THE OHIO STATE UNIVERSITY

Frontiers in evidence-based policy making: COVID-19 and Schools

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Presentation to Evidence-Based Policy for Agricultural and Applied Economists Workshop

October 1, 2021

Agenda

1. What data linkage means to me?
2. Use Case: The CATS project
3. Technical and non-technical details of data linkage in CATS
4. Parting thoughts

What does "data linkage" mean to me and the activities in my research group?

Linking data from diverse stakeholders to help them make sense of their linked data for better decisions and societal impact.

Linked data → **Linked decisions** → **Linked impact**

Diverse stakeholders

School superintendents, school nurses, parents, students, teachers, unions, public health departments, medical advisory board members, and more

Decisions

- ☑ Online, remote or hybrid?
- ☑ Targeted school closures? Which ones, when and how long?
- ☑ Equity considerations?
- ☑ Masks in schools? All grades or some only? Sports? Plays? Other activities?

Impact

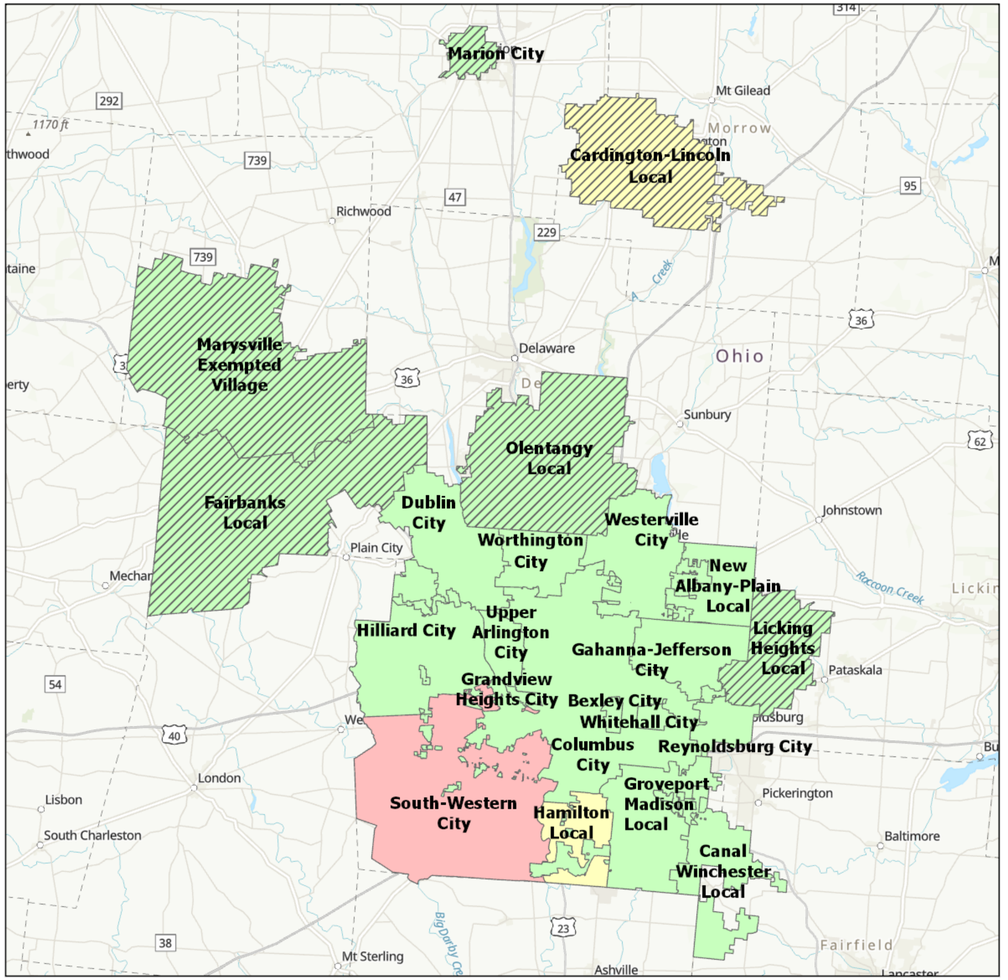
- Social and emotional learning
- Mental and physical health
- Academic performance
- Household impact on jobs, childcare, and nutrition
- Threats against public health and school officials
- Legislated shackling of public health

Use Case:

COVID-19 Analytics and Targeted Surveillance System for School Districts (CATS)

Partners

Franklin County Public Health
Columbus Public Health
Resolve to Save Lives
Educational Service Center of Central Ohio
School Districts (21)



CATS Status
- Live
- Not Participating
- Upcoming
- Not in Franklin County

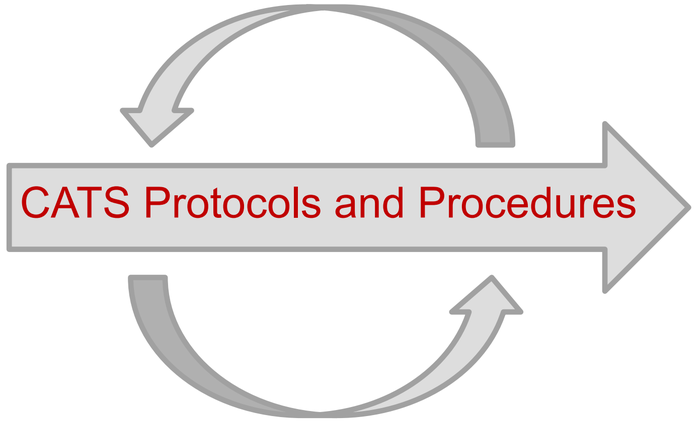
Project Objectives

1. To inform school leaders about emerging trends in COVID-19 cases in their school district, surrounding districts, and county.

2. To inform students and parents about rationale for changing learning strategies during the school year (e.g., online, hybrid, or fully in-person).

Syndromic Surveillance ≠ Outbreak Investigation/Response

- OSU Program Manager
- School District Lead
- Public Health Lead



Lead Time
(1-2 weeks)

Determining thresholds for most advantageous lead time:

- Appropriate for level of resources
- Sensitive enough to identify suspected cases/outbreaks
- Specific enough to not waste resources or cause alarm

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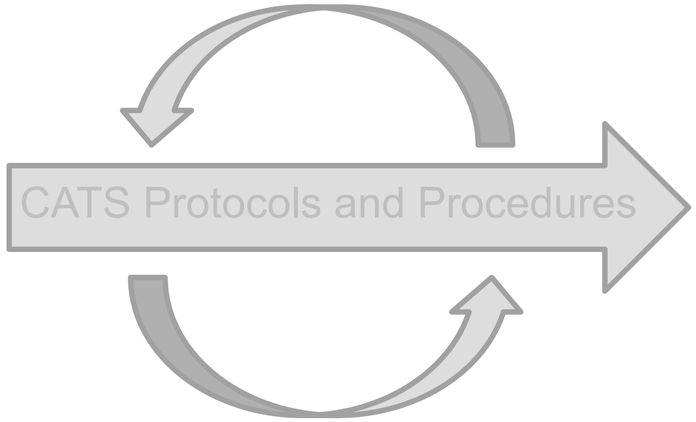


Lead Time
(1-2 weeks)

- School District Lead
- Public Health Lead

School-based Response Community Response

- Daily self-monitoring
- Managing self-identified exposed individuals within school community
- Planning for suspected cases
- **Reporting positive cases**

- Case investigation
- Contact tracing
- Mitigation of spread

Determining thresholds for most advantageous lead time:

- Appropriate for level of resources
- Sensitive enough to identify suspected cases/outbreaks
- Specific enough to not waste resources or cause alarm

Types of Data

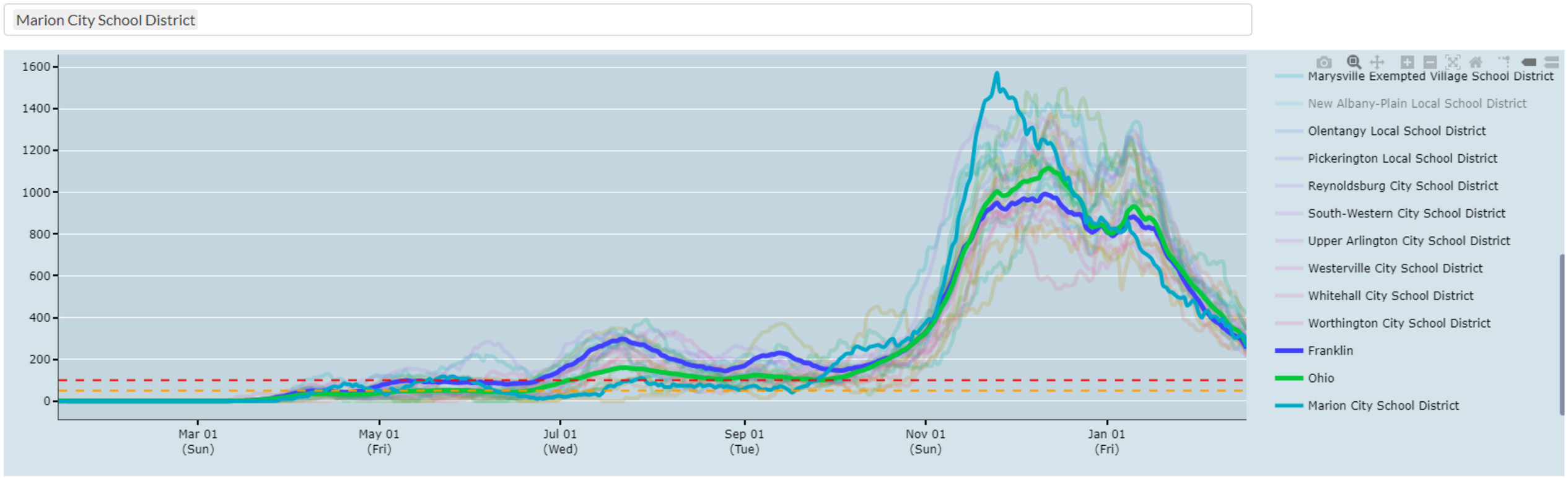
Indicator	Geography	Source
COVID-19 case counts and rates • By age	Franklin County, District Attendance Zone, Building Attendance Zone, Census Tracts	Ohio Disease Reporting System at Ohio Department of Health (ODH)
COVID-19 vaccination uptake data • By age • By race	Franklin County, District Attendance Zone, Building Attendance Zone, Census Tracts	ImpactSIIS at ODH
Student absences due to illness and %	District, Building/Grade/Cohort	
Student nurse visits for influenza-like or COVID-19-like illness (ILI/CLI) and rate	District, Building/Grade/Cohort	Schools/Information Technology Centers/Google Sheets
Staff absences due to illness and %	District, Building/Grade/Cohort	

CATS Data Products and Engagement

- **For school districts and local health departments**
  - Secure data dashboard for high spatial and temporal resolution data with integrated surveillance and monitoring
  - Additional analyses of interest (e.g., disparities, learning mode, quarantining days by district)
  - Mitigation strategies survey
  - Biweekly all districts surveillance teams meetings with LHDs
  - Biweekly CATS-LHDs check-ins
- **For superintendents**
  - Weekly data briefing slides
  - Weekly COVID-19 calls hosted by ESCCO and partner superintendents (only for 2020-2021 school year)
  - Ad hoc analyses requested by superintendents and district medical advisory boards
- **For parents, students, and general public**
  - Public data dashboard
  - Weekly all districts case rates report

Graphics/visualization/data removed due to data privacy issues.

What do case rates and counts look like in other districts throughout Ohio, in Franklin County, and within district attendance zone census tracts?



How do case rates in our district attendance zone compare to that of others?

WHat Information helpS mitigate risK insidE ouR Schools (WHISKERS): Indicators Table
Last Updated: February 17, 2021

- Current 7 Days: Feb 06 -- Feb 12
- Current 14 Days: Jan 30 -- Feb 12
- Past 7 Days: Jan 30 -- Feb 05
- Past 14 Days: Jan 23 -- Feb 05

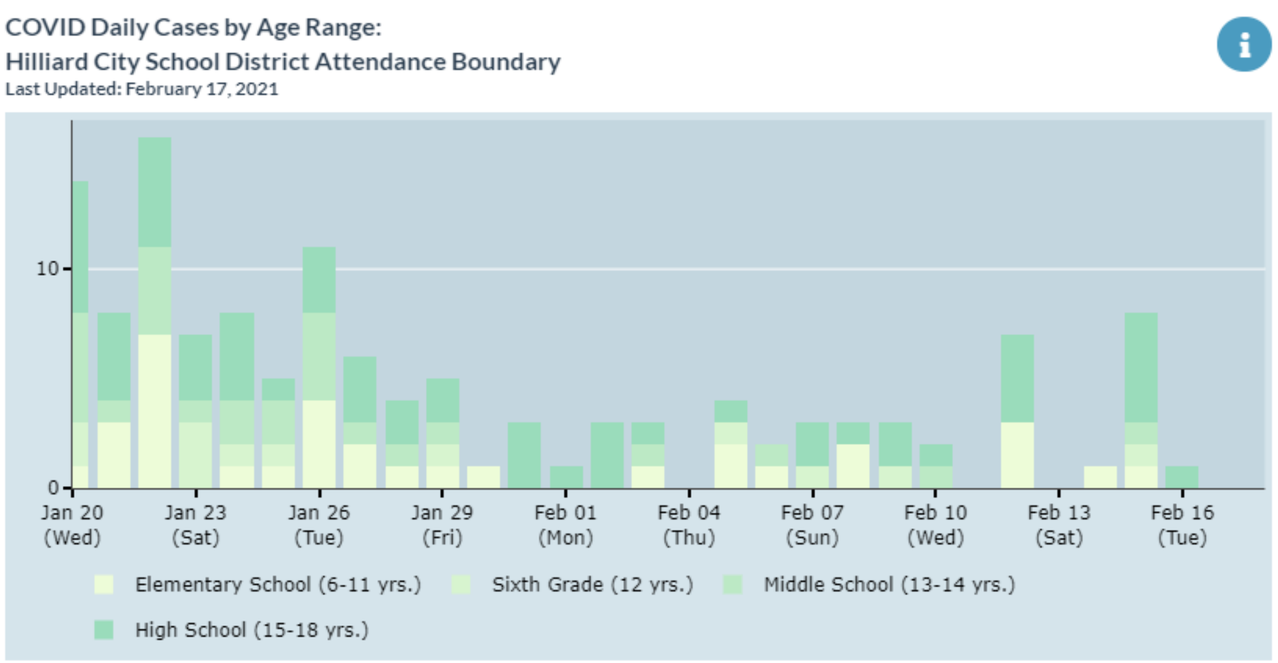
Indicator	Past Value	Current Value	Difference	Threshold*	Condition based on Threshold
Franklin County COVID-19 Cases per 100,000 (7 Days)	176.22	145.39	-30.83	Based on CDC guidelines**	High Transmission
Franklin County COVID-19 Cases per 100,000 (14 Days)	402.43	321.61	-80.82	Current Value > 100	Exceeded
Attendance Zone COVID-19 Cases per 100,000 (7 Days)	153.01	154.07	+1.06	Based on CDC guidelines**	High Transmission
Attendance Zone COVID-19 Cases per 100,000 (14 Days)	447.44	307.09	-140.35	Current Value > 100	Exceeded
Daily Proportion of Cases among School-Aged Individuals (%, 14-Day Moving Average)	13.66	12.43	-1.23	Difference > 10	Not Exceeded
Daily Student Absences (%, 14-Day Moving Average without Weekend)	5.58	2.84	-2.73	Current Value > 15	Not Exceeded
Daily Staff Absences (%, 14-Day Moving Average without Weekend)	2.46	1.81	-0.65	Current Value > 5	Not Exceeded
Daily Nurse Visits per 1,000 Students (14-Day Moving Average without Weekend)	1.54	0.51	-1.04	Current Value > 5	Not Exceeded

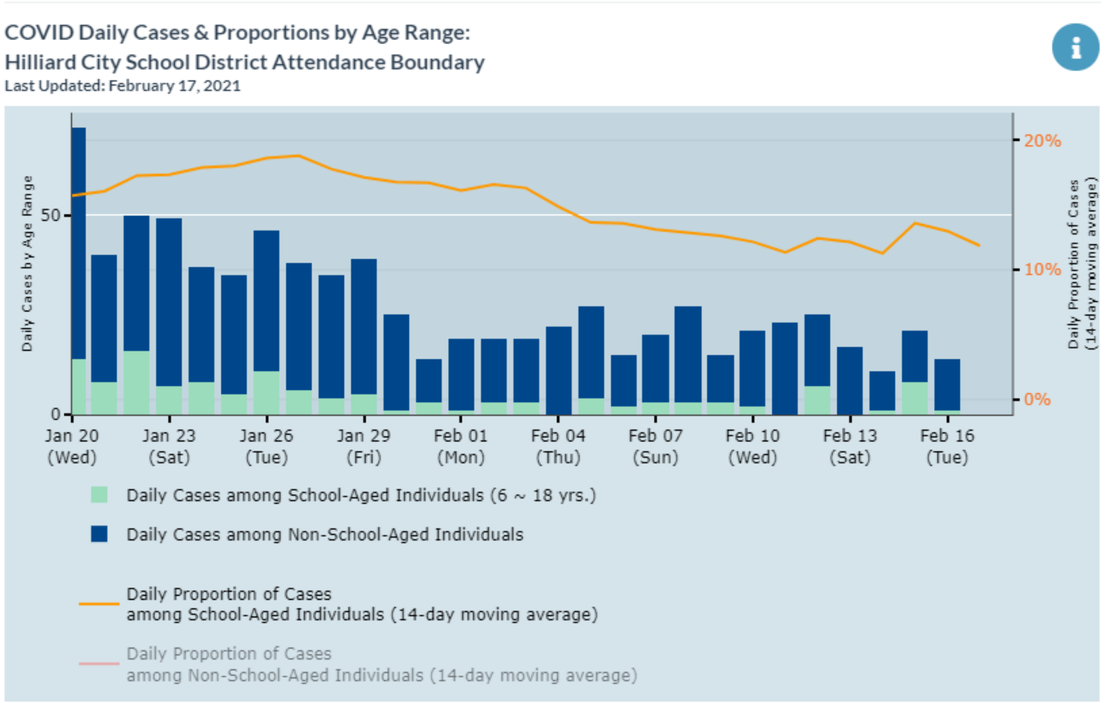
Threshold configurations are approved by school districts or set by CATS team based on historical data. If you have any questions, please contact CATS team to adjust threshold configurations.

Copy Download

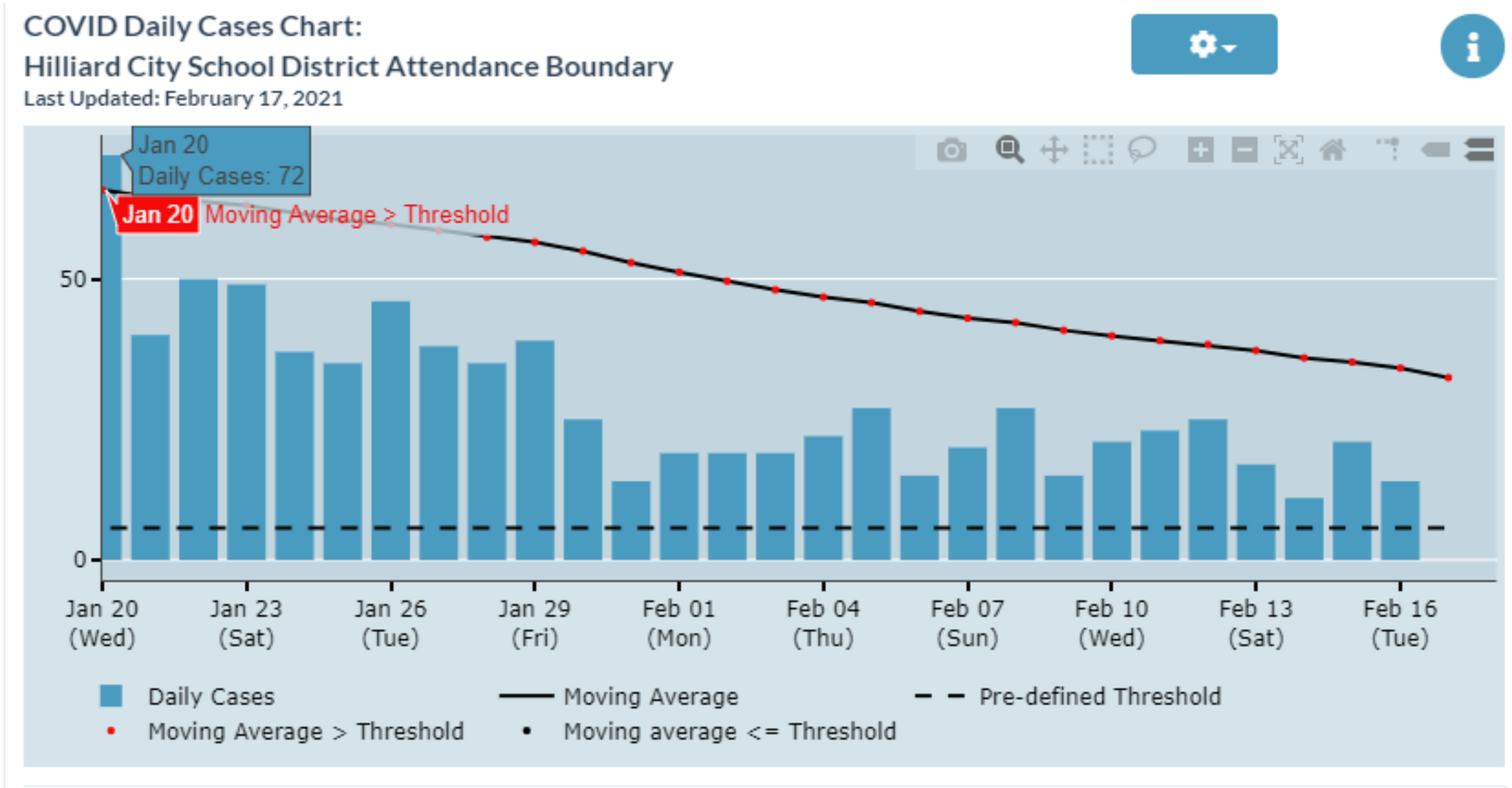
***Current transmission level is based on CDC's new indicators and thresholds for community transmission of COVID-19:*
Low Transmission (0-9); Moderate Transmission (10-49); Substantial Transmission (50-99); High Transmission (>=100)

What is the overall picture of syndromic/early warning indicators in our district and how have they changed over time?

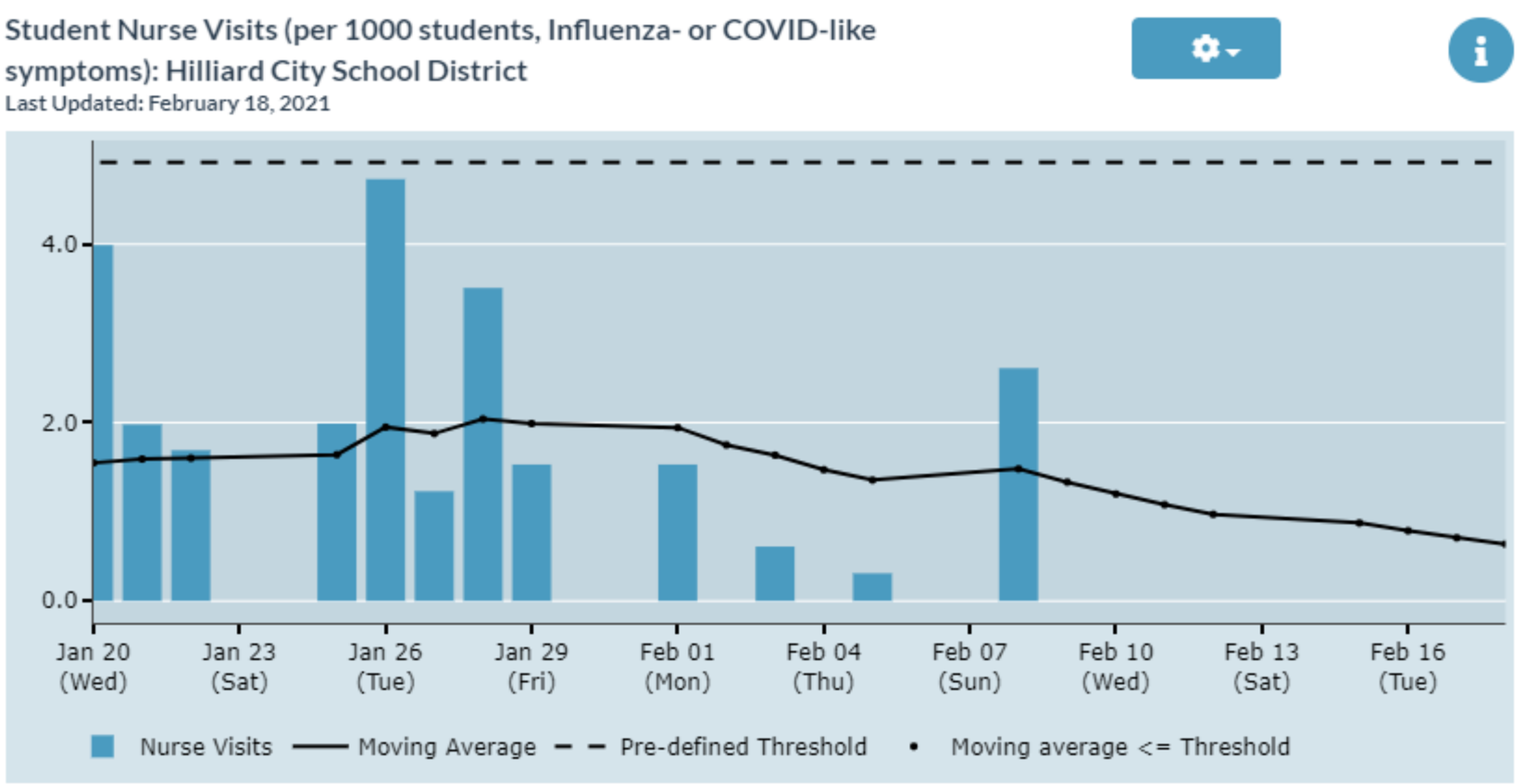




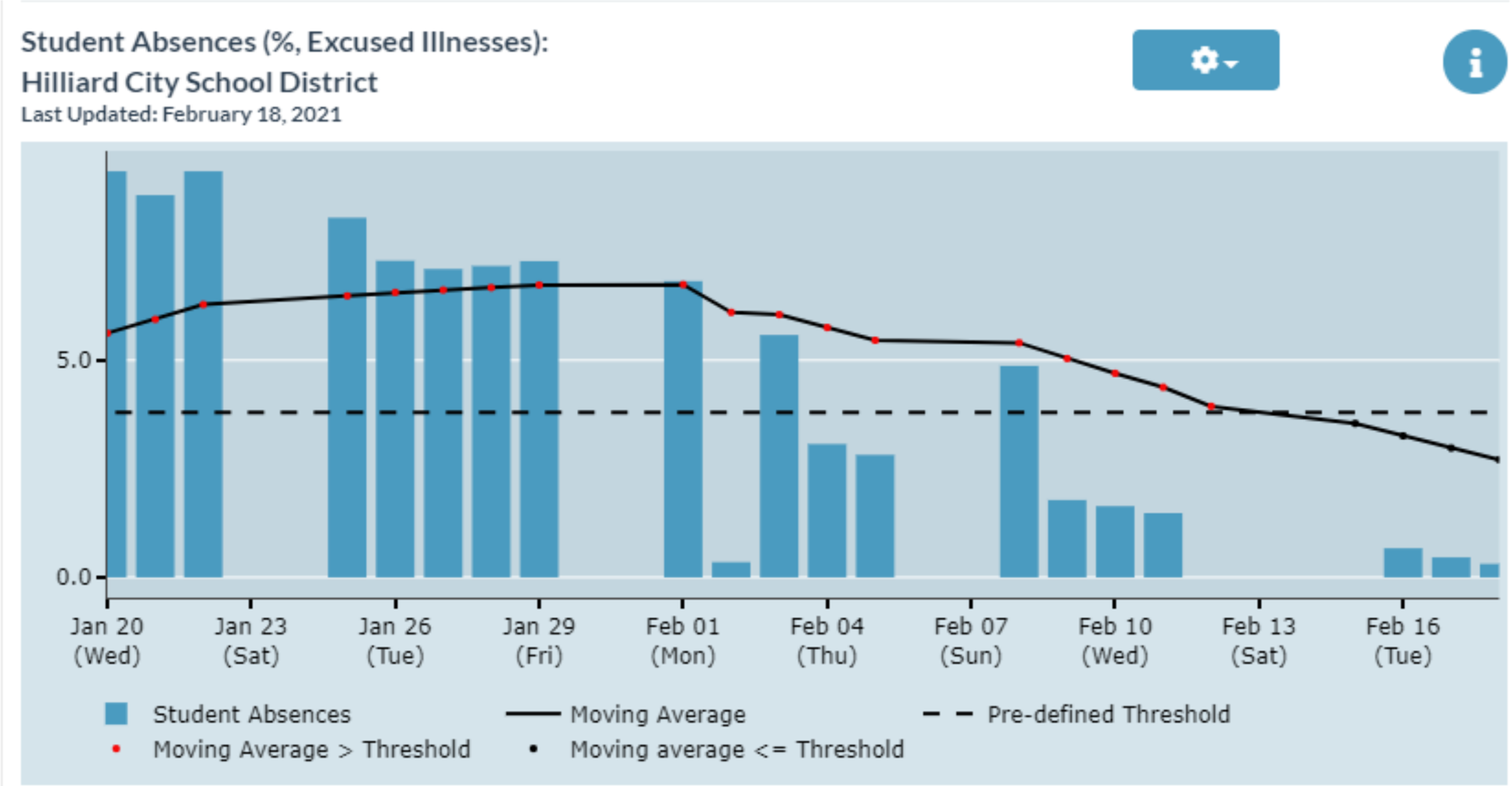
Daily Cases- Age Distribution



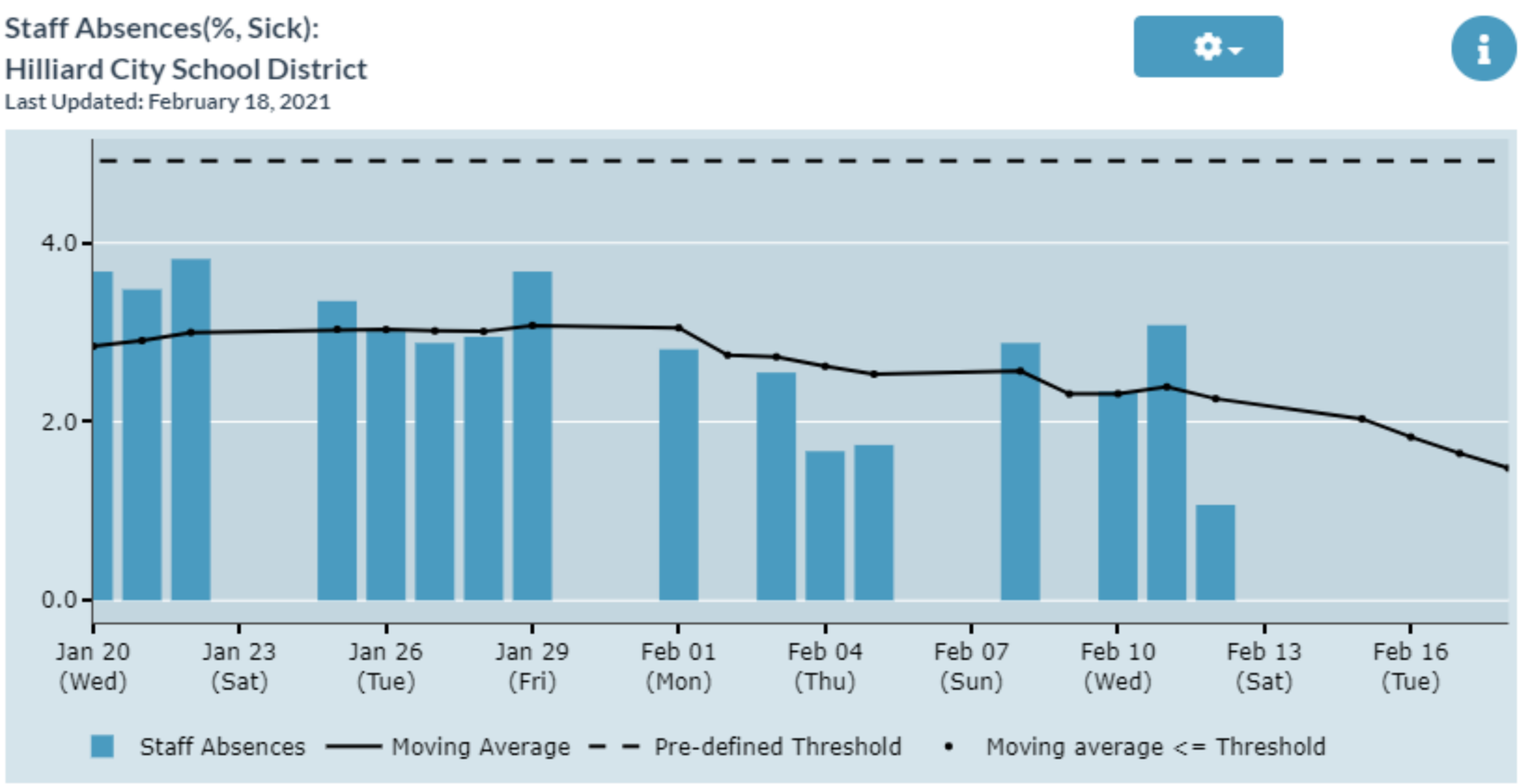
Daily Cases- Count



Daily Nurse Visits for ILI/CLI Symptoms-
Rate per 1,000 Students



Daily Student Absences Due to Excused Illness- Percent

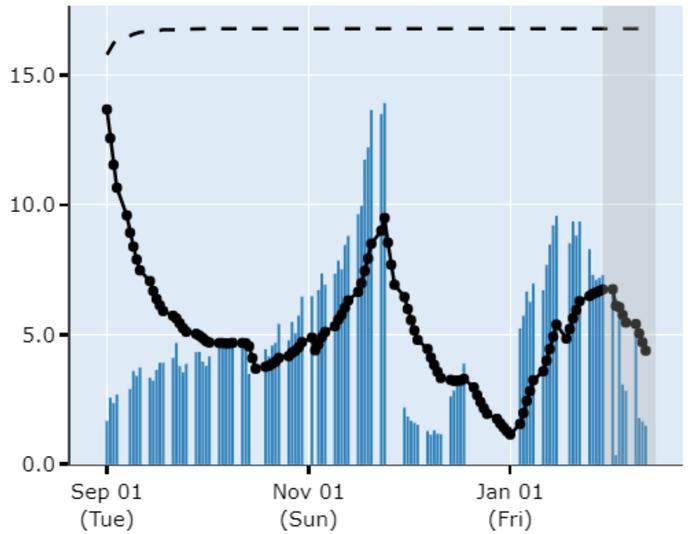


Daily Staff Absences Due to Illness- Percent

School District Data

Student Absences (%, Excused Illnesses)*

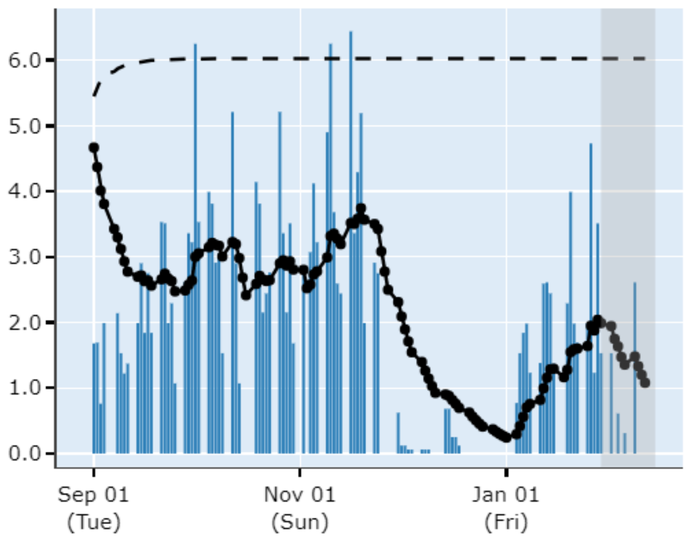
*Preliminary data



Student Absences
Normality (due to value < pre-defined threshold (dashed line))

Student Nurse Visits (per 1000 students, Influenza- or COVID-like symptoms)*

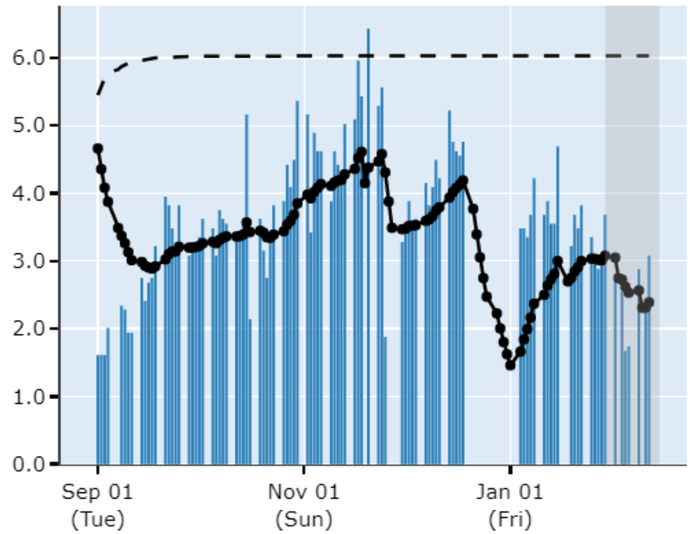
*Preliminary data



Nurse Visits
Normality (due to value < pre-defined threshold (dashed line))

Staff Absences(%, Sick)*

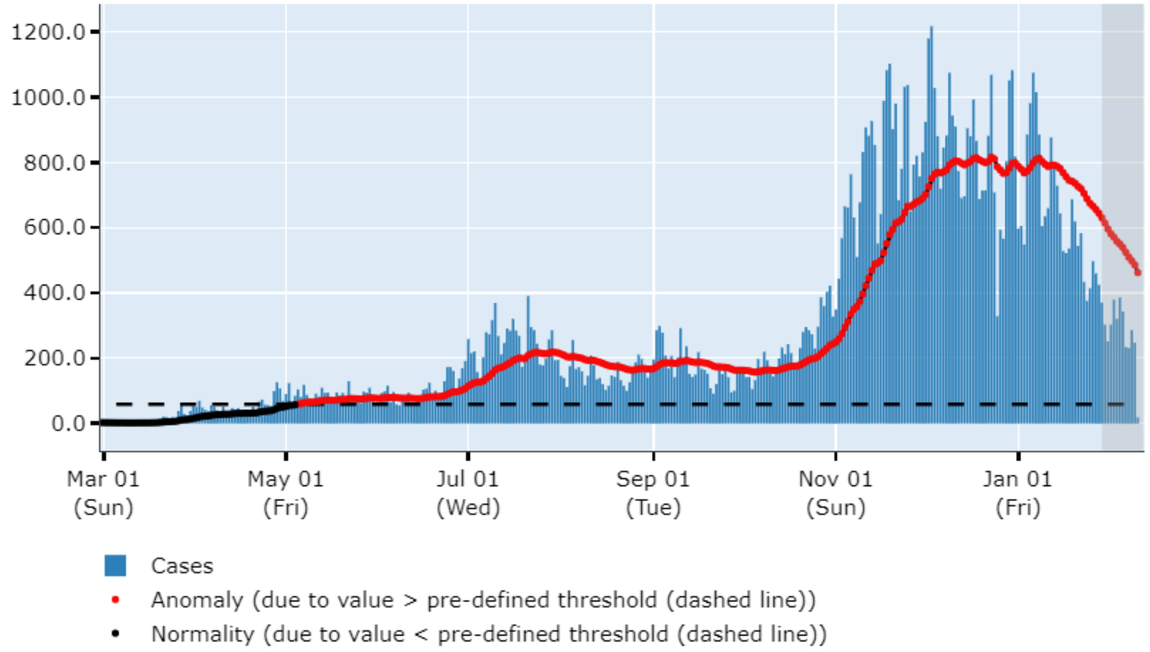
*Preliminary data



Staff Absences
Normality (due to value < pre-defined threshold (dashed line))

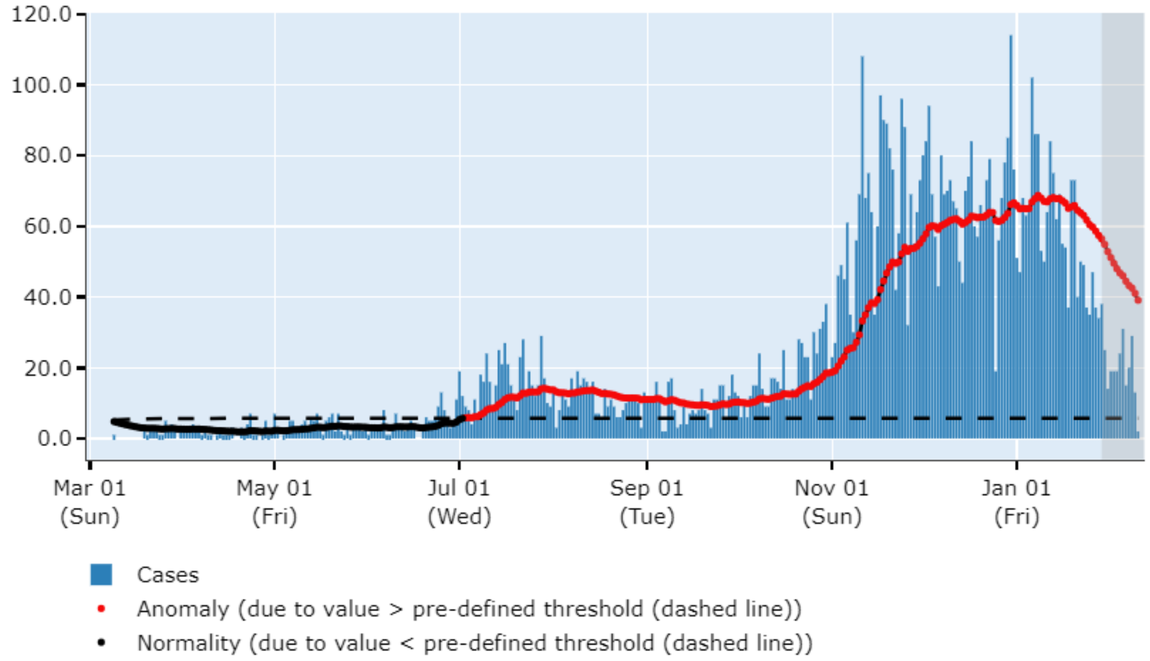
COVID Daily Cases Chart: Franklin County

*Preliminary data



COVID Daily Cases Chart Hilliard City School District Attendance Boundary

*Preliminary data



This is a rate. Rates allow for comparison between geographies with different population size.
This is NOT the number of cases in the district or the county.

Hilliard City School District:

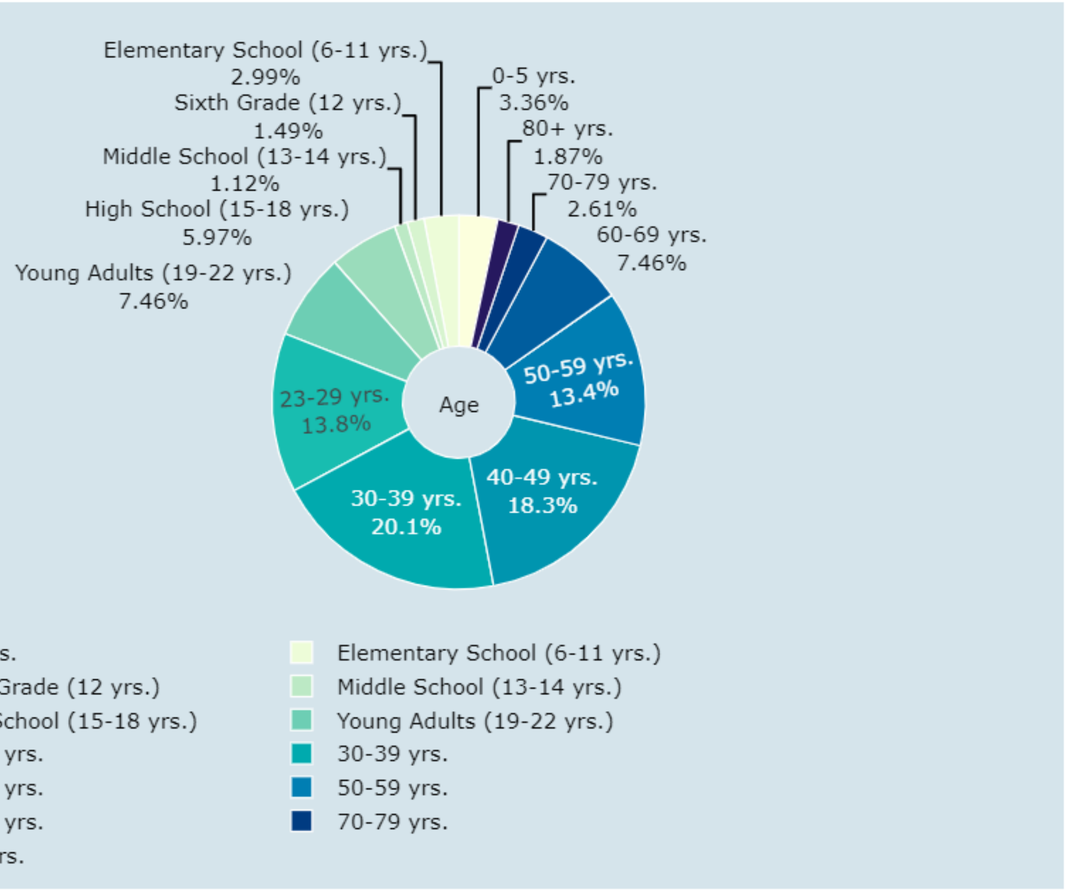
283 cases per 100,000 people based on last two weeks of data for the **POPULATION RESIDING WITHIN THE SCHOOL DISTRICT ATTENDANCE ZONE.**

Franklin County:

280 cases per 100,000 people for the same time period for Franklin as a whole community.

Age Distribution (based on last two weeks of COVID-19 case data)

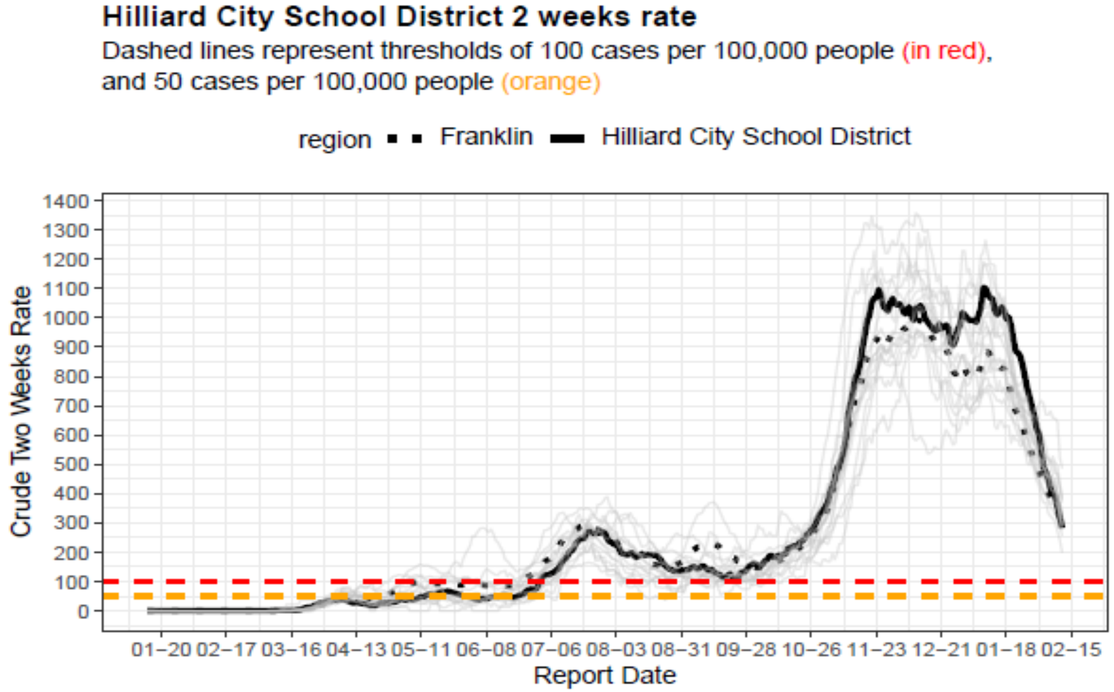
*Preliminary data. This reflects cases residing in the Hilliard City School District attendance zone who may or may not attend school in the district.



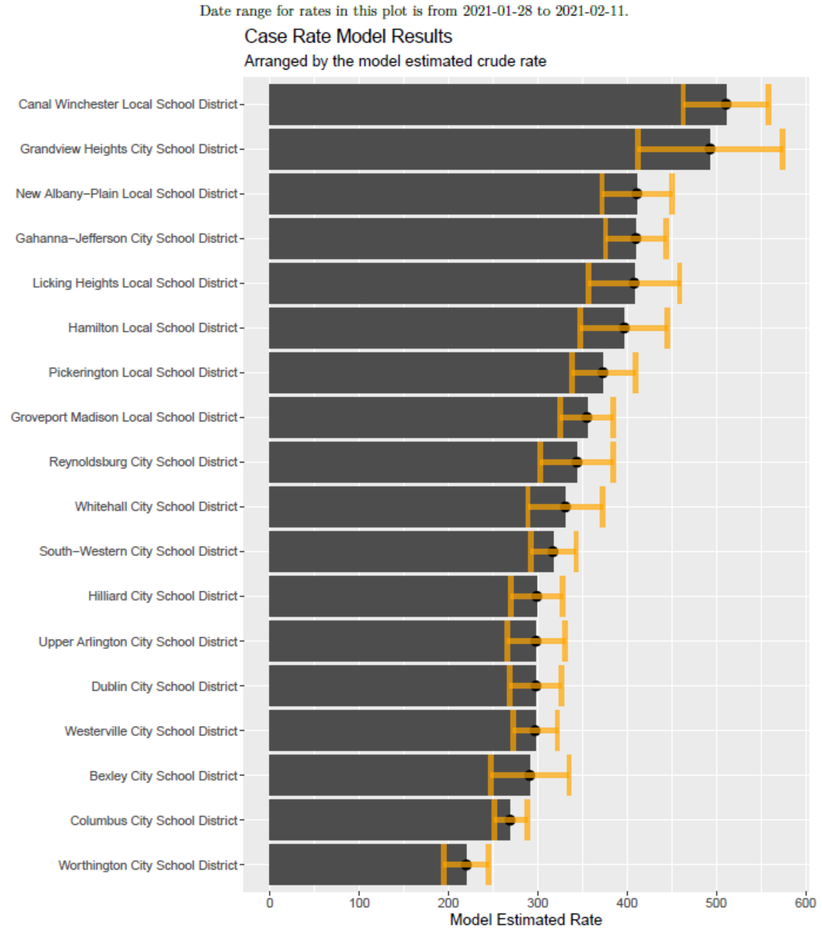
Date range for rates in this table is from 2021-01-28 to 2021-02-11.

Two Week Rate per 100,000

District	Crude Rate	Model Estimates	
	Crude Rate	Model Estimated Rate	Model Estimated Interval
Bexley City School District	276	291	(247, 335)
Canal Winchester Local School District	489	511	(463, 558)
Columbus City School District	256	269	(251, 288)
Dublin City School District	293	298	(269, 327)
Gahanna-Jefferson City School District	379	410	(376, 444)
Grandview Heights City School District	486	493	(412, 574)
Groveport Madison Local School District	328	355	(325, 385)
Hamilton Local School District	370	397	(348, 445)
Hilliard City School District	283	299	(270, 328)



Date range for rates in this plot is from 2021-01-28 to 2021-02-11.



CATS Briefing for Franklin County School Districts

Main takeaways for September 29, 2021

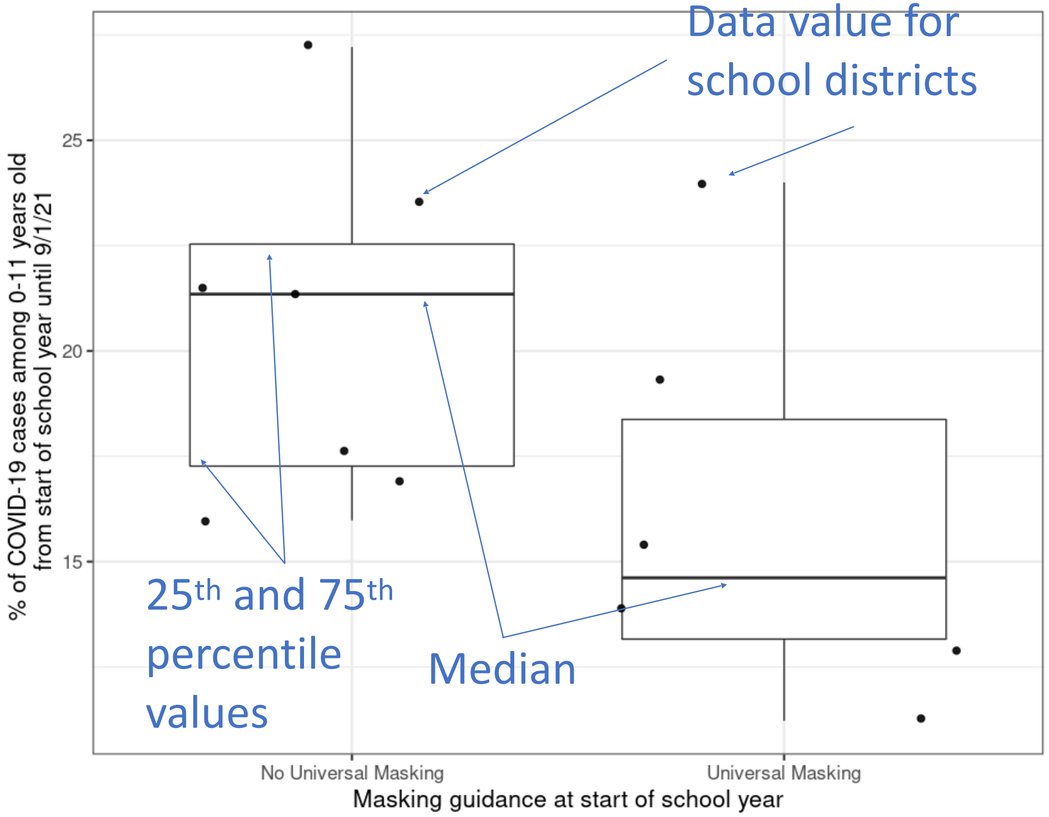
- School districts that required universal masking **at start of the school year continue to have a lower proportion of COVID-19 cases among 0-11 years old** compared to school districts that did not require universal masking at start of the school year.

- Majority of districts have high but decreasing case rates but there are some districts with high and increasing case rates, which may be associated with lack of masking in all grades and lack of indoor masking requirement in public settings outside of school setting.

- **Keeping mitigation strategies in place in schools and cities** (e.g., indoor mask requirement) will likely contributing to declining trends in cases among school-aged children.

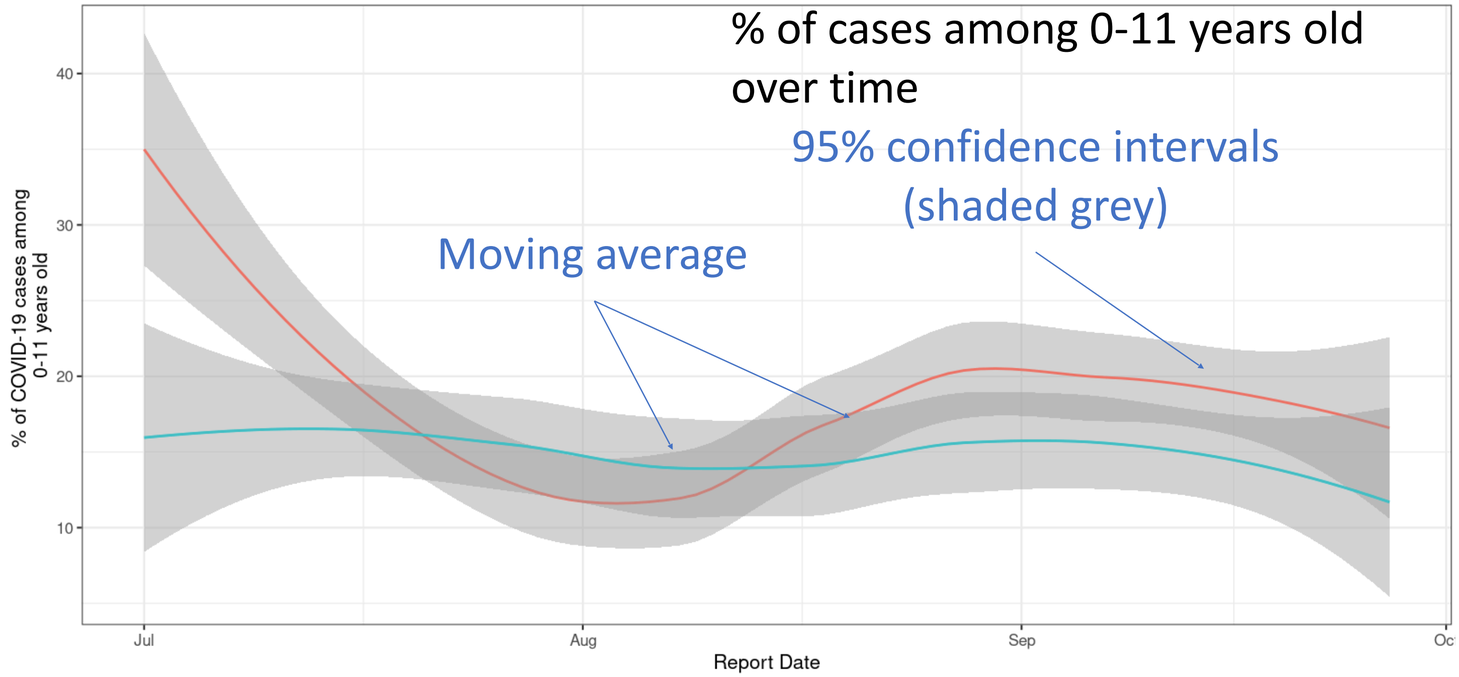
Impact of masking requirements on proportion on cases among unvaccinated school-aged children

% of cases among 0-11 years old from start of school year until 9/1/21

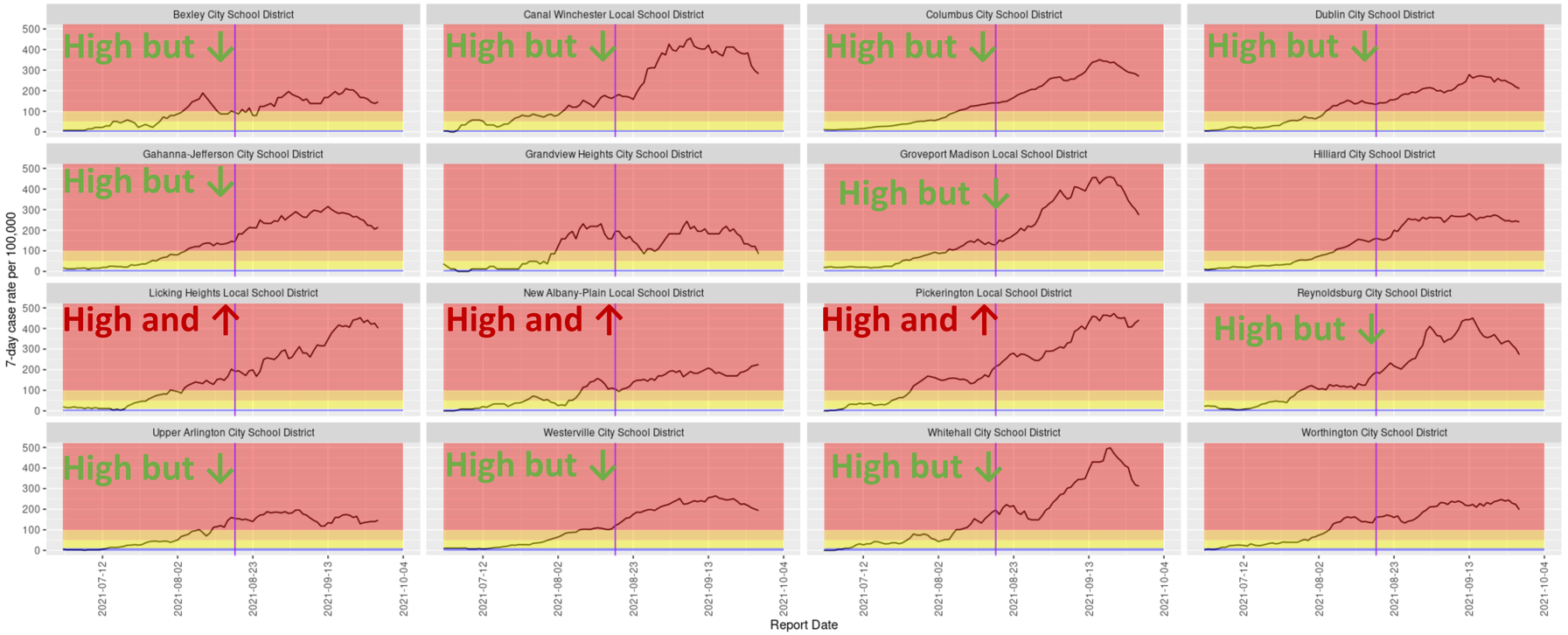


Universal Masking means all students in all grades were required to wear a mask at start of school year

No Universal Masking means that some (e.g., K-6) but not all students were required to wear a mask at start of school year



7-day rates by school district with color-coded regions for community transmission levels (July 1, 2021 to present)



Low Transmission[1] Blue	Moderate Transmission Yellow	Substantial Transmission Orange	High Transmission Red

Patterns:

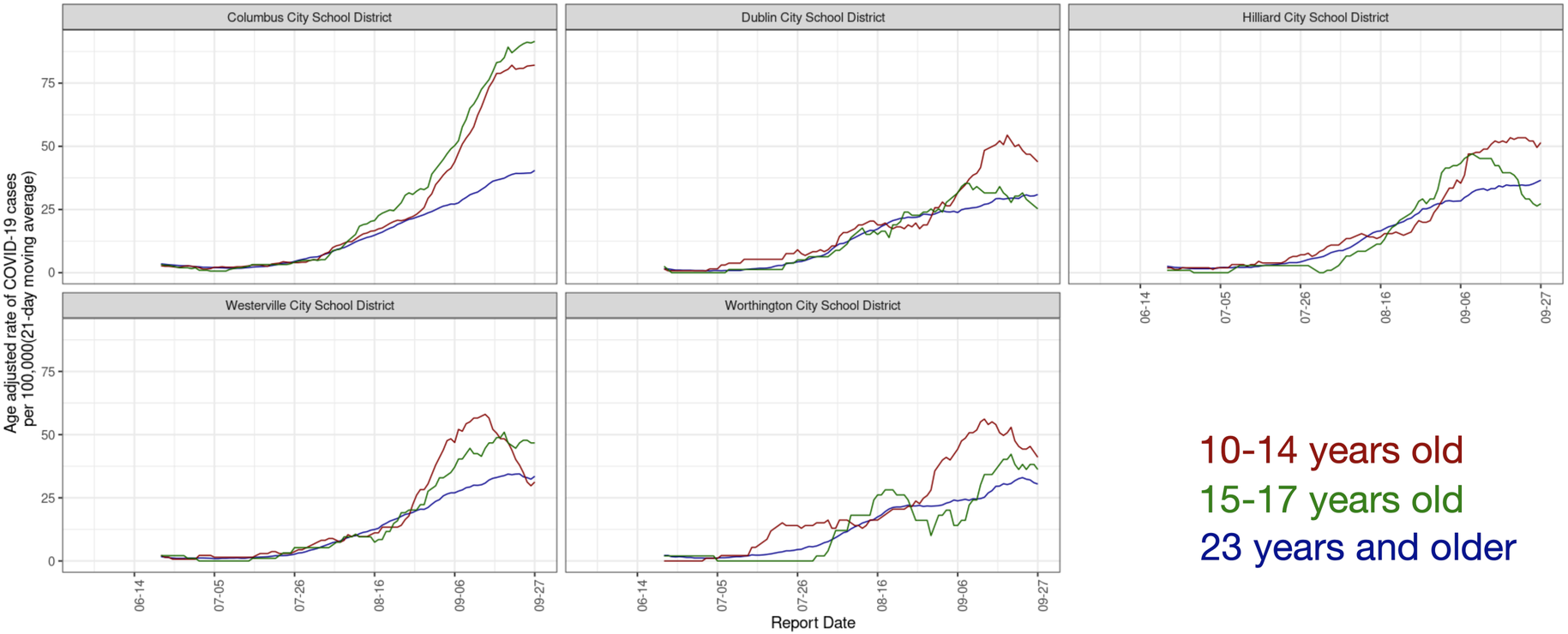
1. Rates per 100,000 remains high in all school districts.
2. High and increasing rates in some school districts (Licking Heights, Hilliard, New Albany-Plain, Pickerington)
3. High but decreasing rates in some school districts (see graph)

Interpretation: Epidemiology of Delta variant, different masking guidance between districts at start of school year and limited mitigation strategies in the community are some of the factors for the rapid rise of cases across all areas of Columbus and Franklin County.

Recommendations:

1. Follow CDC and local public health department guidance, including mask advisory, for school settings.
2. Continue to encourage multiple mitigation strategies outside of school in the community.

Age-standardize rates among large school districts in Franklin County



10-14 years old
15-17 years old
23 years and older

Observed patterns:

1. Rates among 10-17 years old among most districts remain high but are declining or stabilizing over the past week.

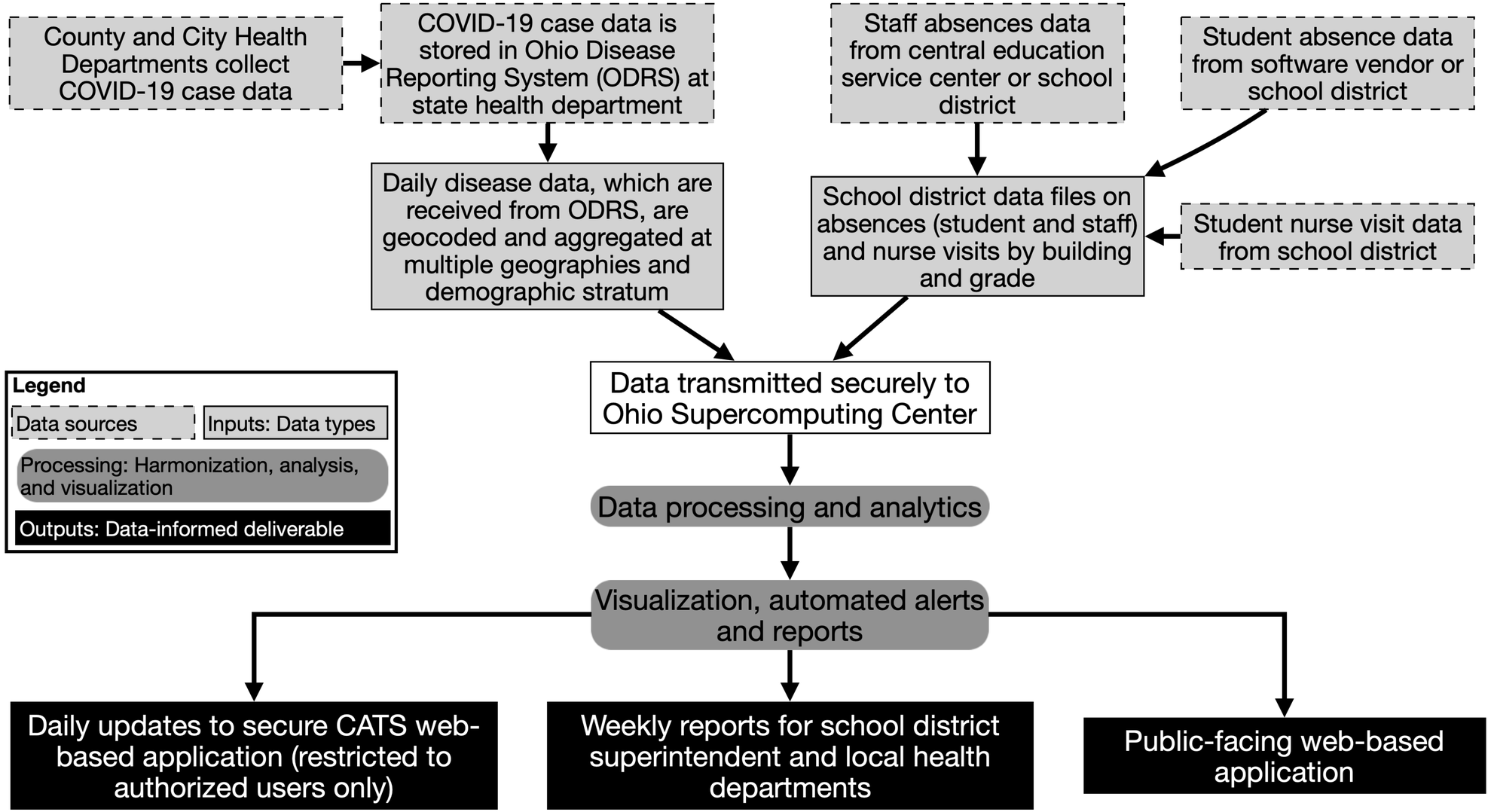
Interpretation: Epidemiology of Delta variant, different masking guidance and limited mitigation strategies in the community are factors in the rapid rise of cases across all areas of Columbus and Franklin County.

Practical recommendations:

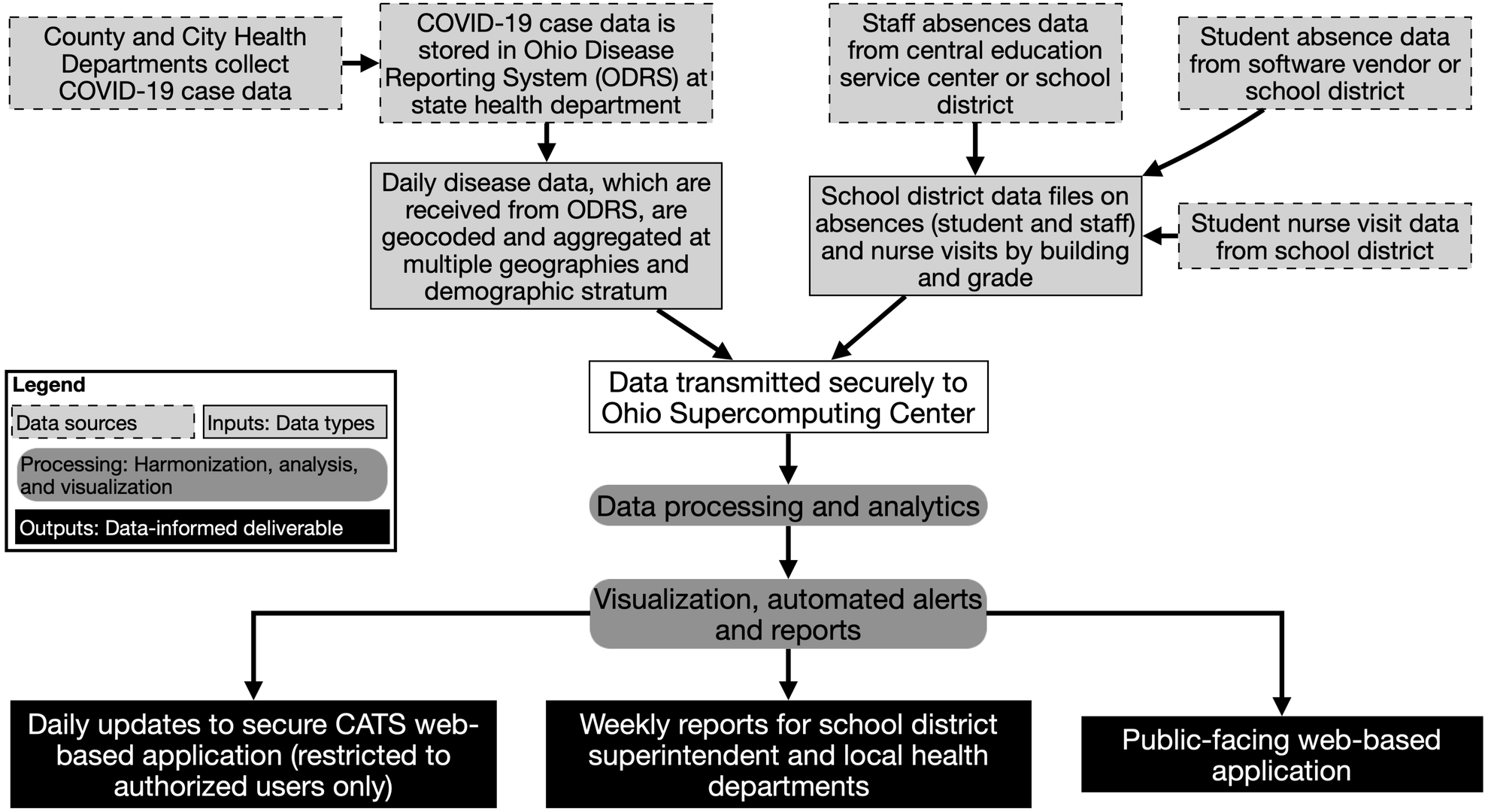
1. Follow CDC guidelines on **<u>mitigation strategies, especially in sports and extracurricular activities involving unvaccinated individuals and 10-17 years old.</u>**
2. **<u>Keeping mitigation strategies in place in schools and cities</u>** (e.g., indoor mask requirement) will likely contributing to declining trends in cases among school-aged children.

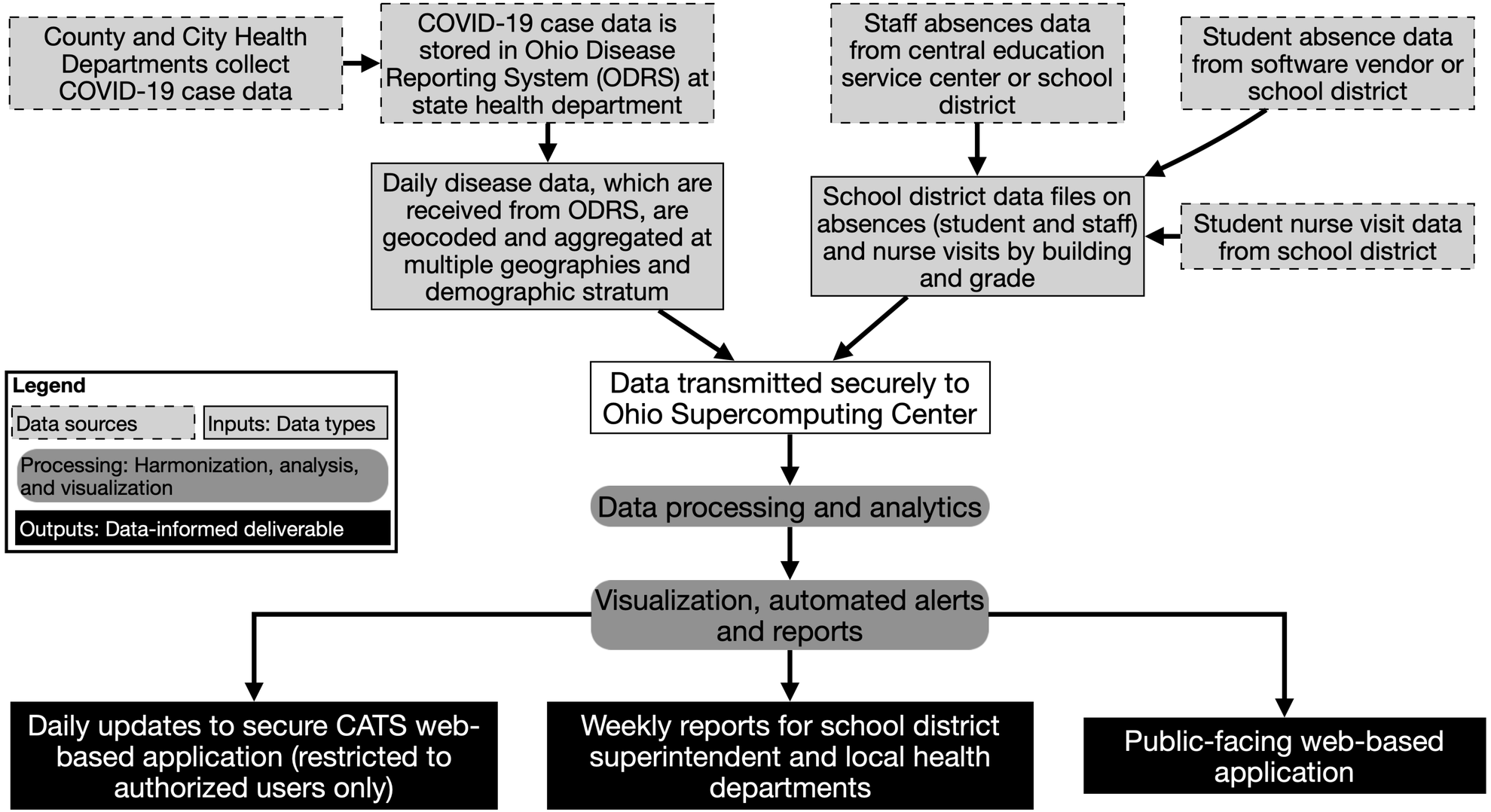
Technical and non-technical details of data linkage in CATS

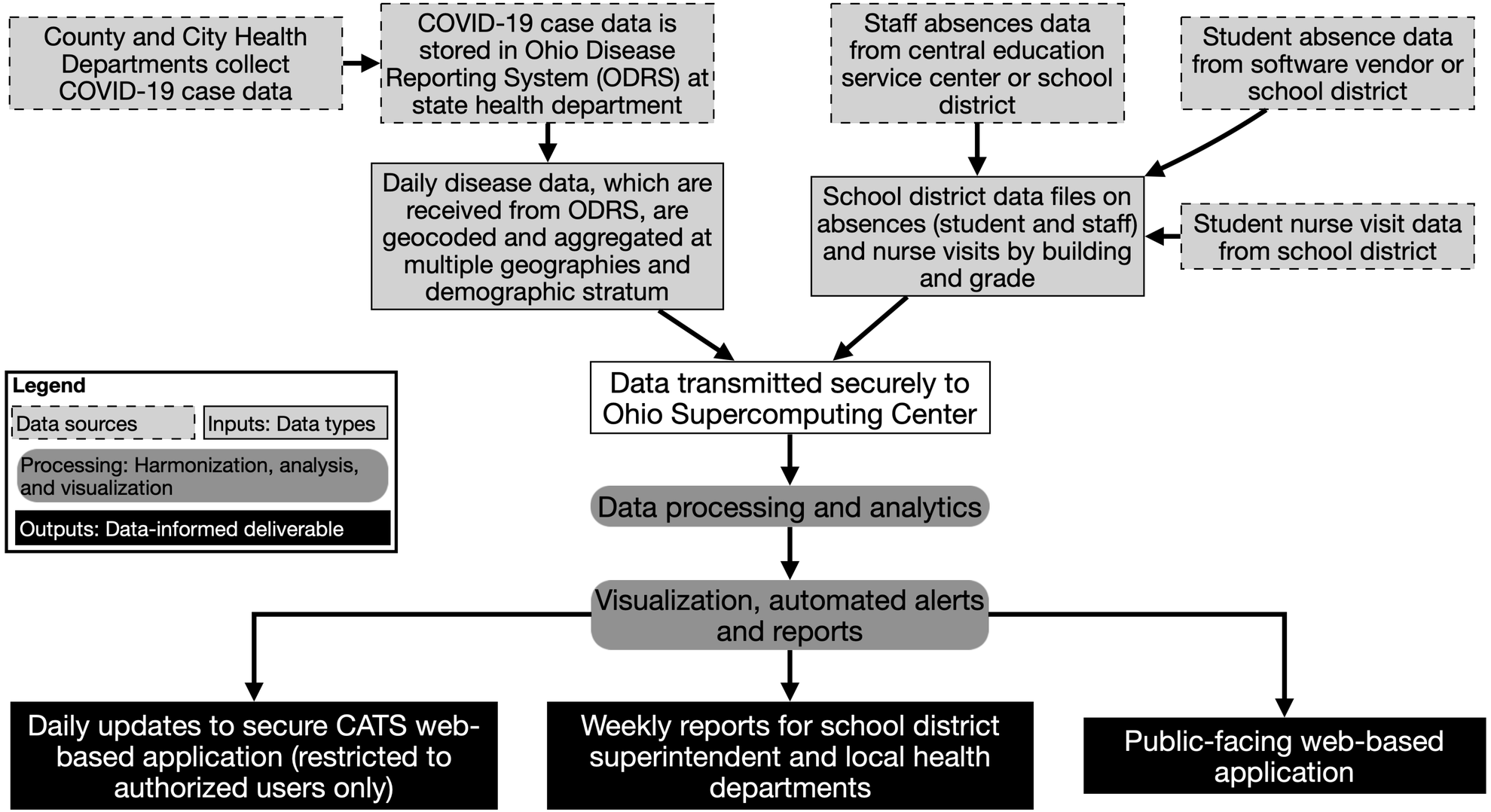
Linking Data - Overview



Linking Data - Technical Details




County and City Health Departments collect COVID-19 case data
COVID-19 case data is stored in Ohio Disease Reporting System (ODRS) at state health department
Staff absences data from central education service center or school district
Student absence data from software vendor or school district
Daily disease data, which are received from ODRS, are geocoded and aggregated at multiple geographies and demographic stratum
School district data files on absences (student and staff) and nurse visits by building and grade
Student nurse visit data from school district
Legend
Data sources
Inputs: Data types
Processing: Harmonization, analysis, and visualization
Outputs: Data-informed deliverable
Data transmitted securely to Ohio Supercomputing Center
Data processing and analytics
Visualization, automated alerts and reports
Daily updates to secure CATS web-based application (restricted to authorized users only)
Weekly reports for school district superintendent and local health departments
Public-facing web-based application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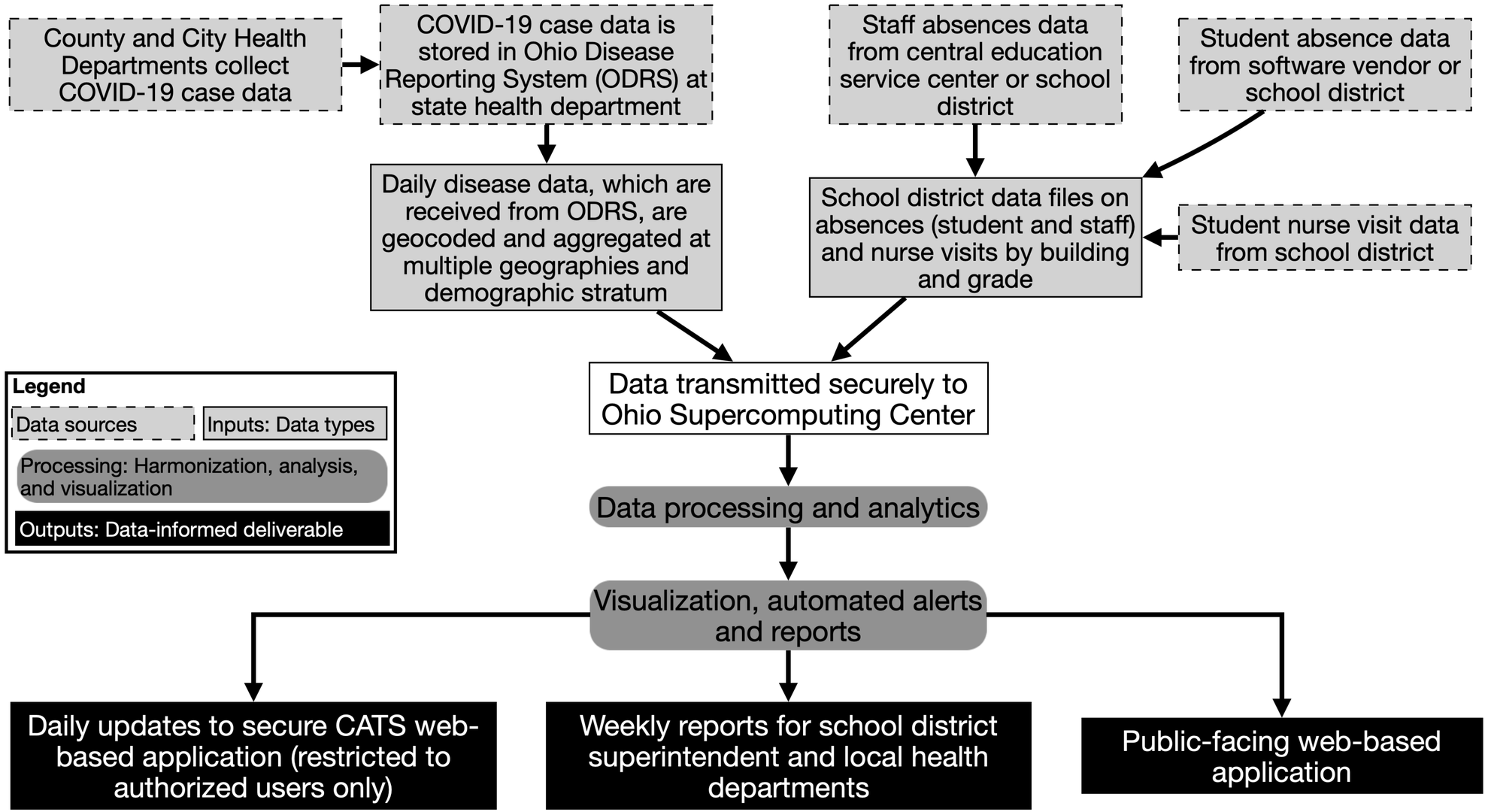
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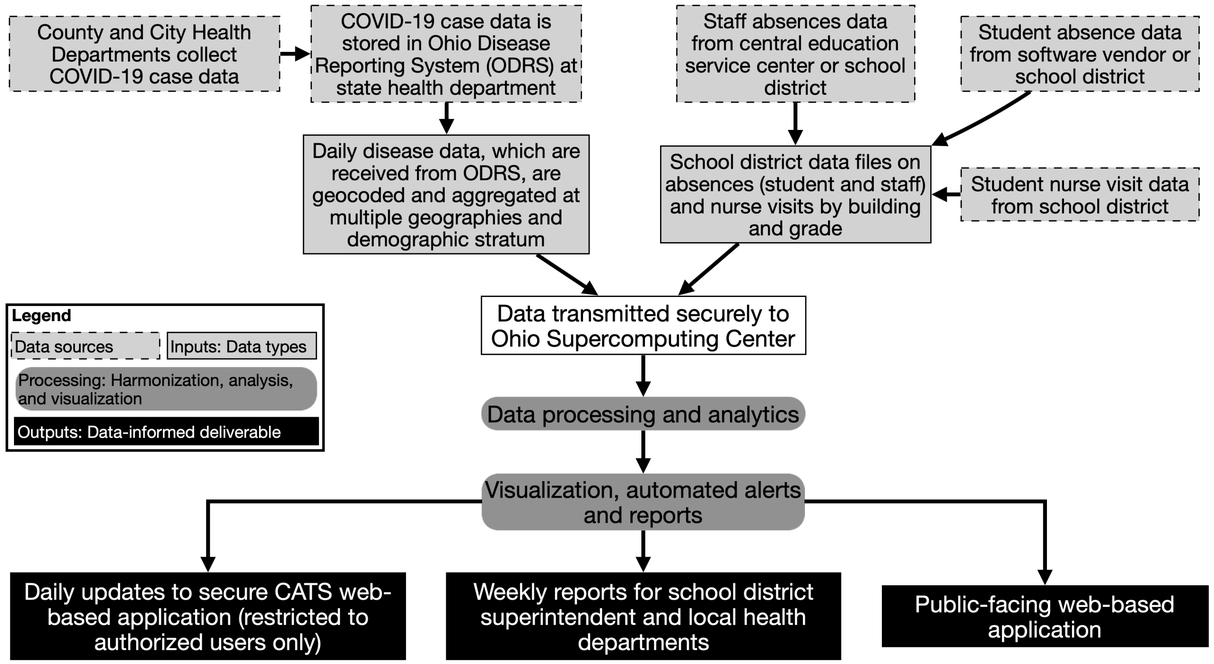
Linking Data - Non-Technical Details

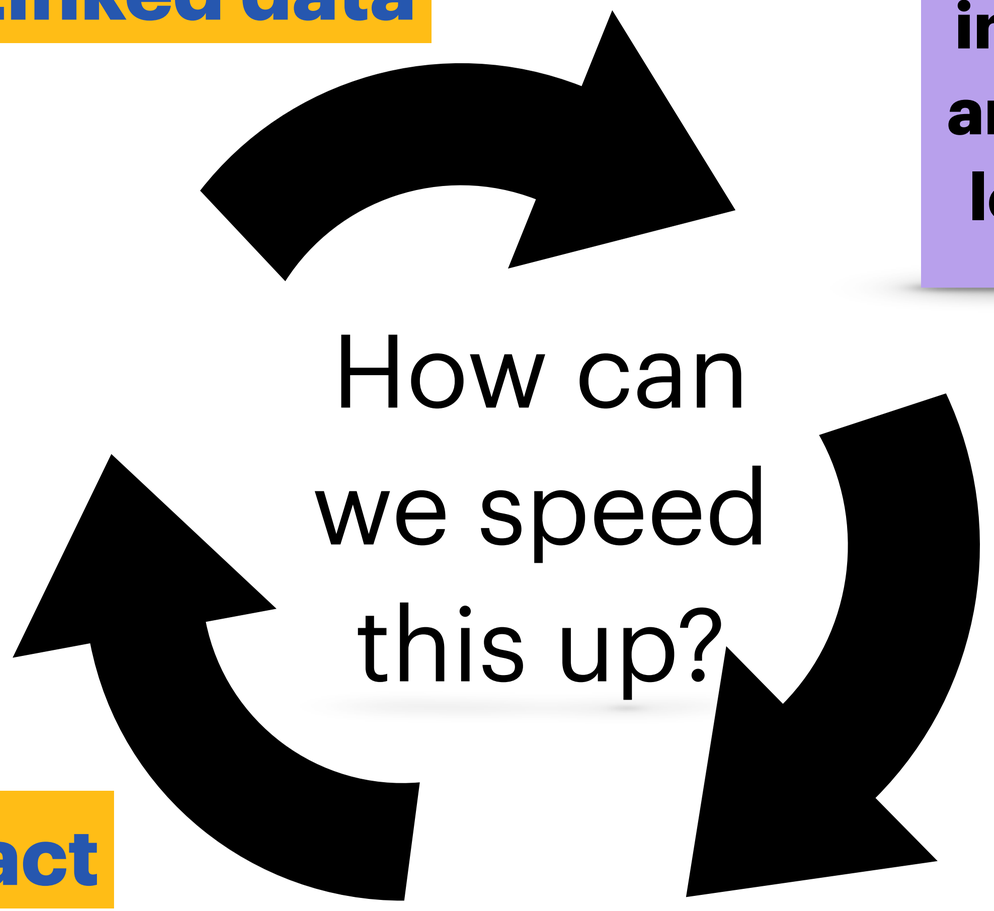
- Patience, patience, and patience 🏃‍♂️
- Build on past collaboration and relationships 🤝
- Be flexible, open-minded, and get creative 🤔
- Always be thinking about sustainability 😀



Linked data → **Linked decisions** → **Linked impact**

Parting Thoughts

How can we speed this up in an equitable, scalable and practical manner for local decision-making?



What?

CECE: The Community-Engaged Computational Epidemiologist

An AI-enabled computer system with a cubicle at the local health department

How?

Public Health Practice Ontology for knowing what data need to be linked for what types of decisions and actions

Tools and workflows for automated, on-demand data access, processing, analytics, and reporting

Data governance, legal, and ethical guidance for AI-enabled entities to access and link public health data

Training for public health professionals to work alongside a computational epidemiologist

Why?

A public health department can deploy CECE using conversational AI to ask questions such as:

- Where can we site **vaccination clinics** for equitable access to COVID-19 vaccines for 5 to 11 years old?
- Which neighborhoods have the **greatest gap in vaccination uptake** rate by race?
- Please generate **school district-specific reports** for several COVID-19 related metrics and email it to the district
- How **many households will become marginally food insecure** if the Kroger on Cemetery Road in Hilliard, OH closes and which **food pantries in the area may be able to minimize the impacts** of the store closure?

What questions do you have?

Or email at hyder.22@osu.edu