Vaccination records from MD registry added
- Mar 2021
  - Reinfection logic added
  - Variant lineage added
- June 2021 - flow of CT data into NEDSS established
- Sept 2021 - Major system architecture change, shifting from first-test result to person-centric system

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Timeline

- Nov 2021
  - Ag to Ag reinfections added
  - Vaccination records from DC registry added
  - 1st booster doses added
- Jan 2022
  - Web survey for 18+ case records launched
  - Positive at-home self-report portal created
- Apr 2022
  - 2nd booster doses added
  - Web survey for minor case records launched

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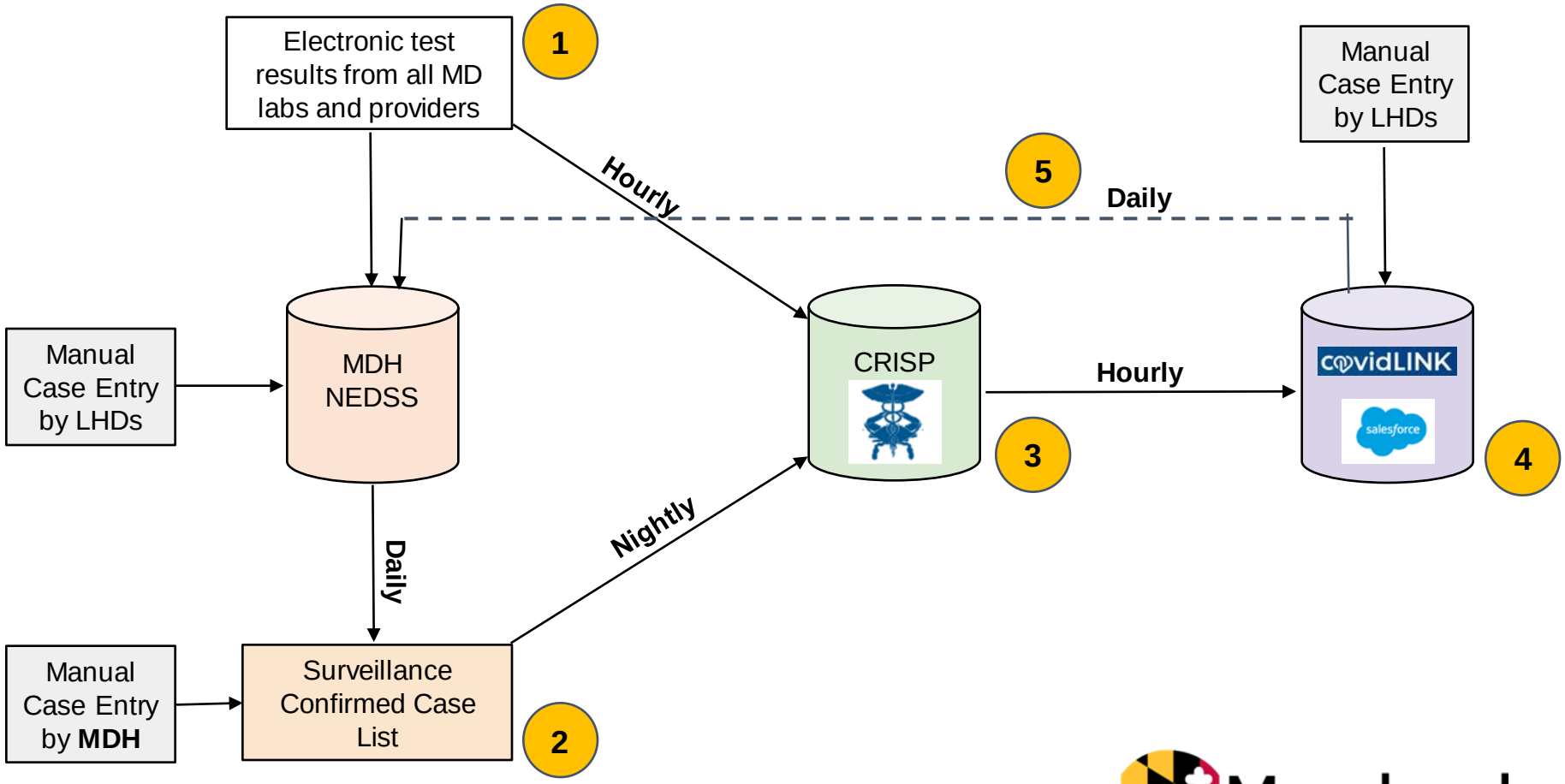
High Level MDH covidLINK Data Flow



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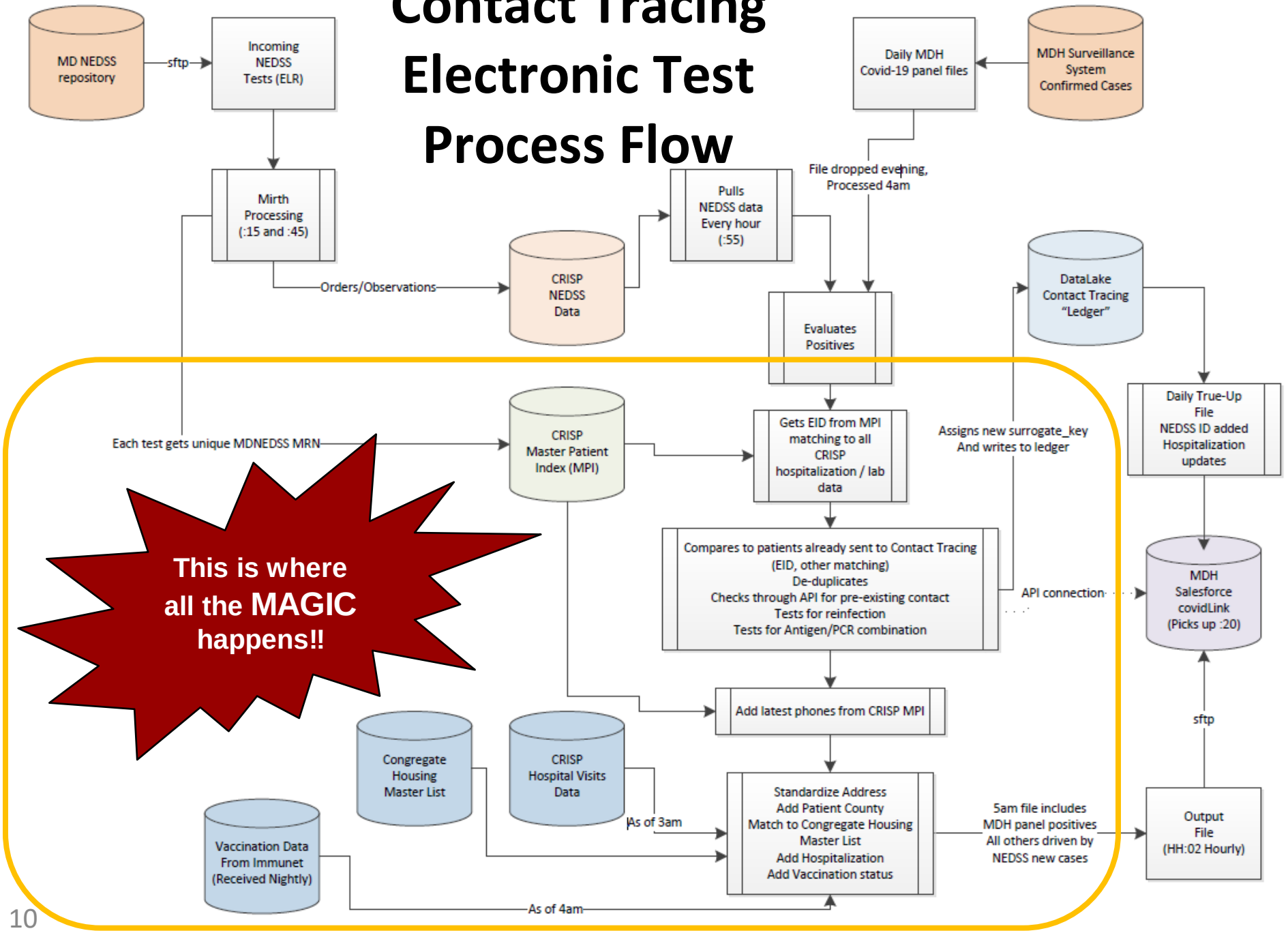
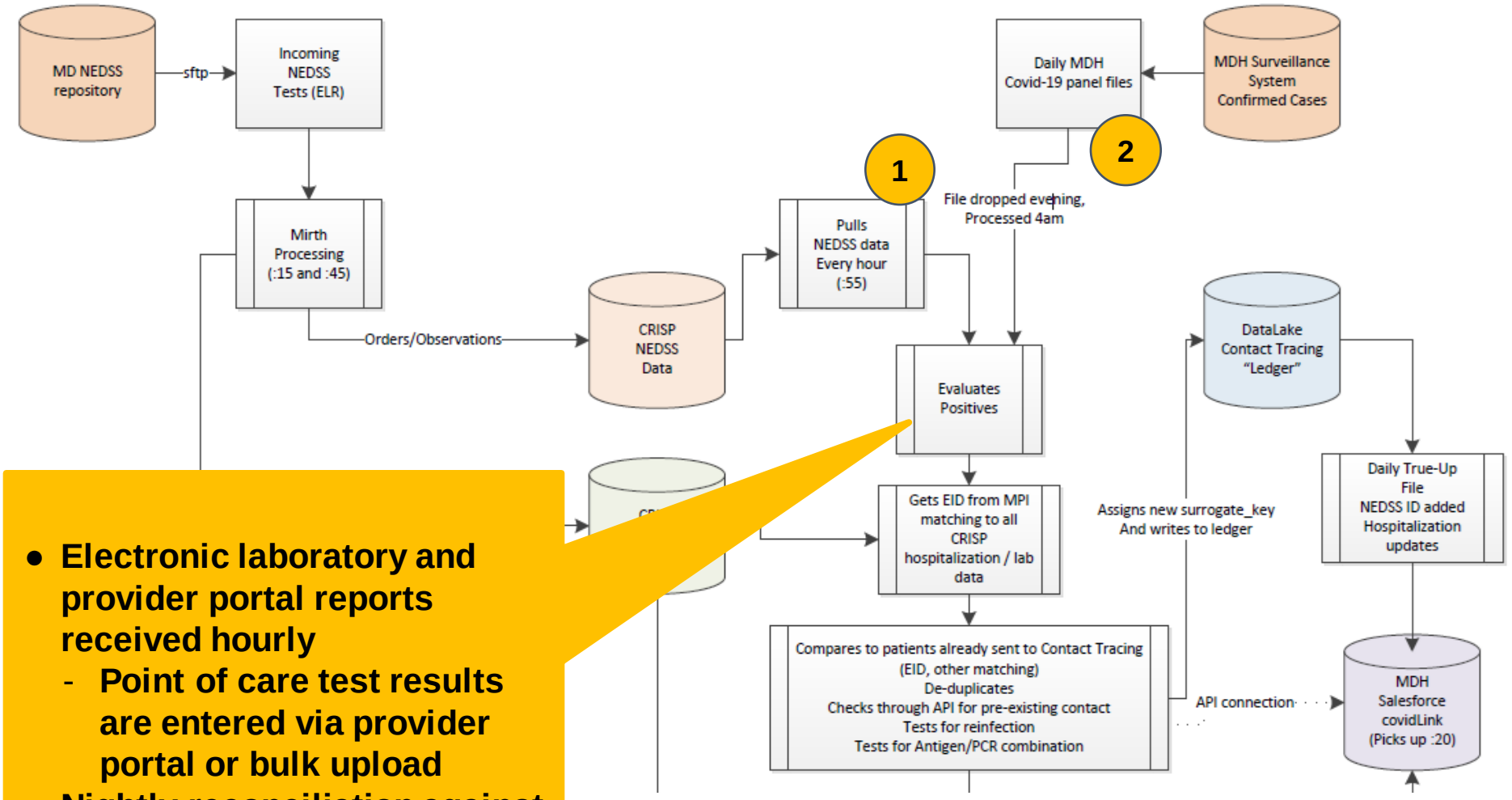
Updated November 30, 2020

Contact Tracing Electronic Test Process Flow



Contact Tracing Electronic Test Process Flow



- **Electronic laboratory and provider portal reports received hourly**
  - **Point of care test results are entered via provider portal or bulk upload**
- **Nightly reconciliation against confirmed case panel**

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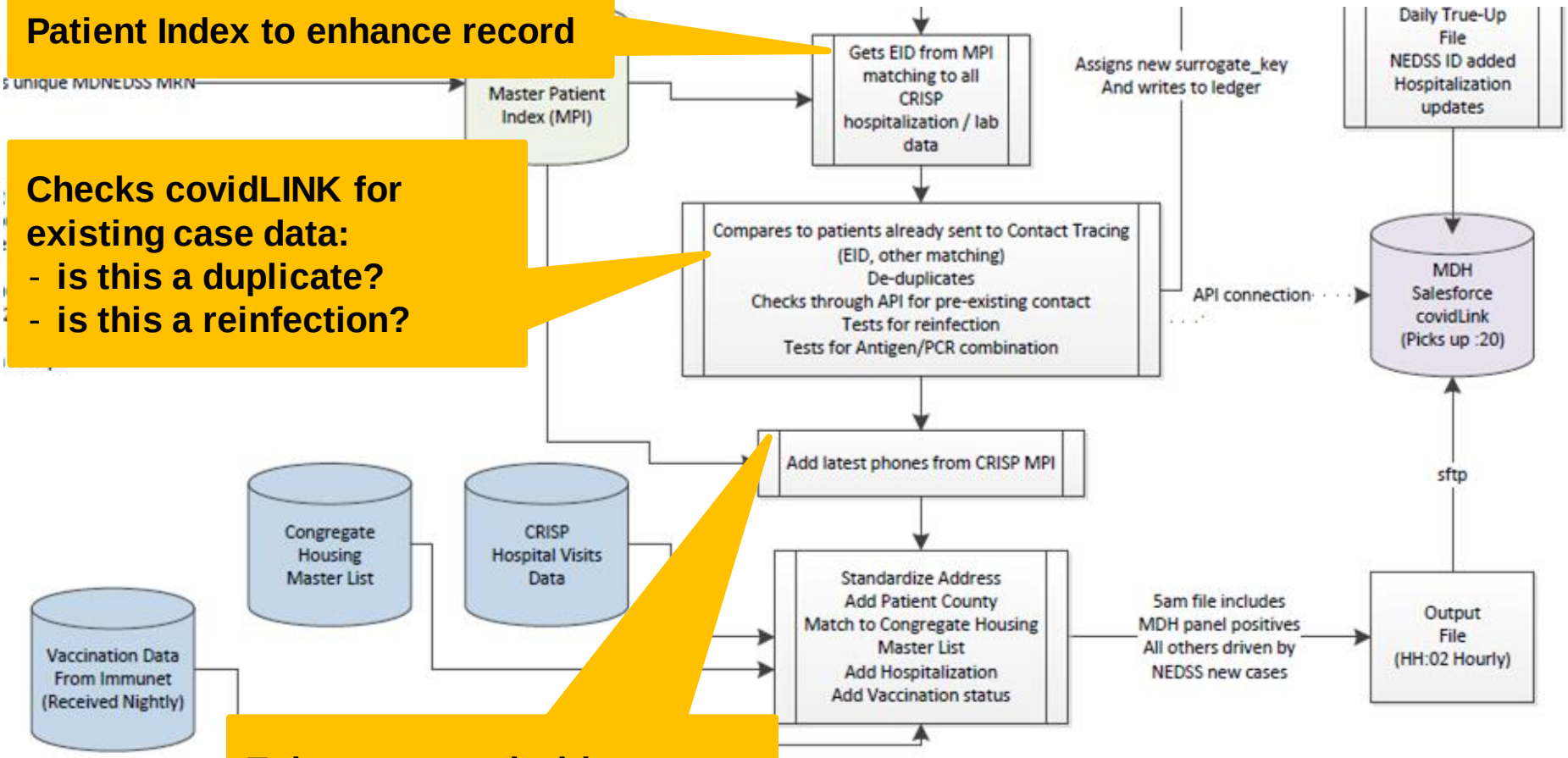
Contact Tracing Electronic Test Process Flow

Matched with CRISP Master Patient Index to enhance record

Checks covidLINK for existing case data:
- **is this a duplicate?**
- **is this a reinfection?**



Enhance record with:
- **demographic info**
- **additional locating info including phone numbers**

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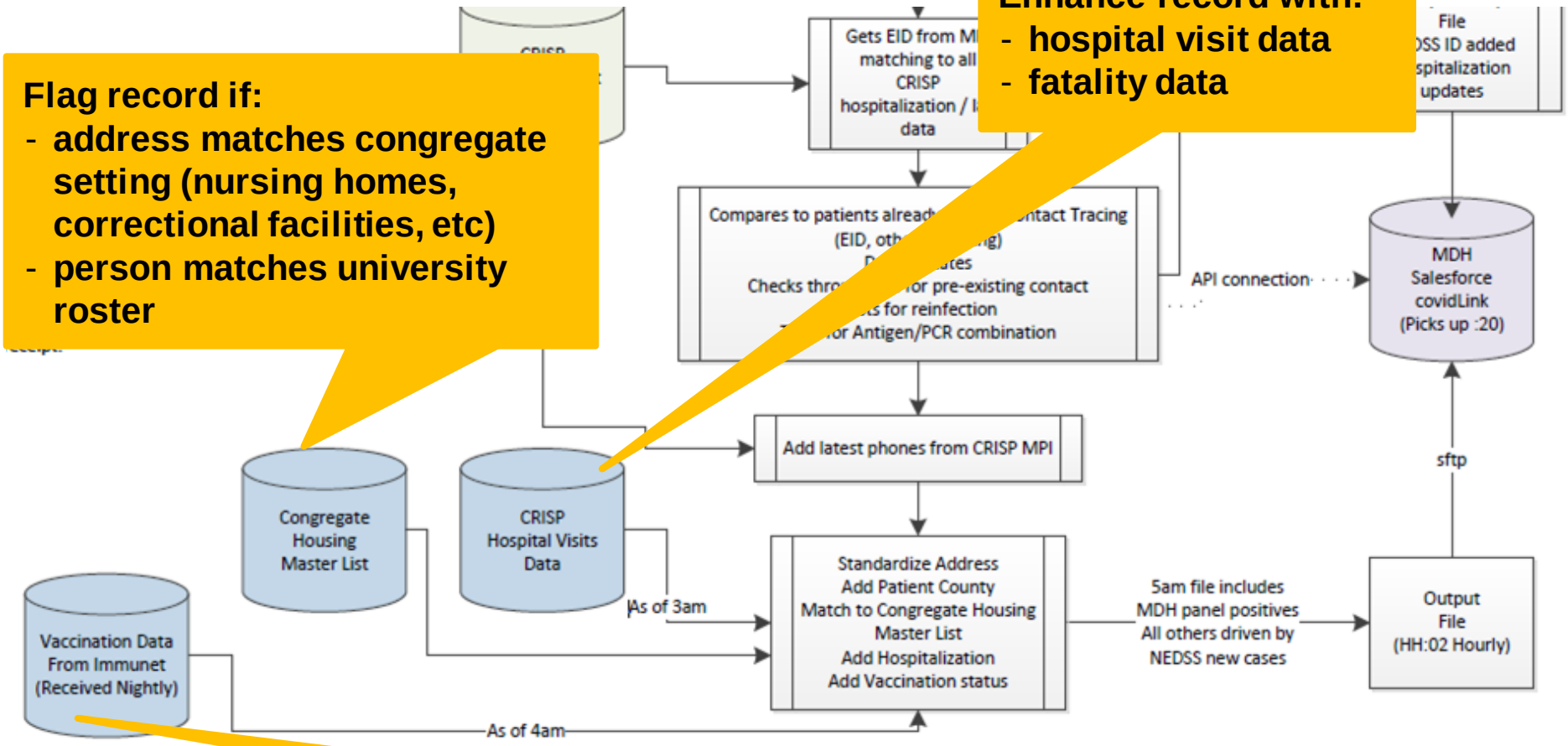
Contact Tracing Electronic Test Process Flow



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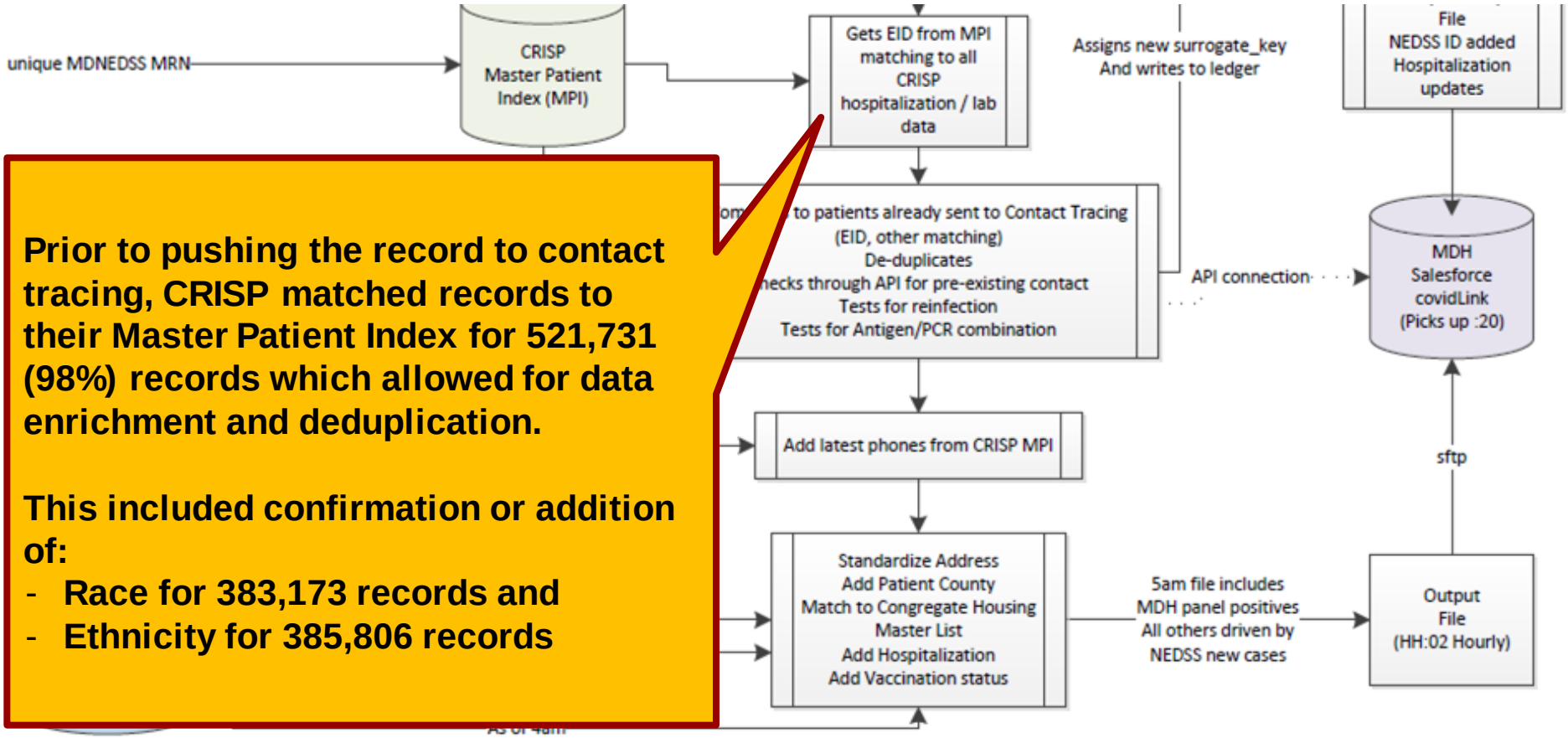
Contact Tracing Outcomes (Jun 2020-Aug 2021)



Prior to pushing the record to contact tracing, CRISP matched records to their Master Patient Index for 521,731 (98%) records which allowed for data enrichment and deduplication.

This included confirmation or addition of:

- **Race for 383,173 records and**
- **Ethnicity for 385,806 records**

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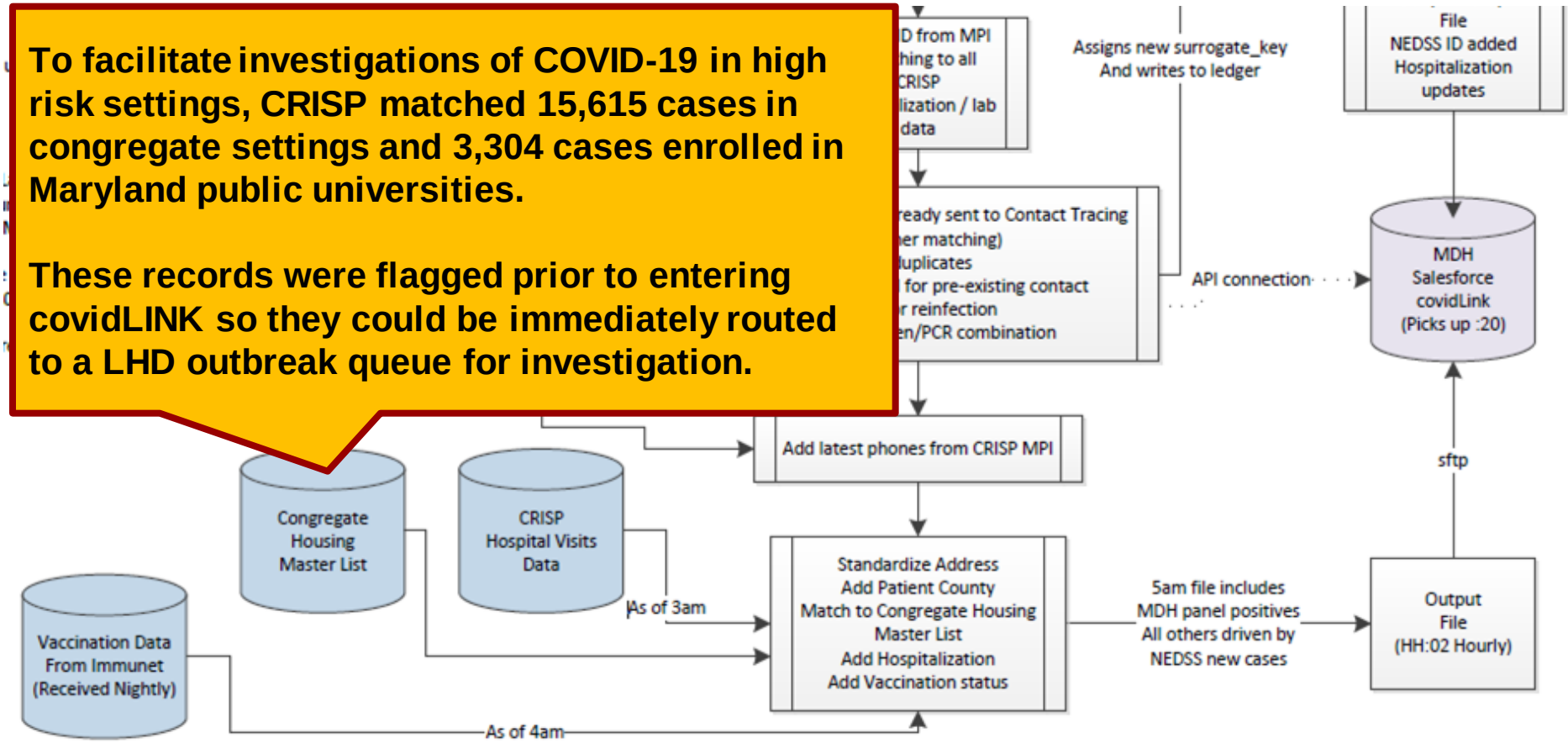
Contact Tracing Outcomes (Jun 2020-Aug 2021)

To facilitate investigations of COVID-19 in high risk settings, CRISP matched 15,615 cases in congregate settings and 3,304 cases enrolled in Maryland public universities.

These records were flagged prior to entering covidLINK so they could be immediately routed to a LHD outbreak queue for investigation.



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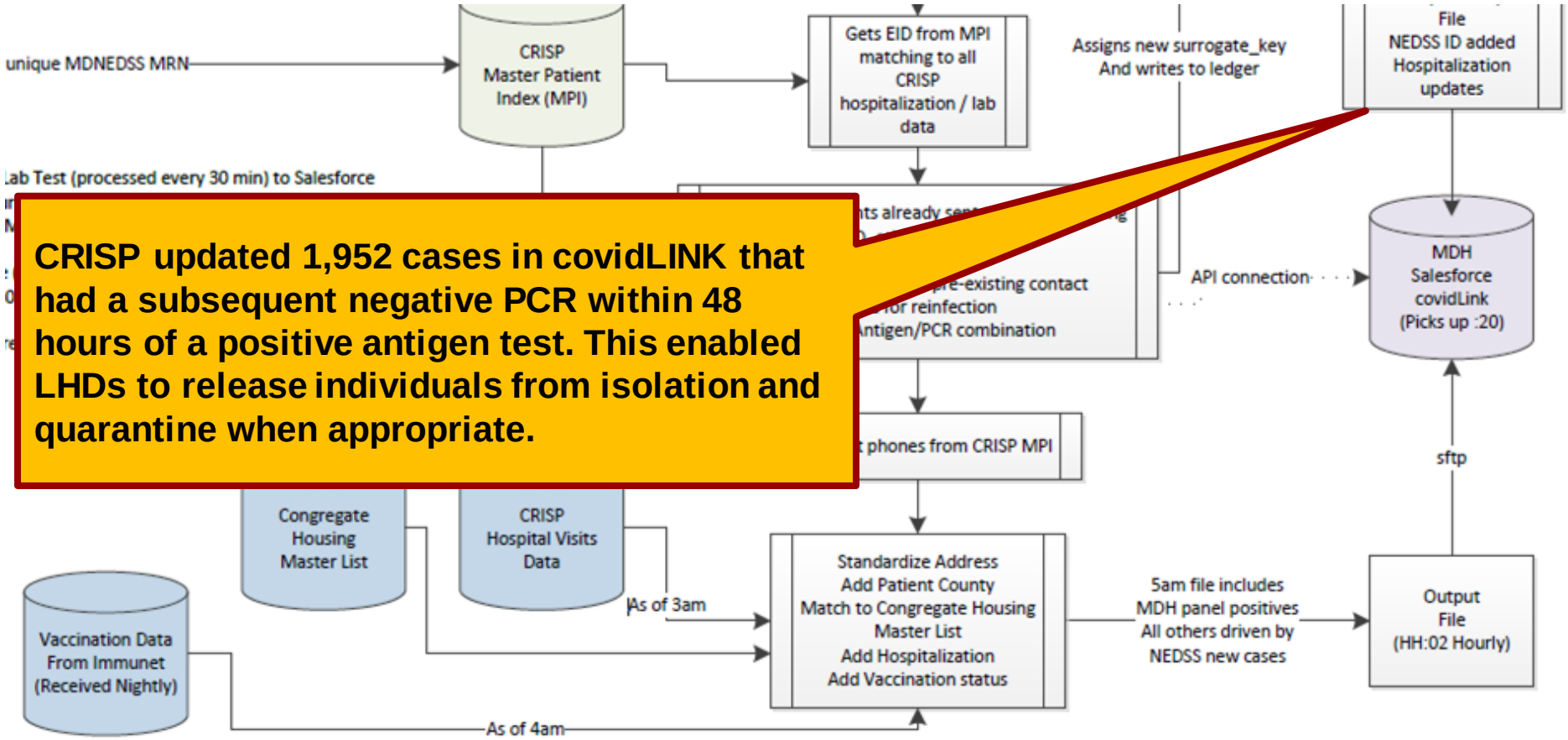
Contact Tracing Outcomes (Jun 2020-Aug 2021)



CRISP updated 1,952 cases in covidLINK that had a subsequent negative PCR within 48 hours of a positive antigen test. This enabled LHDs to release individuals from isolation and quarantine when appropriate.

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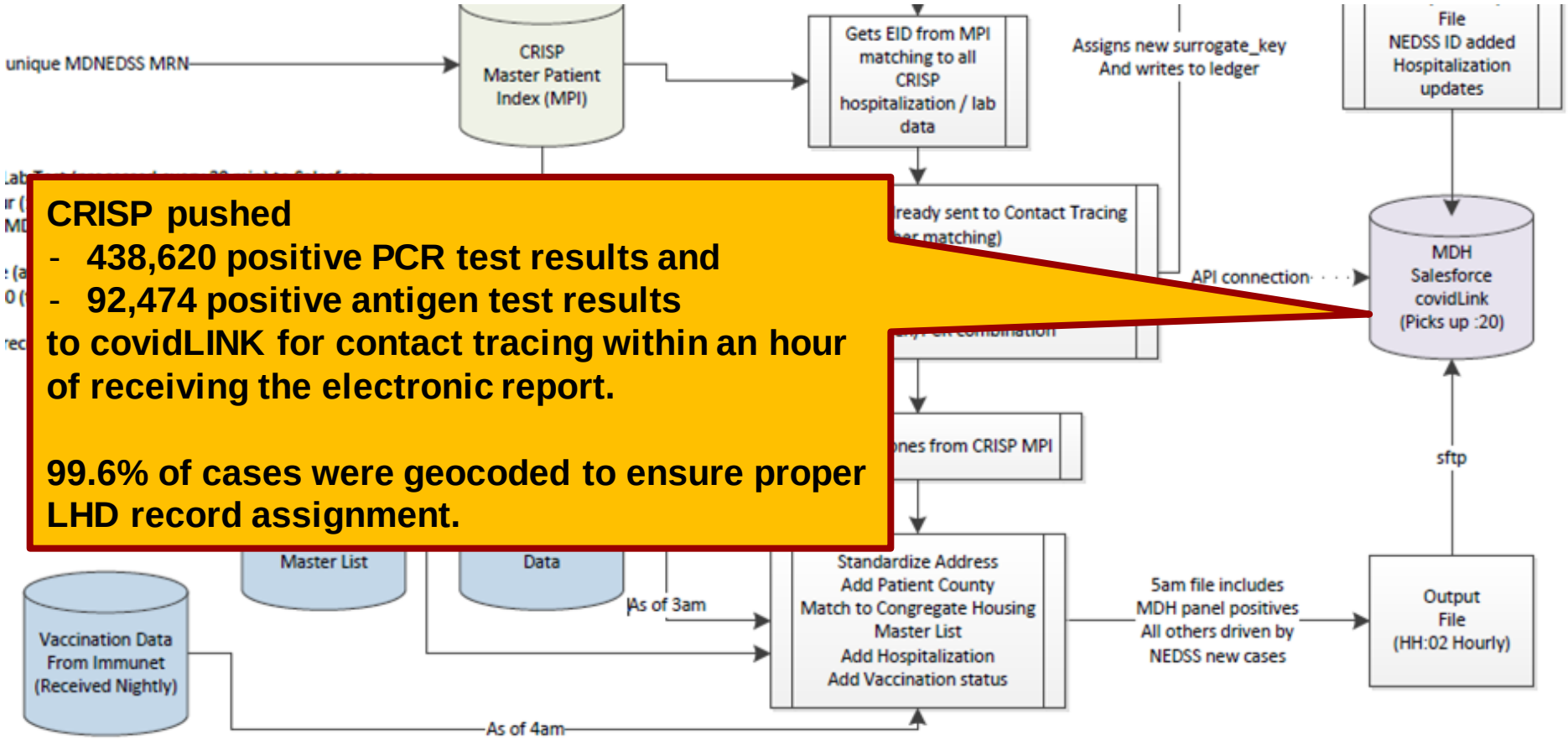
Contact Tracing Outcomes (Jun 2020-Aug 2021)



CRISP pushed
- **438,620 positive PCR test results and**
- **92,474 positive antigen test results**

to covidLINK for contact tracing within an hour of receiving the electronic report.

99.6% of cases were geocoded to ensure proper LHD record assignment.

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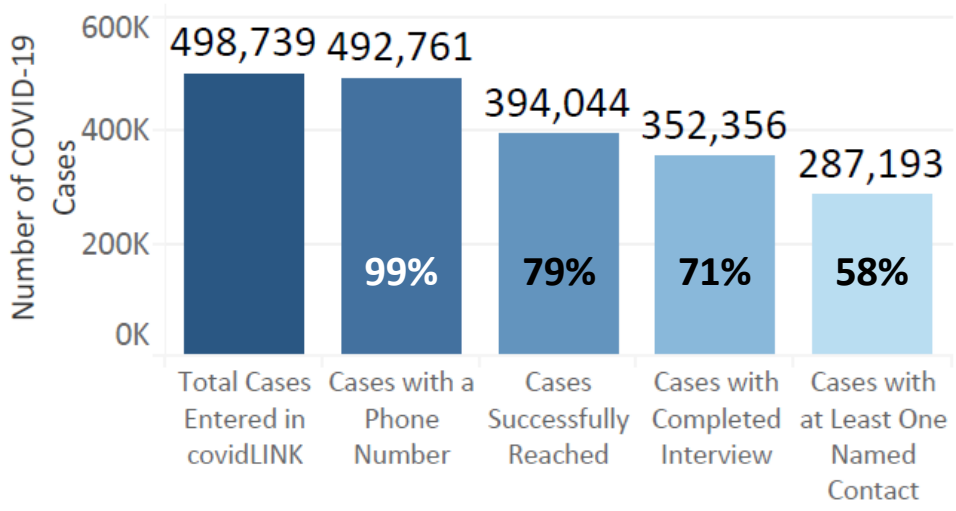
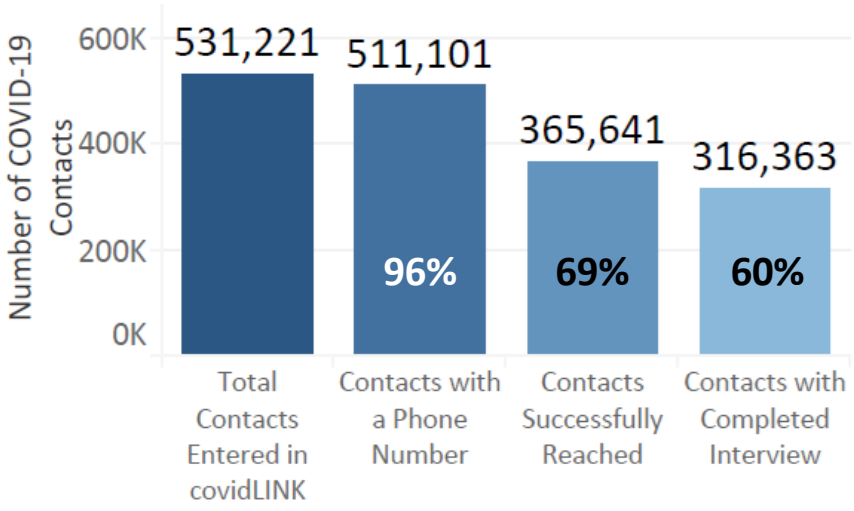
Case Volume and Contact Tracing Outreach Metrics (Jun 2020-Aug 2021)

Completeness: Cases Reached and Interviewed



Effectiveness: Contacts Reached and Interviewed



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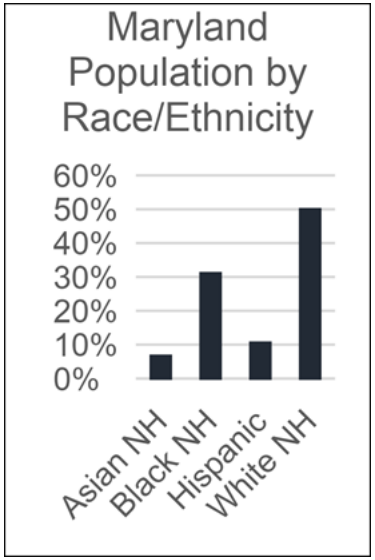
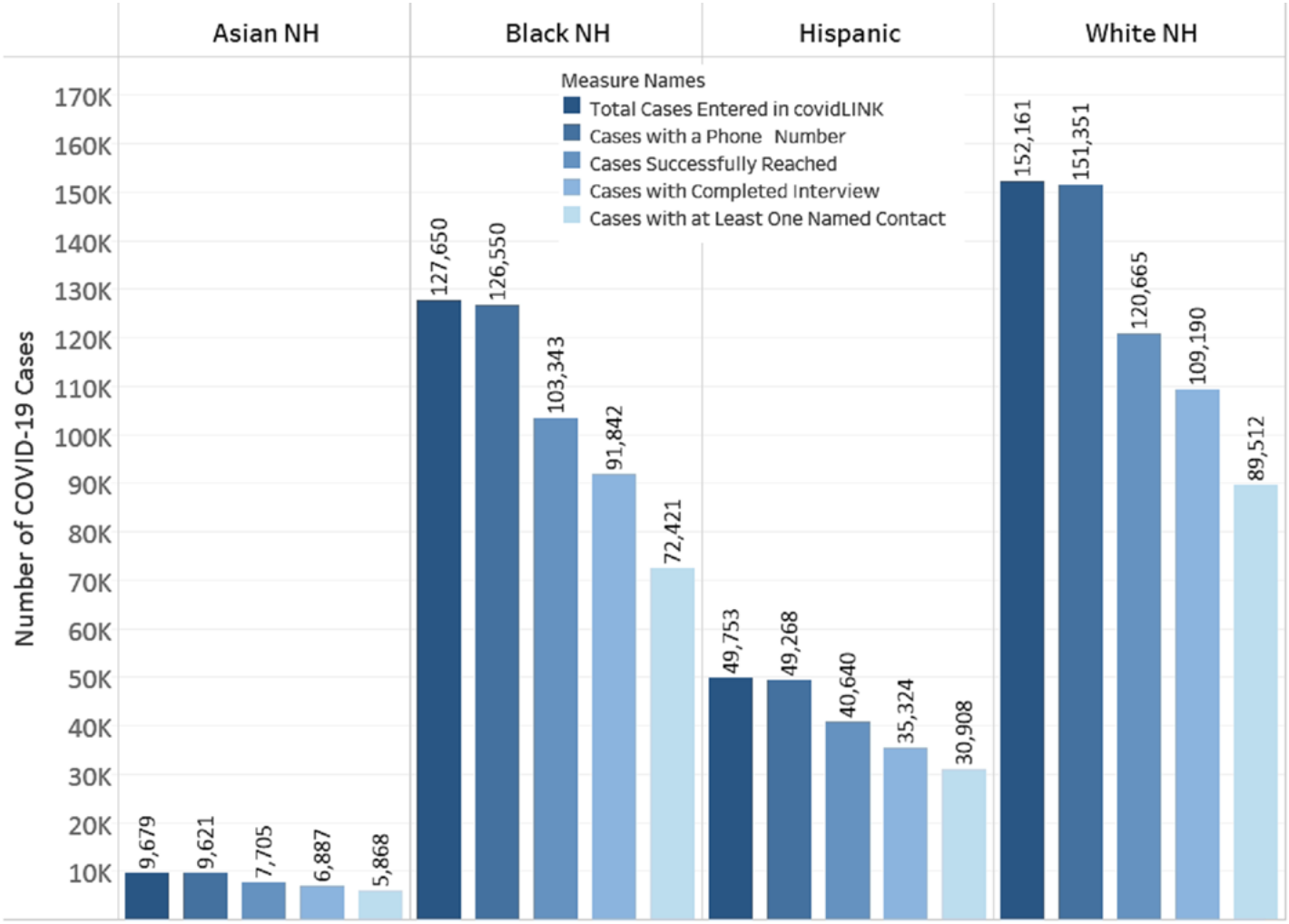
Case Volume and Contact Tracing Outreach Metrics by Race/Ethnicity (Jun 2020-Aug 2021)



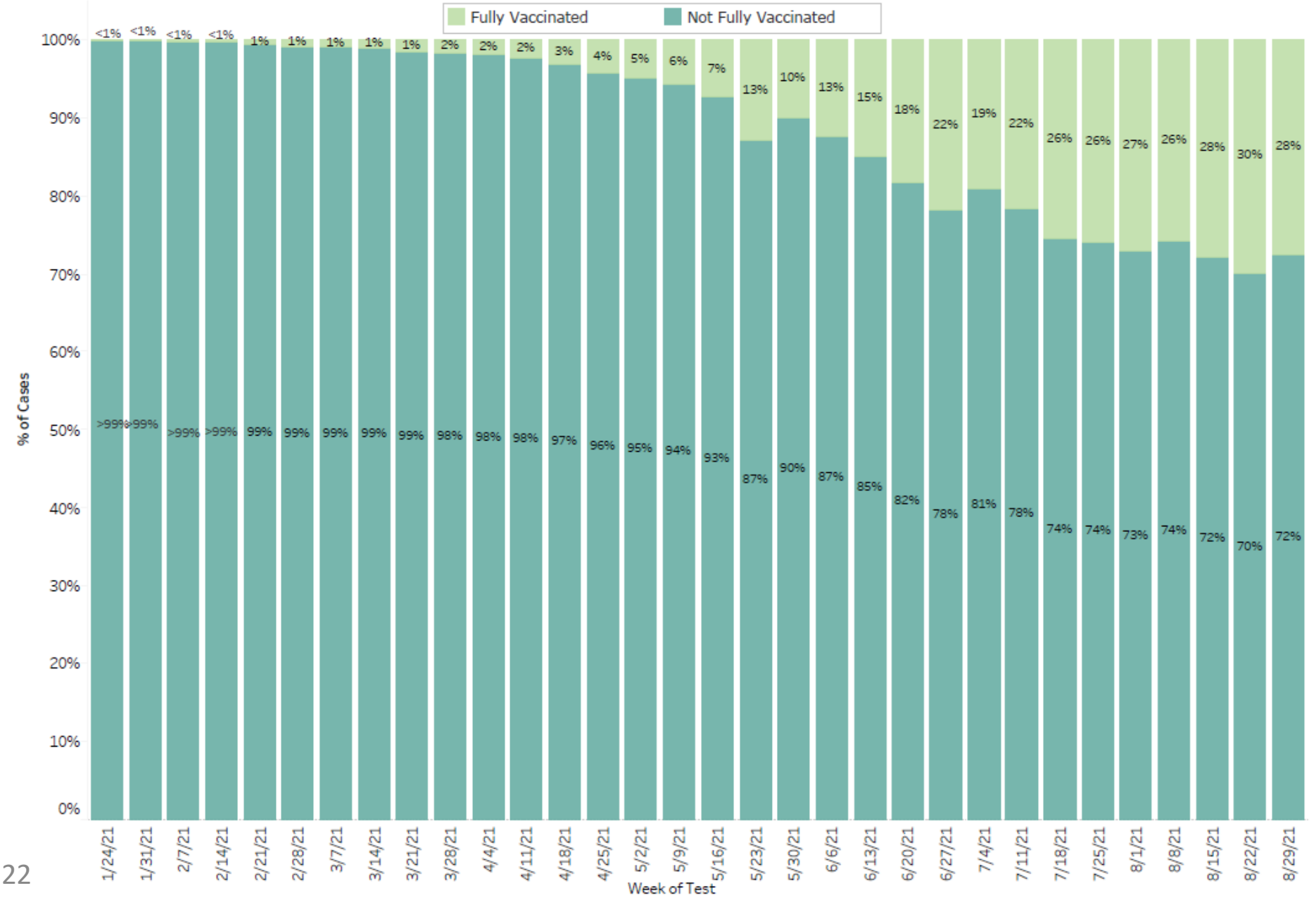


Measure Names
Total Cases Entered in covidLINK
Cases with a Phone Number
Cases Successfully Reached
Cases with Completed Interview
Cases with at Least One Named Contact

Vaccine Status of Maryland Cases by Week of Test

Data refer to cases tested between 1/24/21 and 9/4/2021

Maryland's first post-vaccination infection was identified on 1/26/21. When a person tests positive for COVID-19 at least 14 days after receipt of their last required dose of vaccine, the person is fully vaccinated and considered a post-vaccination infection. All cases in the contact tracing database are matched to vaccination data from the Maryland immunization registry, ImmuNet. This data may not match the surveillance data exactly due to timing and other nuances. The current week is excluded because it is incomplete.



Conclusions

- The robust collaboration between CRISP and Maryland's contact tracing program has allowed for timely and data-informed case investigations and contact tracing
- Data integration and linkage has translated into greater success in locating cases, more efficient routing of records for investigation, enhanced ability to assess disparities and inequities, and rapid investigation of post-vaccination infections
- The infrastructure that has been established provides a strong foundation for data modernization and public health efforts beyond COVID-19

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Taking Stock - One Year into the Statewide Contact Tracing Program

COVIDLINK an **ever-changing system** that so far has had:

As of June 15, 2021

15 System releases (+ several dozen patch fixes)

836 Bug tickets submitted

Contributors

Maryland Department of Health

- Katherine Feldman
- Marcia Pearlowitz
- Alex Goode
- Carly Babcock
- Theo Williams
- Brandon Blouse
- Raina Sharma
- Sarah Linden
- Megan Peters

CRISP

- Andy Hanks
- Craig Behm
- Steve Dowling
- Bracha Orlansky
- Ayanjyoti Thakuria
- Michael Berger

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Regional Collaboration and Data Transformation of communicable disease surveillance and response

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Council of State and Territorial Epidemiologist
Previously Multnomah County Public Health, Oregon

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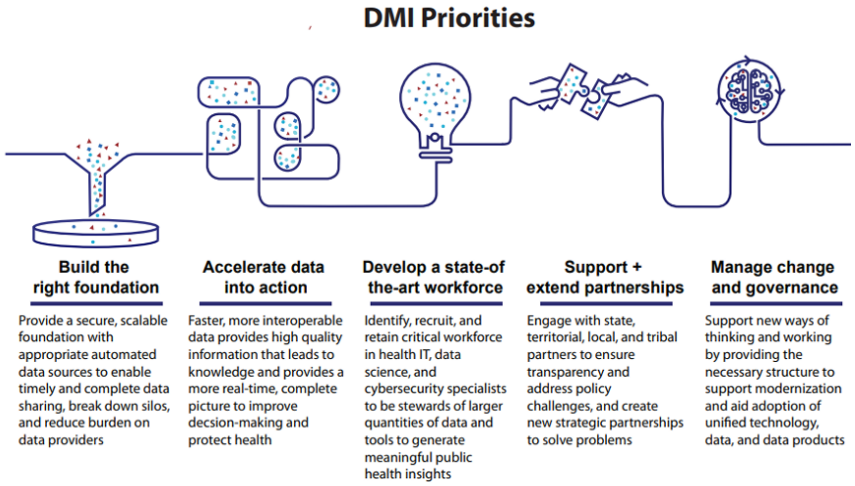
Multnomah County Public Health, Oregon

The Stage

- Goals, foundation, & modernization funding
- Partnership & data sharing agreements
- Data export & functionality (Orpheus/Opera system)
- Cloud based (expanding to a regional model)
- Enterprise & open source tools (Tableau Server, SAS, R, SSMS)

Implementation Strategy

- **Collaboration/Coordination**
- **Accessibility/Security**
- **Flexibility/Management**
- Govern data & state policies
- Literacy/Terminology
- Data Dictionary
- Skilled Workforce



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Multnomah County

WASHINGTON COUNTY OREGON

YAMHILL COUNTY

In Practice

- Regional connection, alignment of methods, and troubleshooting
- Identifying equity-based trends via dashboards
- Predicting and hitting our metrics (risk levels)
- Efficient data access and workflows

Successes & Benefits

- EFFICIENT DATA ACCESS!
- Early stages of regional (and state) level coordination of investments, priorities, & policies.
- Shared understanding of resources & roles.
- Strengthen and increase high quality epidemiology, data management, & informatics capacity.

Challenges of this work

by Abhinav Kaiser

"Are you sure this is how we upload data into the Cloud? "

CLACKAMAS COUNTY

Multnomah County

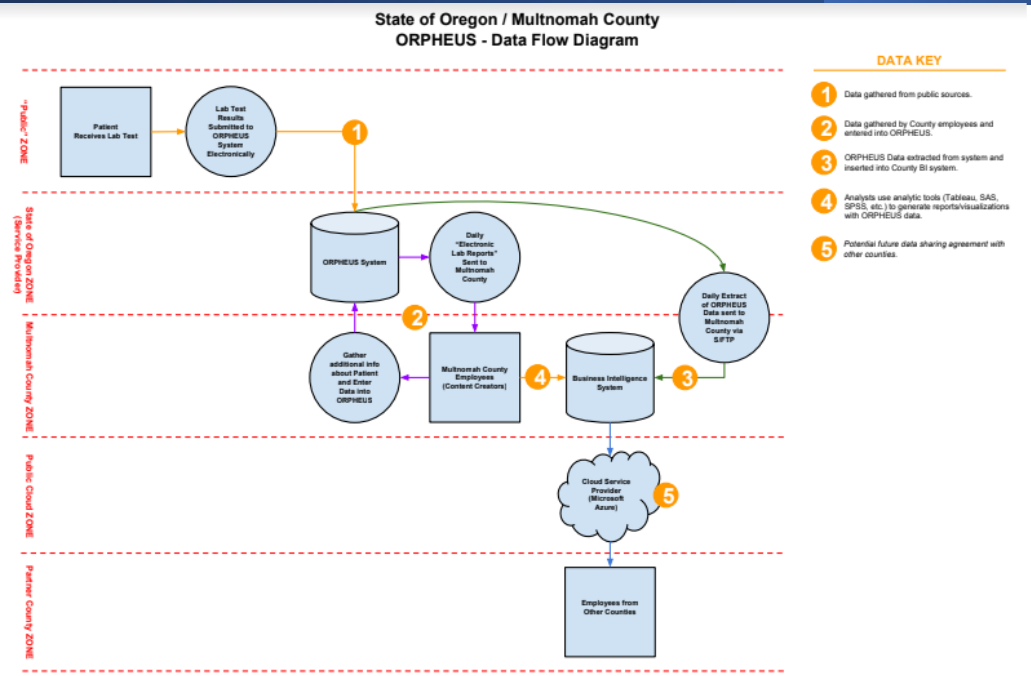
WASHINGTON COUNTY OREGON

YAMHILL COUNTY

Acknowledgements

- Special thanks goes to Michelle Barber at the Oregon Health Authority
- Multnomah County
  - Thank you to Russel Barlow, Kevin Jian, Jaime Walters, Rwayda Hassan, Taylor Pinsent
- Clackamas County
  - Thank you to Shannon Hiratzka and Anna Menon
- Washington County
  - Thank you to Wayne Flynn, Michael Berck, Lourdes Irwin, Blanca Perez, Ryan Ames
- Yamhill County
  - Thank you to Brian Leon

APPEDNIX: Data Flow



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Massachusetts Department of Public Health

150 YEARS OF ADVANCING PUBLIC HEALTH

"PROMOTING INTEGRATION OF ELECTRONIC CASE REPORTS (ECR) INTO MAVEN THROUGH DEVELOPMENT OF A HIGHLY CONFIGURABLE WEB-BASED PORTAL"

Data Modernization Initiative Workshop 2022

May 26th, 2022

Molly Crockett, MPH
Senior Surveillance and Informatics Epidemiologist

Tara Fleckner, MPH
Surveillance Epidemiologist

Today's Presentation

- Overview of goals for eCR Portal development
- Display portal features and data flow
- Describe data integration into MAVEN
- Recommendations for other jurisdictional use

Development of eCR Portal

Goals for development:

- Flexible
- Configurable
- Accessible by multiple users
- Easily maintained and monitored
- Potential for future enhancements

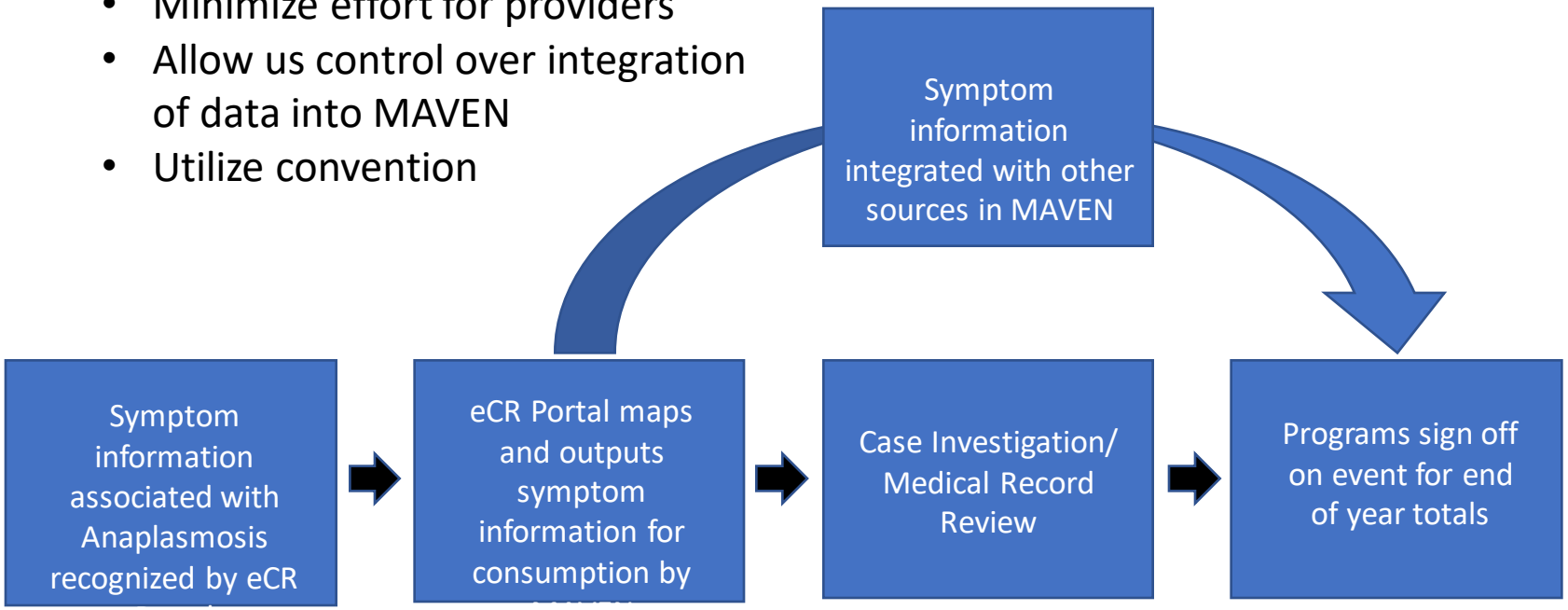
Requirements for portal:

- Accept eCR in multiple CDA formats
- Generate records in MAVEN's native MIF format
- Customize content and output by condition for MAVEN consumption
- Quickly and easily adapt to consume new information based on changing guidelines, clinical practice, epidemiologic information, and public health priorities (e.g. SDOH, CSTE case definitions)

Designing An Integrated eCR Solution

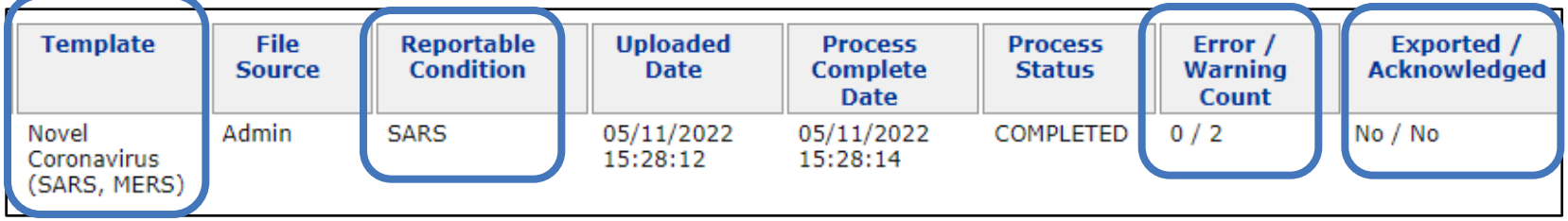
Design strategy:

- Quickly accommodate changes
- Minimize effort for providers
- Allow us control over integration of data into MAVEN
- Utilize convention



Incoming Data At A Glance

No	File Name	Provider Name	Provider Code	Facility Name	Facility Code	Template	File Source	Reportable Condition	Uploaded Date	Process Complete Date	Process Status	Error / Warning Count	Exported / Acknowledged
1	DMI_Workshop_Demo_Screenshots.xml	CDA_TEST_DOCSNY_COVID_DOC	1043772783	ANY MEDICAL HOSPITAL INPATIENT	1111111111	Novel Coronavirus (SARS, MERS)	Admin	SARS	05/11/2022 15:28:12	05/11/2022 15:28:14	COMPLETED	0 / 2	No / No



Template controls structure and content of output file

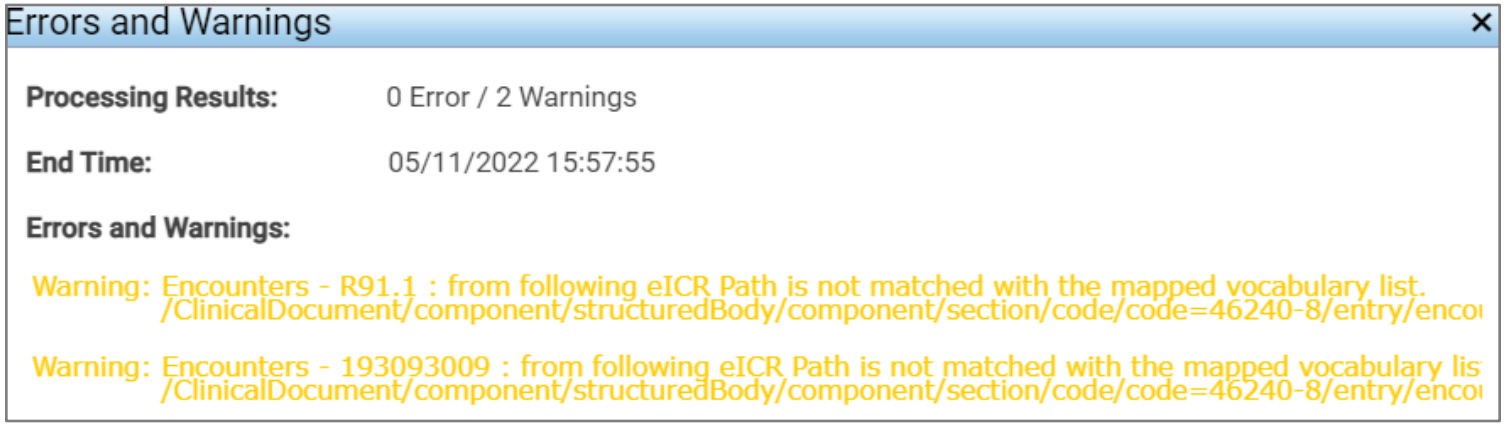
Reportable condition indicates MAVEN product code

Errors and warnings configured by template for each data element

MAVEN retrieves output files using web service call; processing status is reflected here

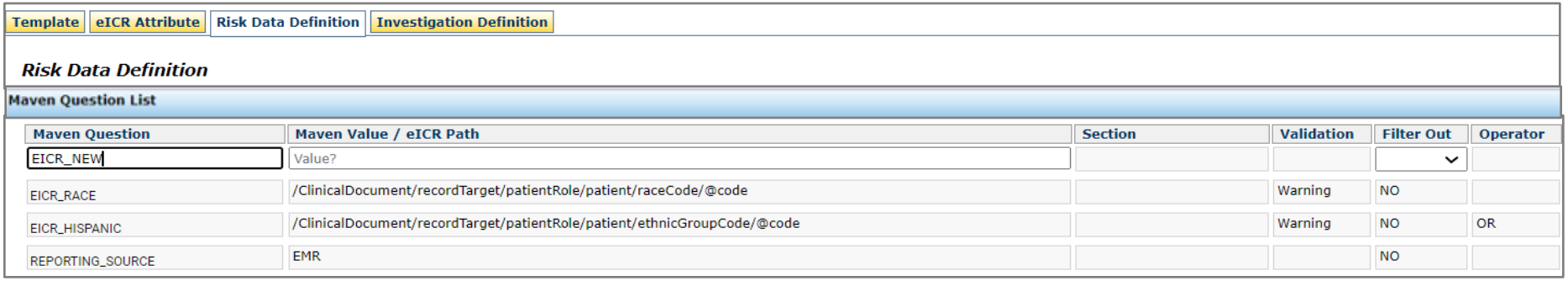
Errors and Warnings

- Warning messages show:
  - Section of eCR CDA
  - Unmapped code
  - xPath
- Messages can be reviewed in human readable format and by downloading the file in XML or zipped XML (eCR and RR) format

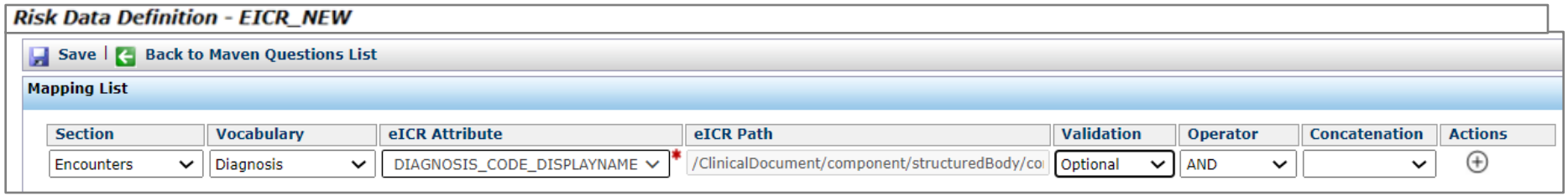


MAVEN Variable Mappings

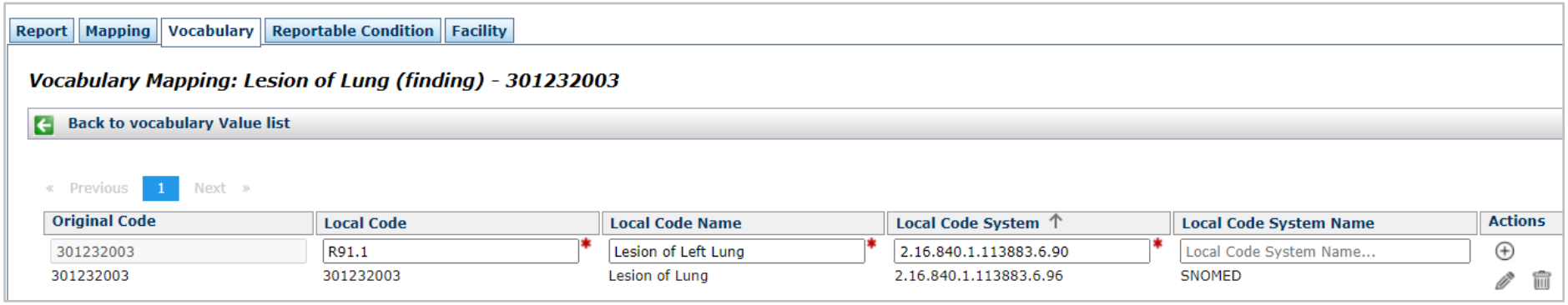
- MAVEN Question IDs are added to templates and mapped to appropriate xPath
  - Multiple xPaths can be mapped to one MAVEN Question (hierarchy or concatenated)



- Validation indicates if failed lookup generates error, warning, or no note



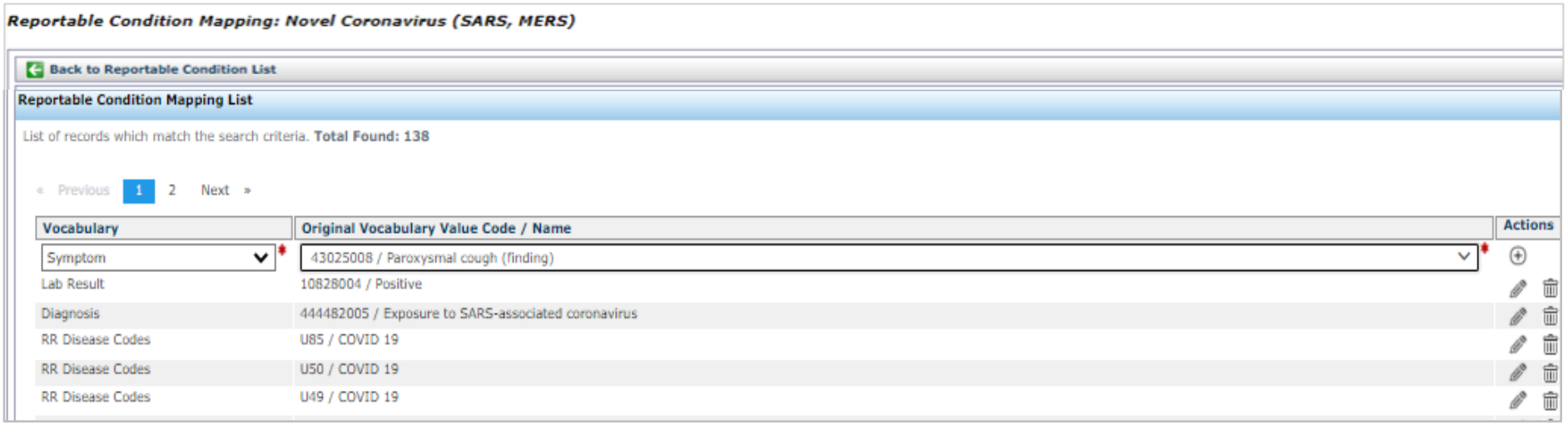
Local Code Mappings



- "Original Code" is code used in output generated for MAVEN
  - Fewer codes in MAVEN, less frequent updates
- Local codes (from facility/provider messages) are either mapped to an existing Original Code or added as new output codes if needed

Mapping to Reportable Conditions

- Only relevant coded values for symptoms, diagnoses, medications, tests, and results are mapped to each reportable condition
  - Reduces storage of excessive, unnecessary data
  - Avoids access to sensitive information not appropriate for public health
  - Ensures utility of data collected in a given event

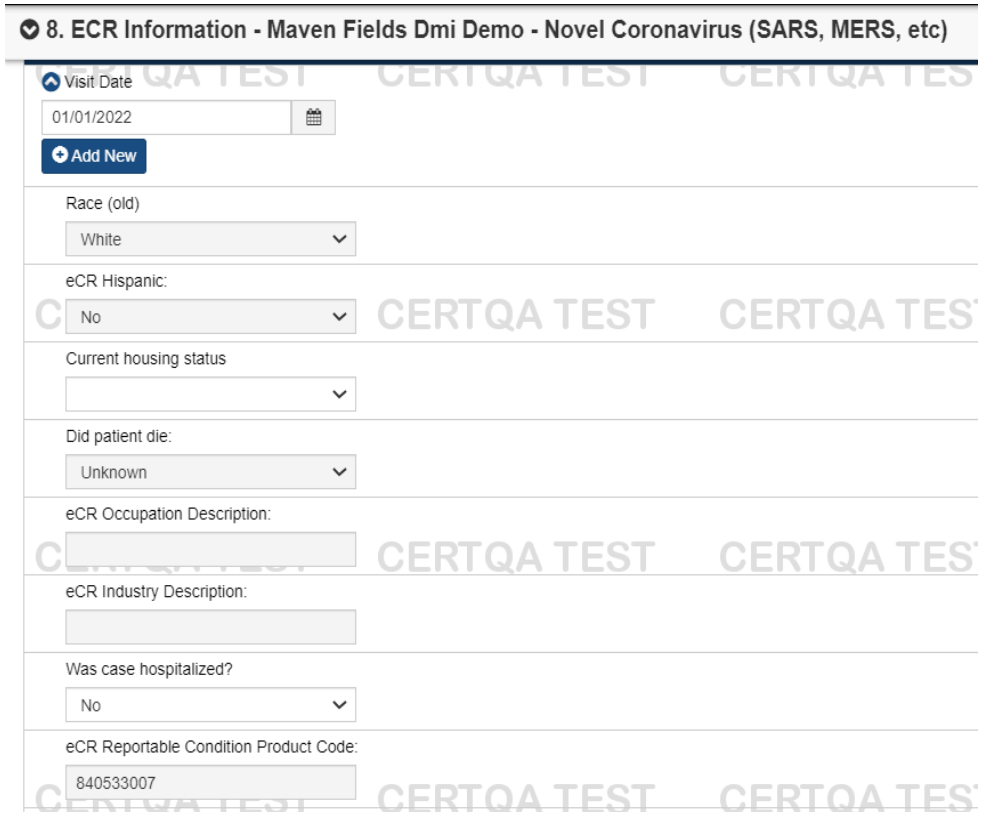


MAVEN Integration Format

- Processed data are transformed to MAVEN's native MIF (XML) format
  - Allows more precise information for MAVEN to create/append cases
  - Control over iterations allows repeatable blocks to be preserved, even if some elements are missing from individual blocks
- Coded values validated against MAVEN reference code tables

```
<RiskDataDefinition Iteration="0" QuestionID="EICR_RACE" Value="WHITE"/>
<RiskDataDefinition Iteration="0" QuestionID="EICR_HISPANIC" Value="NO"/>
<RiskDataDefinition Iteration="0" QuestionID="REPORTING_SOURCE" Value="EMR"/>
<RiskDataDefinition Iteration="0" QuestionID="REPORTING_SOURCE_DATE" Value="05/11/2022"/>
<RiskDataDefinition Iteration="0" QuestionID="EICR_VISIT_DATE" Value="01/01/2022"/>
<RiskDataDefinition Iteration="0" QuestionID="EICR_DIAGNOSIS_DESCRIPTION" Value="Shortness of breath"/>
<RiskDataDefinition Iteration="0" QuestionID="EICR_DIAGNOSIS_CODE" Value="267036007"/>
<RiskDataDefinition Iteration="0" QuestionID="EICR_DIAGNOSIS_DATE" Value="01/01/2022"/>
<RiskDataDefinition Iteration="0" QuestionID="EICR_SYMPTOM_DESCRIPTION" Value="Difficulty Breathing"/>
<RiskDataDefinition Iteration="0" QuestionID="EICR_SYMPTOM_CODE" Value="230145002"/>
<RiskDataDefinition Iteration="0" QuestionID="EICR_SYMPTOM_DATE" Value="11/04/2021"/>
```

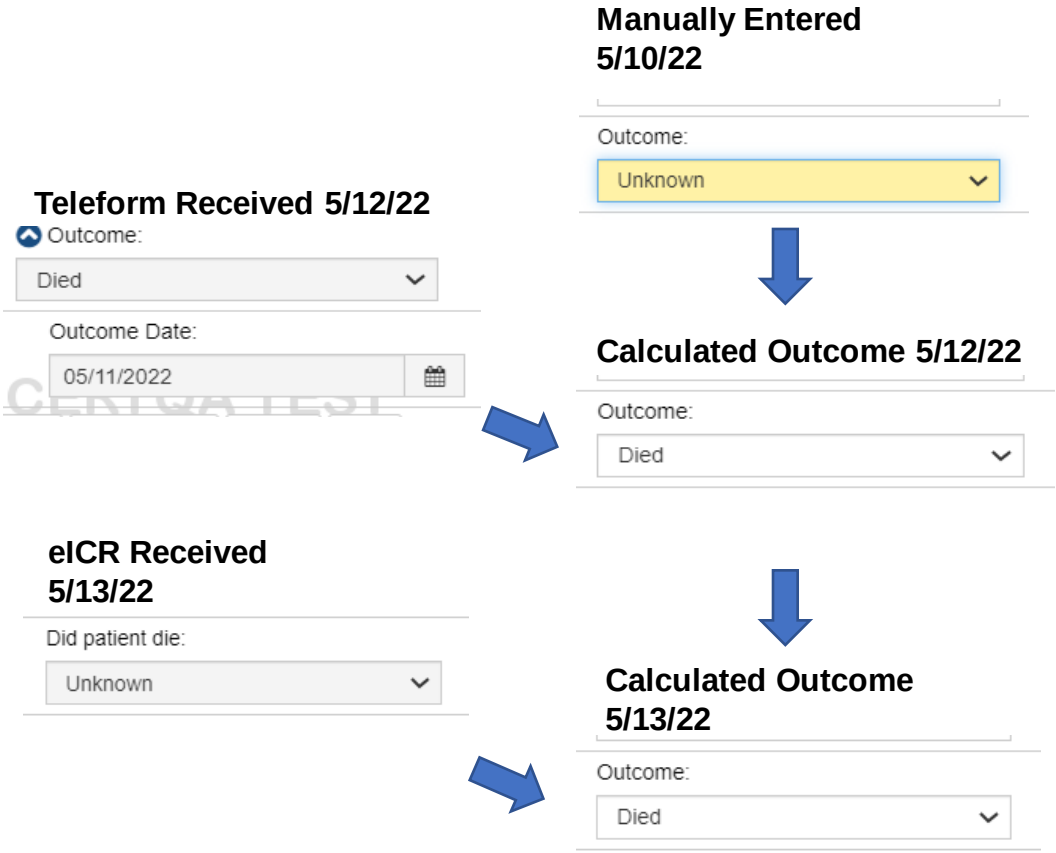
MAVEN Integration



- Data collected in source-specific fields to prevent overwriting
- Repeatable elements add iterations
  - *Work in Progress: Removing duplicate repeatable blocks*

MAVEN Integration

- Efforts to integrate eCR data into standard question packages underway
  - *Work in Progress: Establishing additional logic to combine data sources*
- Integrated data can contribute to automated MAVEN functionality (workflows, reports)



Challenges During Development

- Labor intensive mapping as providers are onboarded
- Large variations in location and format of information in EMR/eCR, sometimes requiring major revision and IT intervention
- Treating laboratory information as different from ELR

In Conclusion…

- Massachusetts' eCR interface provides a flexible, configurable platform for eCR CDA consumption and transformation
  - Portal provides simple, condition-specific customization at multiple points in the data flow, allowing the system to easily accommodate quick changes
  - Interface is accessible and to multiple users, facilitating daily QA and ongoing maintenance
  - MIF output provides control over data import and integration into MAVEN to provide meaningful, actionable data for programs

- Portal has potential for use by other jurisdictions
  - Configurable settings allow processing to be easily adapted to additional jurisdictions/surveillance systems
    - Customized output requires vendor support to establish message structure and data elements
  - Surveillance systems may require changes to retrieve and consume messages

Connect with DPH

@MassDPH

Massachusetts Department of Public Health

DPH blog
https://blog.mass.gov/publichealth

www.mass.gov/dph

150 YEARS OF ADVANCING PUBLIC HEALTH

Thank You!

Molly Crockett

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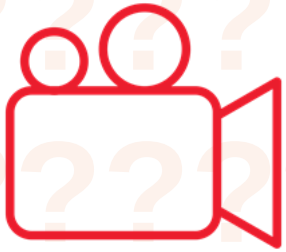
Tara Fleckner

Tara.Fleckner@mass.gov

Questions and answer

Post in the chat

Raise your hand



Turn on your video

Next Steps

- Post additional questions on Circle - link provided in the chat
- Common grounds networking break 1:40-1:55 PM EST
- Next session 1:55 PM EST
  - *Workshop reflections*

Thank you.

DMI

Better data. Better decisions. Better health.