COVID-19 and Schools

Lessons from 2020-21 & Implications for 2021-22

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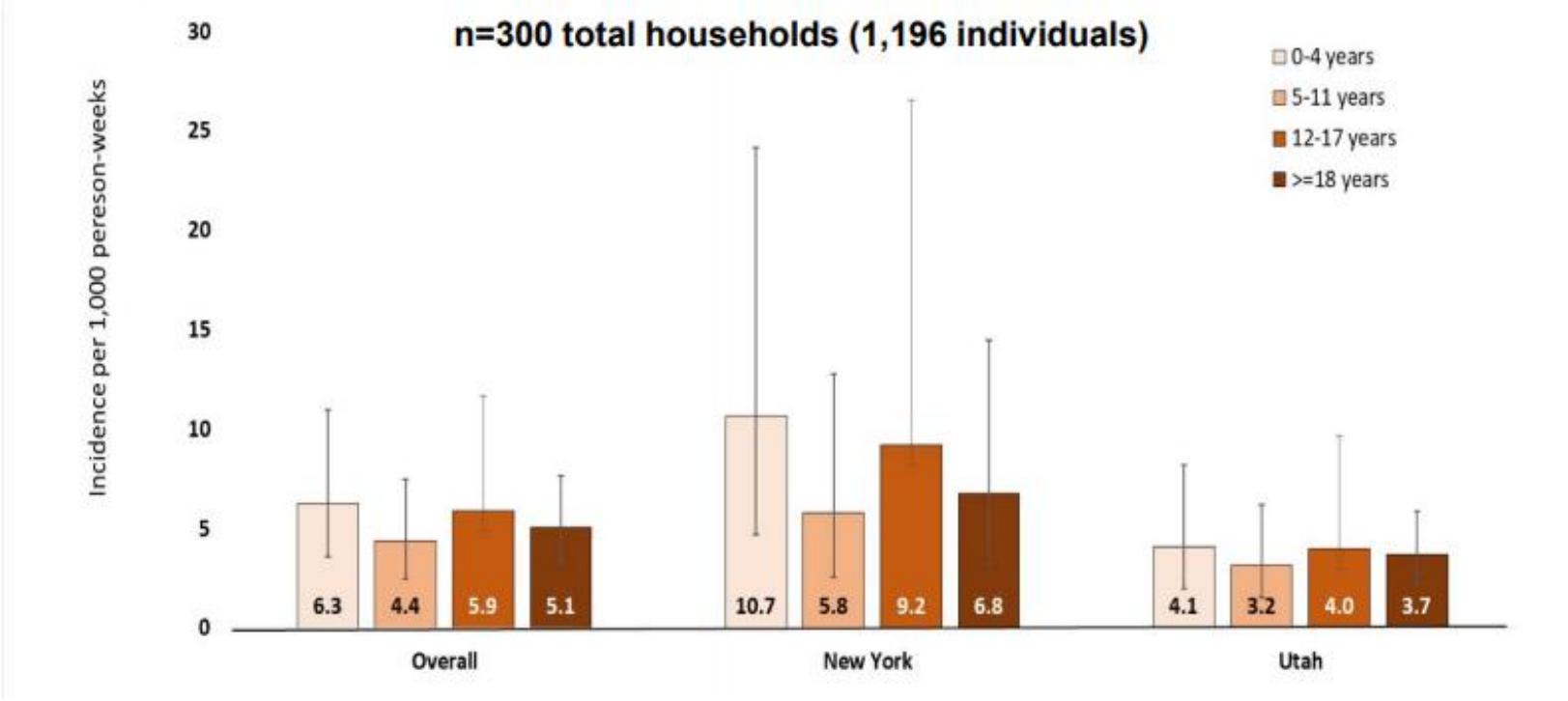
Key lessons from 2020-2021

- Children can acquire and transmit SARS-CoV-2
- Risk of introduction into school depends on community COVID-19 rates
- Once introduced into schools, risk of onward transmission in schools was low (with full mitigation and pre-delta)
- In-person learning is essential for educational, social/emotional, physical health, and mental health outcomes
- Delta adds uncertainty, but mitigation and vaccination remain effective

Children can acquire and transmit SARS-CoV-2

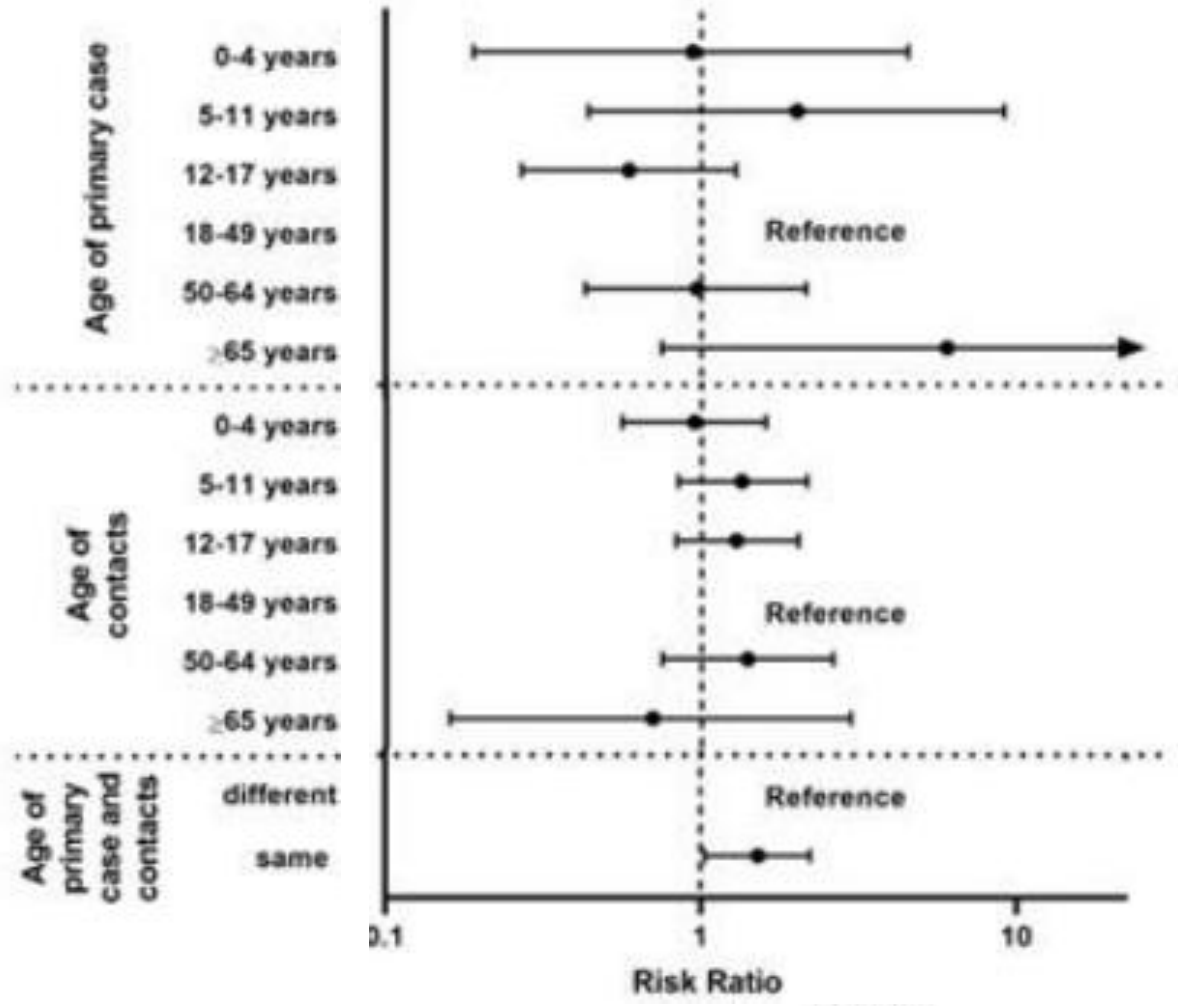
Infection Incidence per 1,000 Person-Weeks by Age, September 2020–February 2021



Unpublished CDC data (C-HEART Study), currently under peer-review.

Children can acquire and transmit SARS-CoV-2

Risk of SARS-CoV-2 Infection and Transmission is Similar Across Age Groups

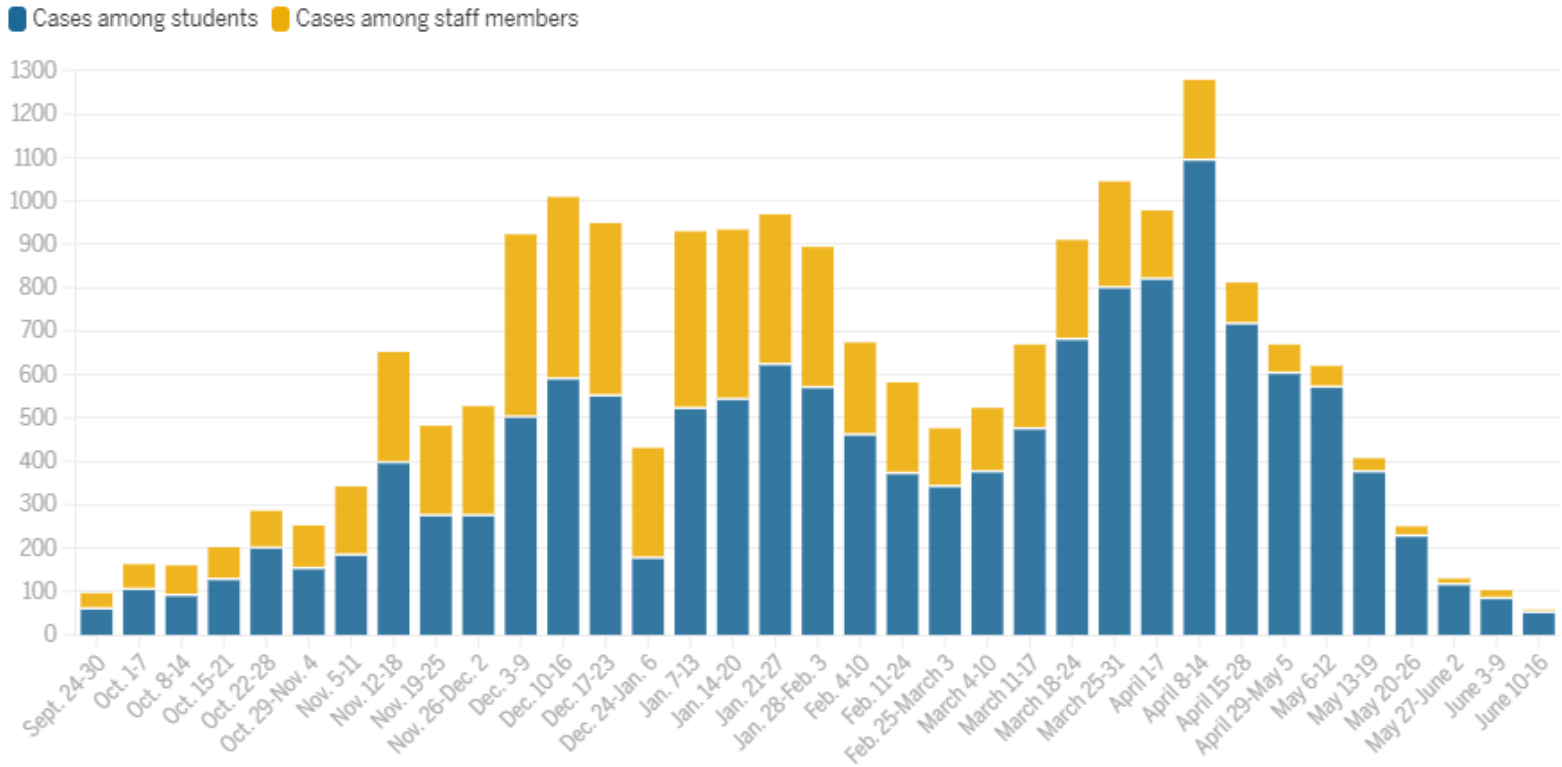


Unpublished CDC data (FluTES-C Study), manuscript in CDC clearance.

Introduction into school depends on community incidence

Coronavirus cases reported in Massachusetts schools

The Massachusetts Department of Elementary and Secondary Education releases weekly reports with the number of coronavirus cases reported among students and staff who have been inside Massachusetts public schools. Students and staff members who are learning or teaching exclusively remotely are not included in this data.



Source: Mass. Department of Elementary and Secondary Education • Graphic by Felicia Gans/Globe Staff

Risk of onward transmission in schools was low

- 2020-21 school year (pre-delta)
- If students or staff were in school during infectious period, the risk of transmitting to another person ranged from 0-4%
  - With masking, distancing, simple ventilation, staying home with symptoms, handwashing
  - Without these: ~ 11-27%
  - No data on the individual contribution of each component (e.g., how much protection was due to masking alone?)

Risk of onward transmission in schools was low

- 2020-21 school year (pre-delta)
- Shrewsbury public schools:
  - 165 people in school during infectious period
  - 358 in-school close contacts
  - 223 of these contacts tested
  - 3 possible and 6 probable in-school transmissions (4%)
    - 5 classroom, 3 school sports, 1 staff workspace
    - All masked, 3 at school with symptoms
    - 4 from staff, 5 from students

In-person learning is essential

- 2020-21: Increased depression, anxiety, substance use, obesity, vision deterioration
  - Missed opportunities for detection and treatment
- Educational outcomes: lower reading and math gains
- Exacerbated previous inequities by race and class
- Difficult to isolate impact of remote learning from overall pandemic
- CDC, AAP, DESE: In-person learning a priority this year

Is Delta causing more severe disease in children?

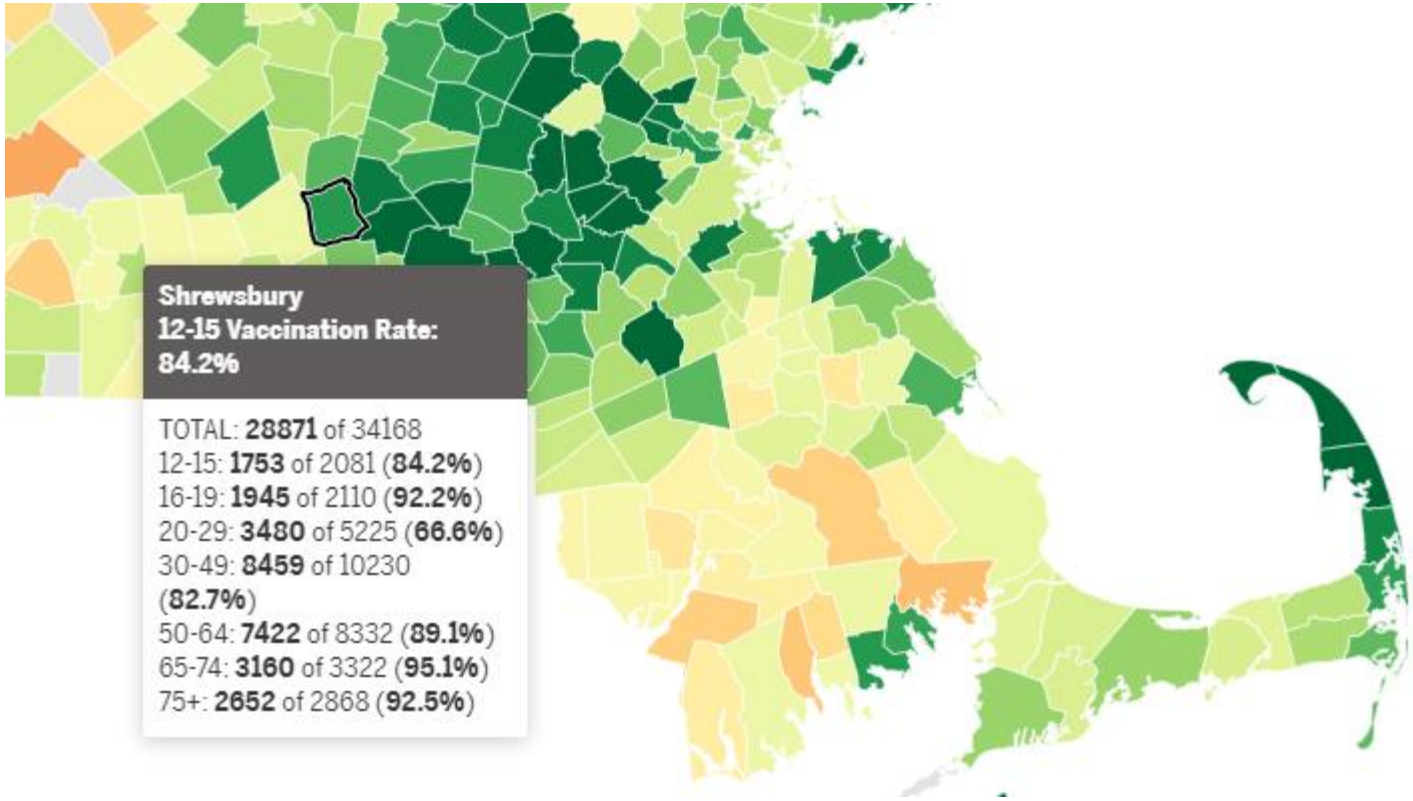
- Pediatric COVID-19 cases and hospitalizations are rising in the US
- Highest in areas with low vaccination and high case rates
- Trends in children parallel trends in adults
  - Proportion of cases in children increasing (expected)
- Early data from Canada: 2x higher risk of hospitalization for children with delta vs. older variants
  - Still low risk of hospitalization (<2%)
  - Long-COVID after Delta unknown; previous variants <2%, similar to non-COVID illness

How will Delta change plans for this year?

- Delta variant ~2 times more transmissible than last year's strain
  - No evidence of change in mask effectiveness
- Vaccines reduce infection risk about 8-fold
  - Vaccinated people can still acquire and transmit infection (similar viral loads to unvaccinated, likely for shorter period of time)
  - Vaccines reduce severe illness, hospitalization, and death about 25-fold

How will Delta change plans for this year?

- Early July: many MA districts were planning a “near-normal” school year
  - Vaccination rates seemed high enough to make cases so rare that mitigation could be removed



How will Delta change plans for this year?

- July-August: COVID-19 cases rising despite vaccination
- Need to reassess plans with goals in mind:
  - Avoid any SARS-CoV-2 infections acquired in school?
  - Avoid severe illness in students, staff, families?
  - Avoid disruption in learning and loss of in-person days?

CDC and DESE guidance

- Both: Prioritize in-person learning
- CDC 8/4/21:
  - Vaccination for all eligible people (12 and up)
  - Universal masking indoors for all (regardless of vax)
  - 3 feet distance where possible
  - Screening testing for unvaccinated people
  - Handwashing, respiratory etiquette
  - Stay home when sick (with testing)
  - Contact tracing, quarantine, isolation
- DESE 7/30/21 (where different):
  - Masking indoors for unvaccinated people
  - Recommend schools allow vaccinated students to unmask (vaccinated staff: not mentioned)
  - School-based testing options supported: diagnostic, screening, and “test-to-stay” after exposure

When can we stop masking?

- Combinations of high vaccination rates and low case counts in the community will make this possible
- Specific thresholds (masking “off ramps”) depend on goal
    - Avoid any SARS-CoV-2 infections acquired in school?
    - Avoid severe illness in students, staff, families?
    - Avoid disruption in learning, loss of in-person days?

When can we stop masking?

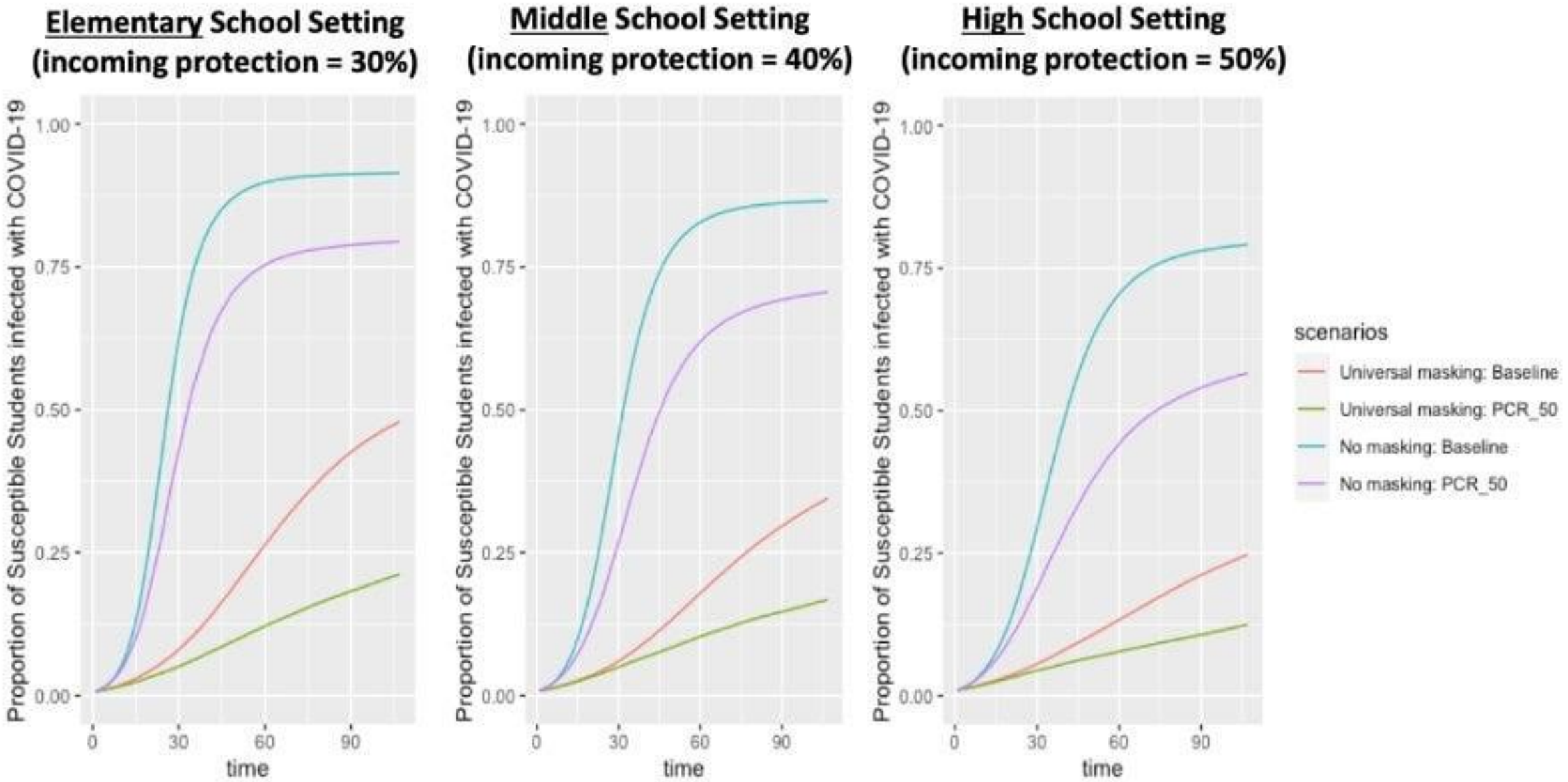
Computer modeling can give approximate guidance:

- If mitigation without masks reduces risk by 40% (e.g., open windows, HEPA filters, handwashing, stay home when sick)
- Preliminary results:

Over 1 month, in a single school, if the goal is to prevent:	**Elementary (0% vax)**	***Elementary (50% vax, if EUA)***	**High school (80% vax)**
	Add/remove masks at a community incidence of:		
3 added cases	4/100K/day	*13/100K/day*	3/100K/day
5 added cases	6/100K/day	*23/100K/day*	5/100K/day
10 added cases	13/100K/day	*>50/100K/day*	10/100K/day
25% chance of in-school transmission	<1/100K/day	*3/100K/day*	1/100K/day
50% chance of in-school transmission	3/100K/day	*7/100K/day*	4/100K/day
75% chance of in-school transmission	7/100K/day	*13/100K/day*	10/100K/day

*Shrewsbury: 8.7/100K/day, Worcester County: 15/100K/day

Giardina et al, 2021: preliminary analyses



Zhang et al, 2021 (over 3 months)

Sources

- CDC data from June 10, 2021 ACIP meeting: Dr. Hannah Kirking https://www.fda.gov/media/150050/download
- Secondary attack rate data from US K-12 schools: CDC Science Brief: https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/transmission_k_12_schools.html; section 4, https://globalhealth.massgeneral.org/covidlibrary.pdf
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- Pediatric cases and hospitalizations with Delta, long-COVID pre-Delta: https://www.thelancet.com/journals/lanchi/article/PIIS2352-4642(21)00198-X/fulltext, https://twitter.com/dfisman/status/1426176810627305474?s=21, https://yourlocalepidemiologist.substack.com/p/pediatric-numbers-3-things-to-keep (link within to CDC data)
- Vaccine effectiveness against delta: https://context-cdn.washingtonpost.com/notes/prod/default/documents/8a726408-07bd-46bd-a945-3af0ae2f3c37/note/57c98604-3b54-44f0-8b44-b148d8f75165.#page=1
- Vaccination rates by town (scroll down): https://www.bostonglobe.com/2021/01/29/metro/charts-how-many-vaccine-doses-has-massachusetts-received-who-has-been-vaccinated/
- CDC schools guidance: https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/k-12-guidance.html
- DESE guidance: https://www.doe.mass.edu/covid19/on-desktop.html
- Modeling thresholds for masking: https://www.medrxiv.org/content/10.1101/2021.08.04.21261576v1, https://www.medrxiv.org/content/10.1101/2021.08.10.21261726v1, https://covsim.hosted-wordpress.oit.ncsu.edu/school-level-modeling-results/

Thank You