

# COVID-19 Simulation Integrated Model (*COVSIM*) to Inform Local Decision-Making

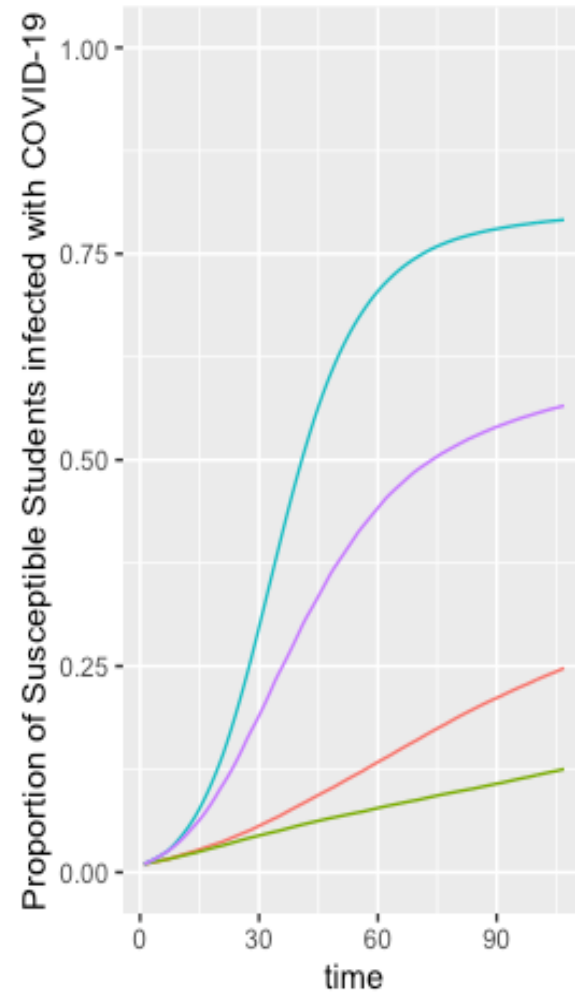
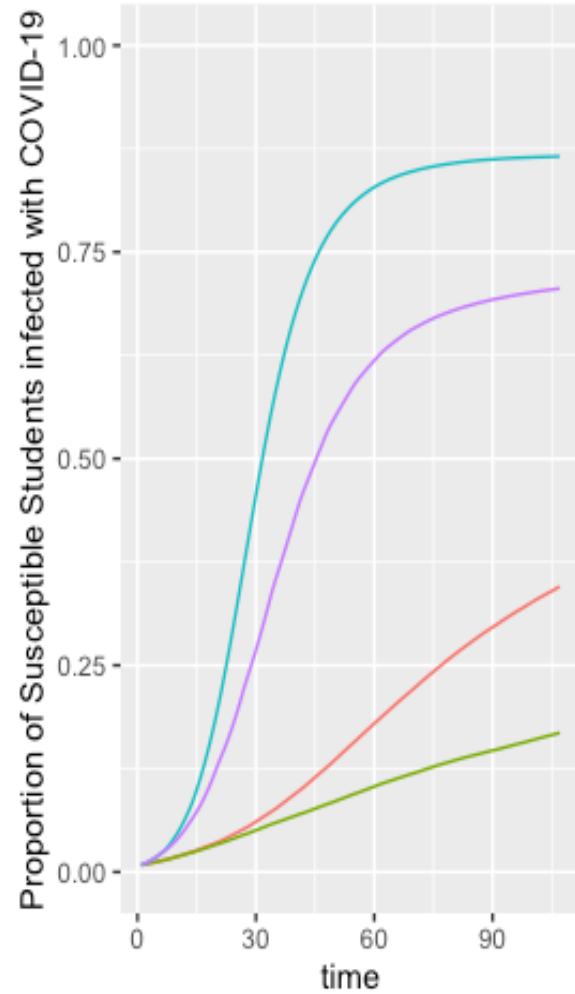
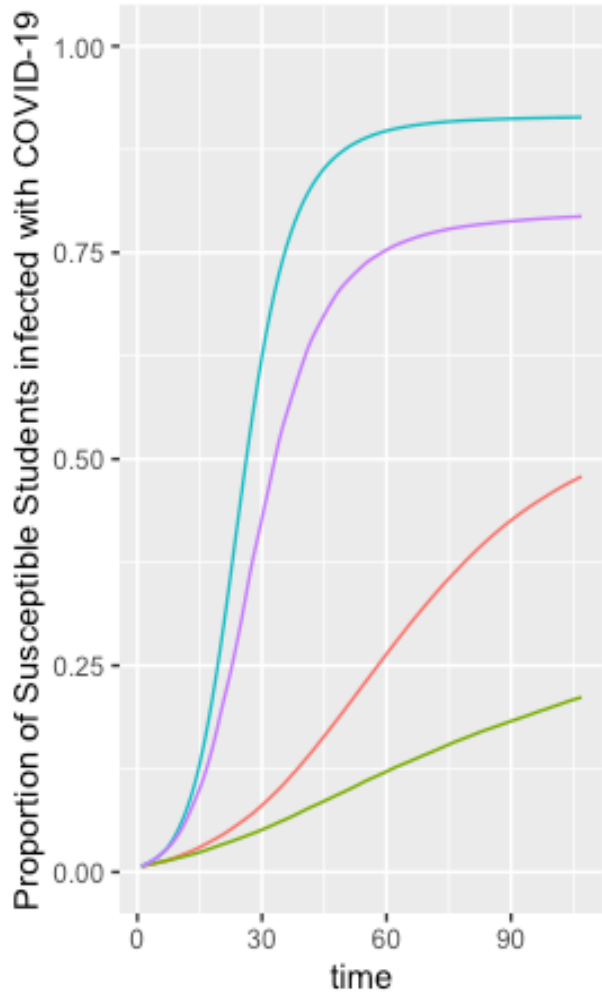
## COVID-19 Modeling Projections for Schools Part 2: Model Results



**Elementary School Setting**  
(incoming protection = 30%)

**Middle School Setting**  
(incoming protection = 40%)

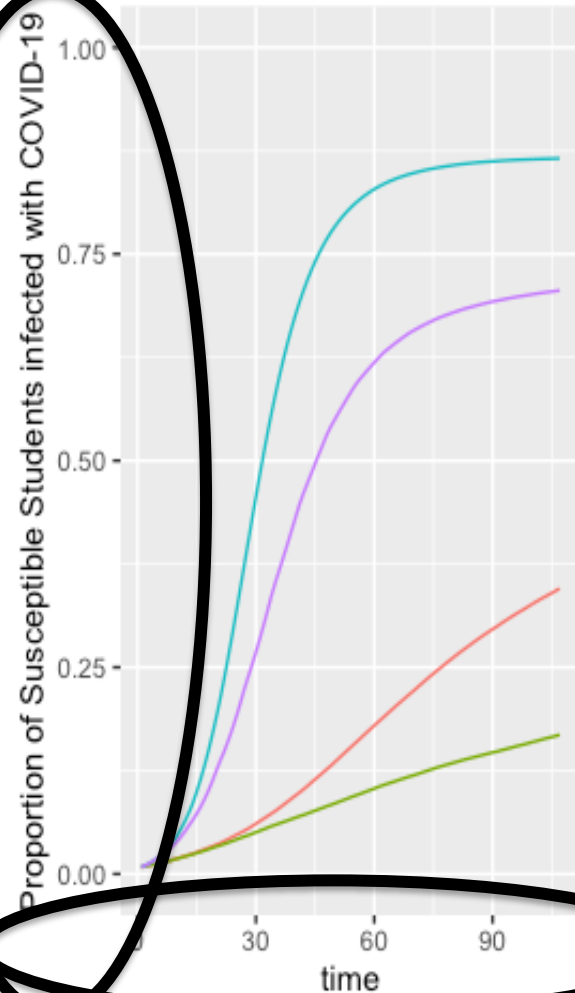
**High School Setting**  
(incoming protection = 50%)



- scenarios
- Universal masking: Baseline
  - Universal masking: PCR\_50
  - No masking: Baseline
  - No masking: PCR\_50

**Y axis = Percent of  
*Susceptible* Students  
who have become  
infected**

**Middle School Setting  
(incoming protection = 40%)**

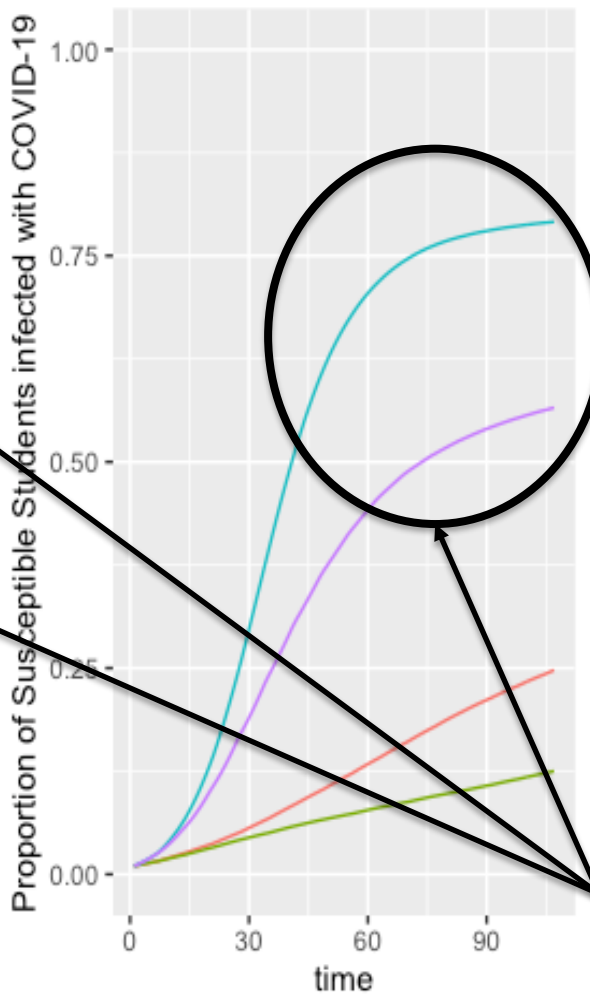
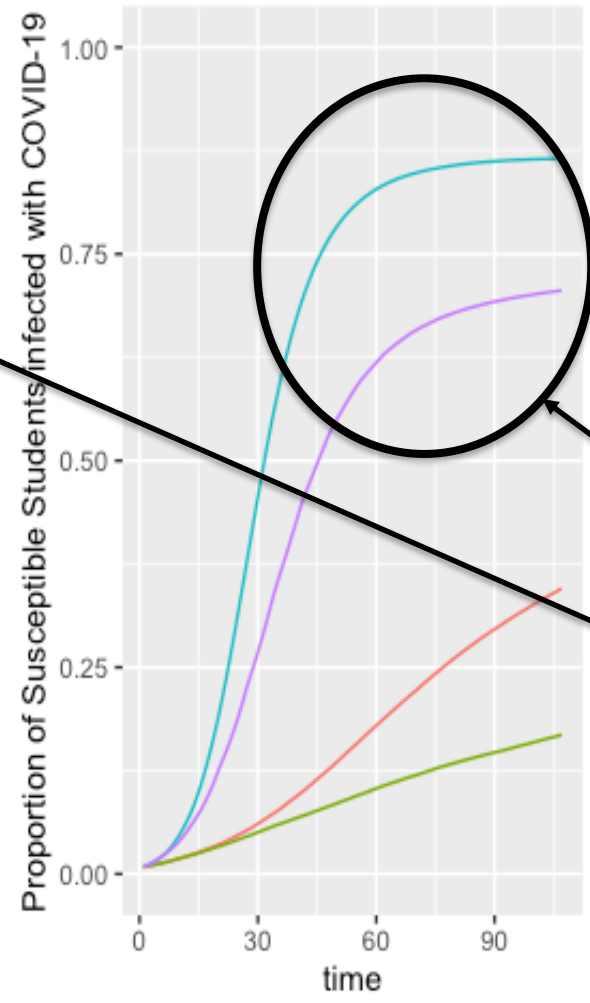
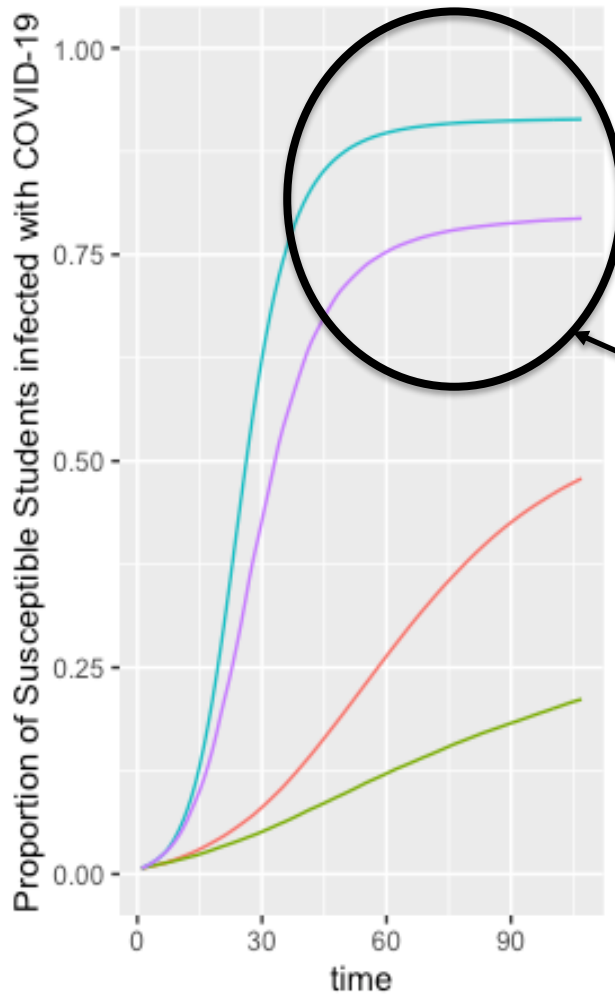


**X axis = days since the  
school semester began  
(107 total days)**

**Elementary School Setting**  
(incoming protection = 30%)

**Middle School Setting**  
(incoming protection = 40%)

**High School Setting**  
(incoming protection = 50%)



scenarios

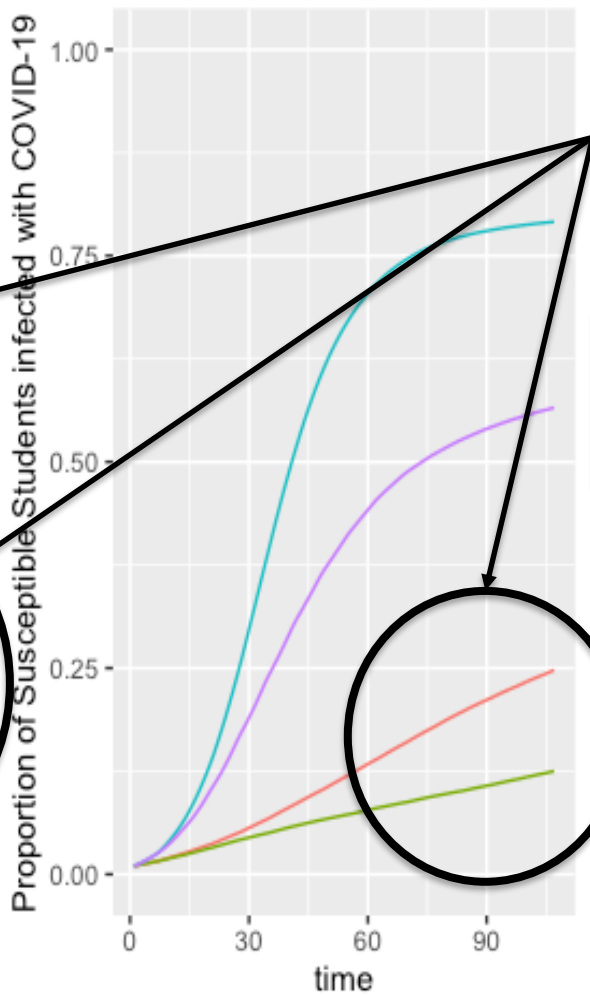
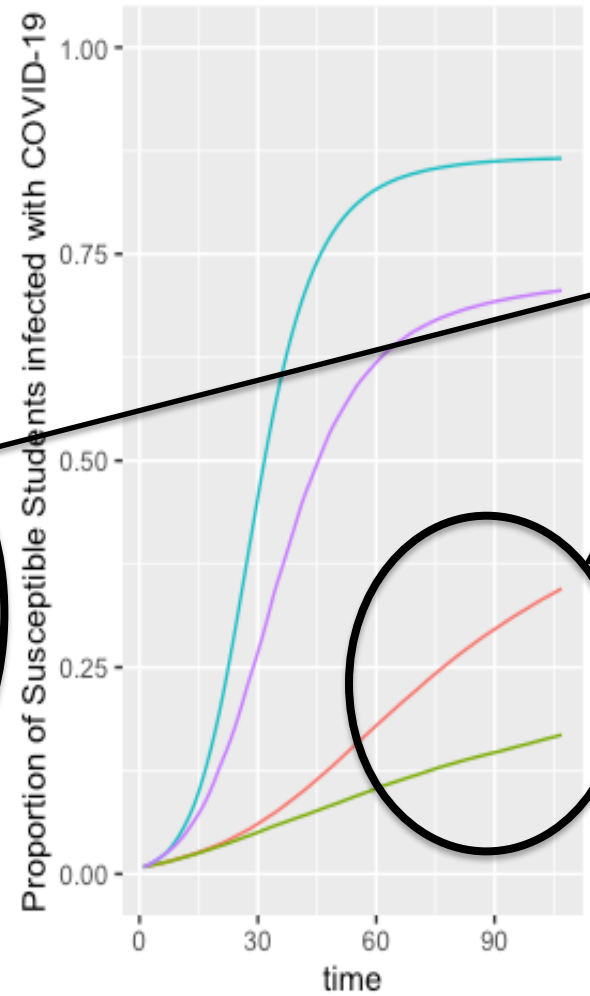
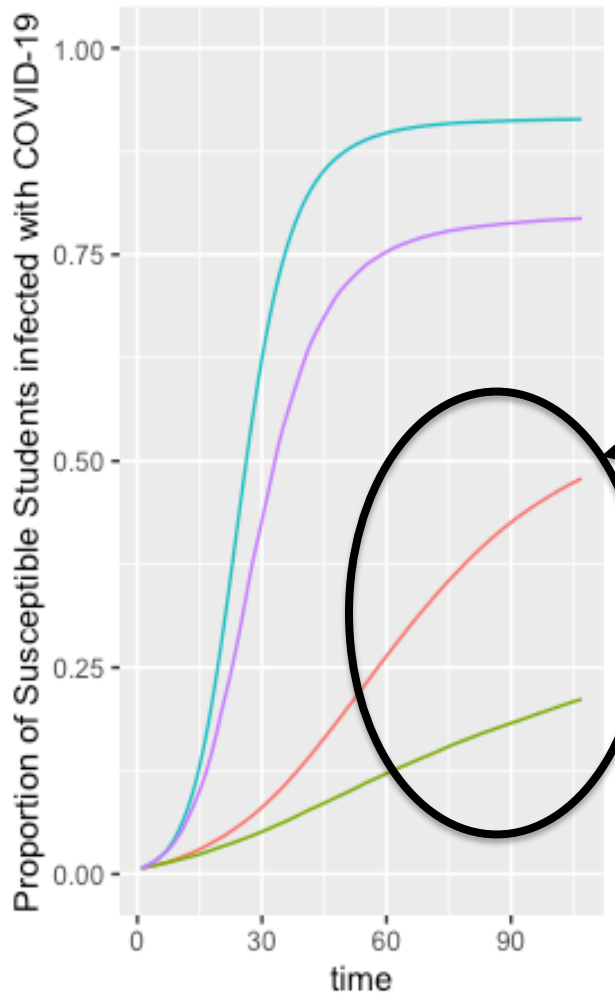
- Universal masking: Baseline
- Universal masking: PCR\_50
- No masking: Baseline
- No masking: PCR\_50

**“No Masking” scenarios:**  
effective reproductive rate = 4.0  
(for every 1 person infected, 4 other students become infected)

**Elementary School Setting**  
(incoming protection = 30%)

**Middle School Setting**  
(incoming protection = 40%)

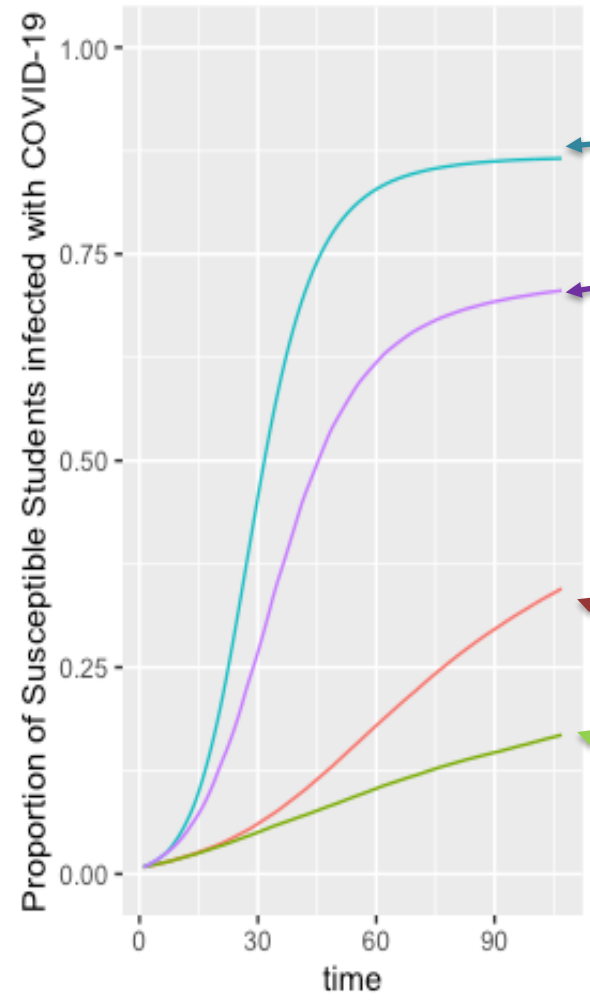
**High School Setting**  
(incoming protection = 50%)



**“Universal Masking”**  
scenarios: **effective reproductive rate = 2.0**  
(50% reduction in viral reproducibility from masking)

- scenarios
- Universal masking: Baseline
  - Universal masking: PCR\_50
  - No masking: Baseline
  - No masking: PCR\_50

**Middle School Setting**  
(incoming protection = 40%)



**No Masks**

No testing

Testing 1/2 of students

**2 Levels of Testing for either masking policy**  
(no testing OR testing 1/2 of students every week)

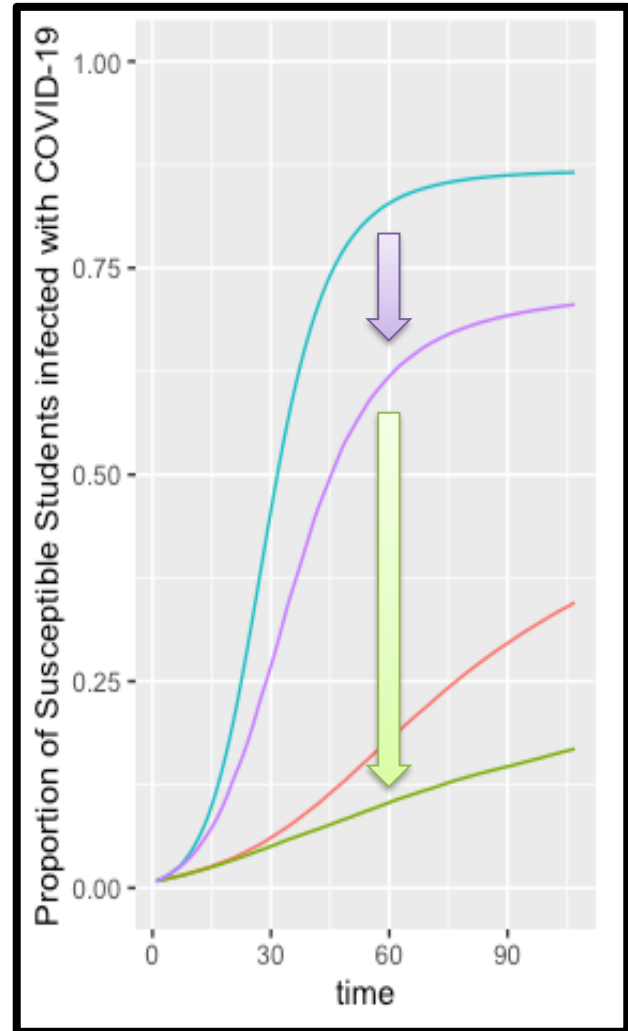
**Universal Masking**

No testing

Testing 1/2 of students



**Middle School Setting**  
(incoming protection = 40%)



**after 60 days....**

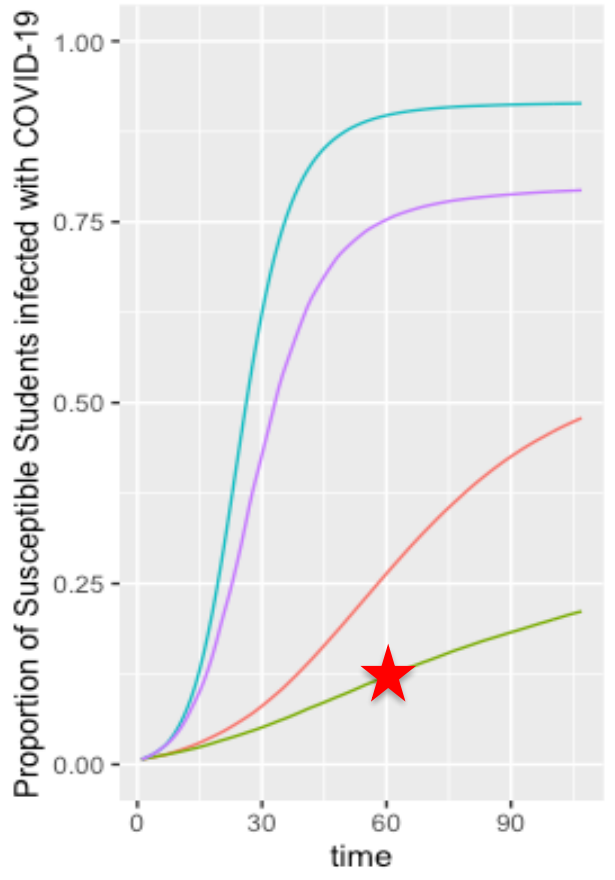
**No testing, No masking = ~80%** of susceptible students have become infected

**Testing students, no masking = ~60%** of susceptible students have become infected

**Testing students + universal masking = ~10%** of susceptible students have become infected

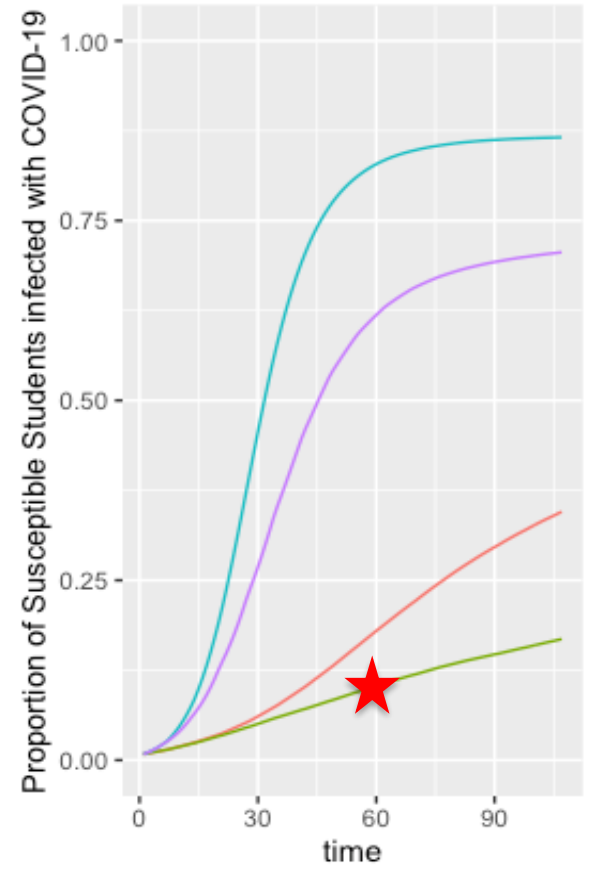


**Elementary School Setting**  
(incoming protection = 30%)



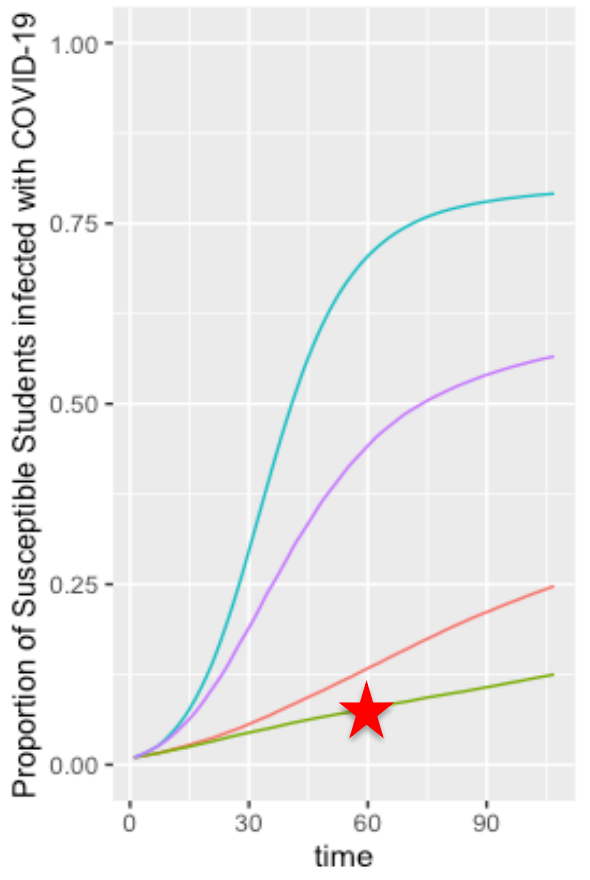
~15% of susceptible students have become infected (30% protection)

**Middle School Setting**  
(incoming protection = 40%)



~10% of susceptible students have become infected (40% protection)

**High School Setting**  
(incoming protection = 50%)



~7% of susceptible students have become infected (50% protection)

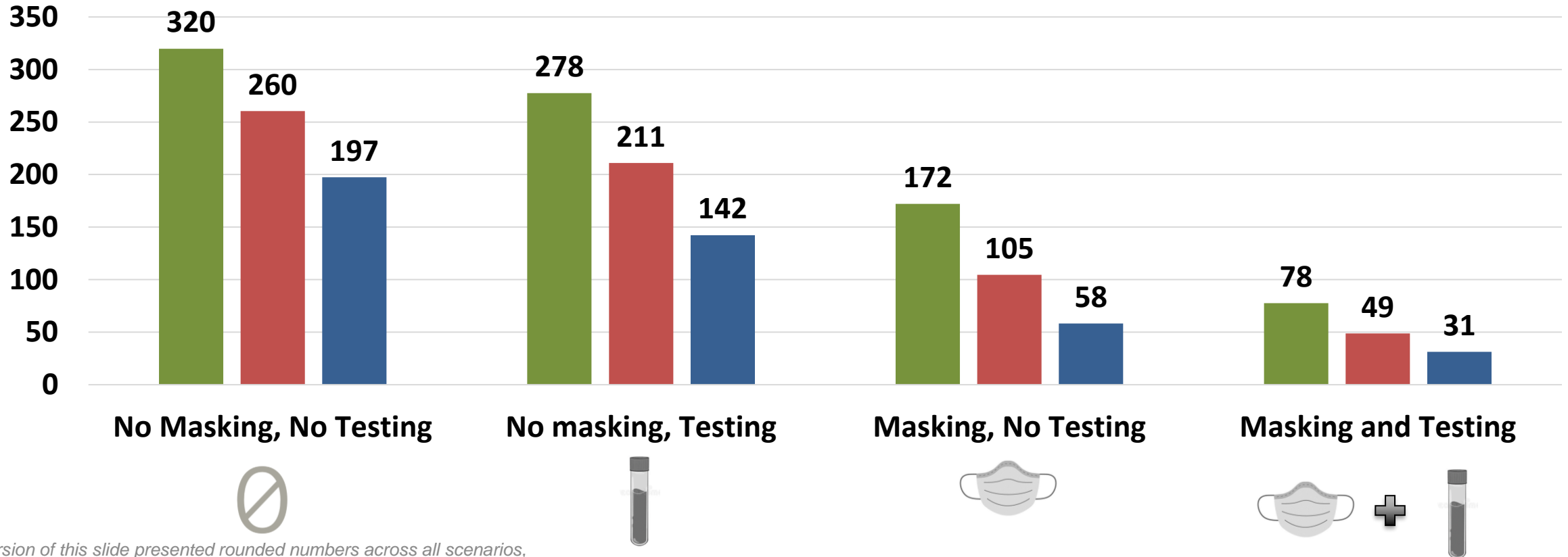
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after 60 days....



# New Infections among 500 Students after 1 semester

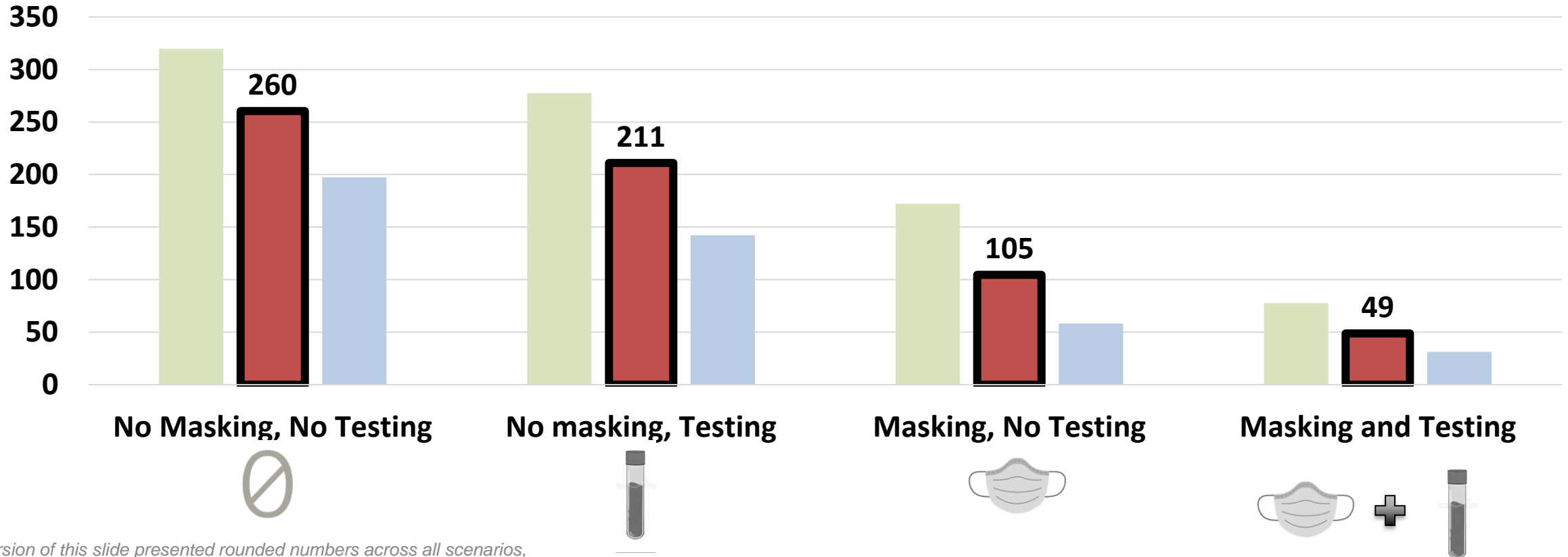
- Elementary School Setting (incoming protection = 30%)
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- High School Setting (incoming protection = 50%)



A prior version of this slide presented rounded numbers across all scenarios, which have since been updated (08.24.2021) to be exact values

# New Infections among 500 Students after 1 semester

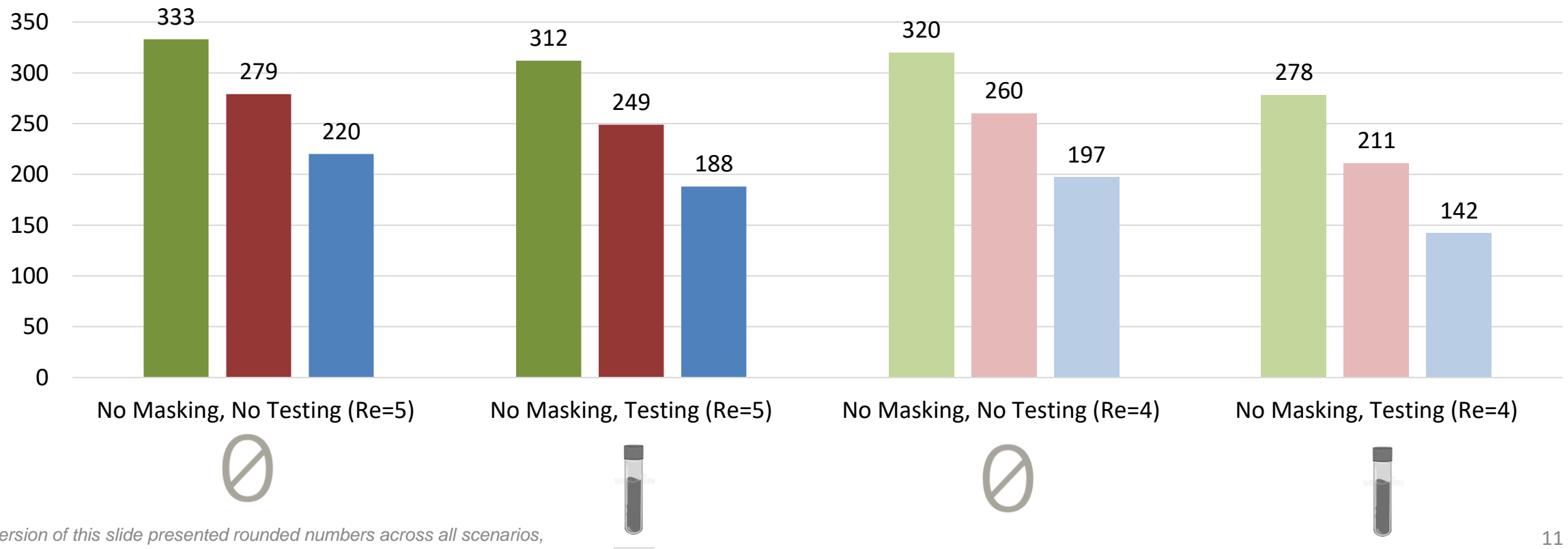
- Elementary School Setting (incoming protection = 30%)
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- High School Setting (incoming protection = 50%)



A prior version of this slide presented rounded numbers across all scenarios, which have since been updated (08.24.2021) to be exact values

# New Infections among 500 Students after 1 semester (Re = 5 vs Re = 4)

- Elementary School Setting (incoming protection = 30%)
- Middle School Setting (incoming protection = 40%)
- High School Setting (incoming protection = 50%)



A prior version of this slide presented rounded numbers across all scenarios, which have since been updated (08.24.2021) to be exact values

## What does this all mean?

1. The Delta variant is *very* infectious; kids under 12 years old are not yet eligible for vaccines and therefore remain unprotected
2. Without masks or testing, up to 90% of susceptible students may become infected by the end of the semester (if only 30% have incoming protection)
3. Masks and testing, in combination, can prevent 40-70% of new infections (or more with high-quality, well-fitting masks)

## Consequences may extend beyond the classroom and after the semester...

- Additional cases in the community--including among elderly grandparents and other family members--especially when community rates are already increasing ([Goldhaber, 2021](#))
- More infected students leads to more days of school absences, forcing caregivers to take time off work
- Multi-inflammatory syndrome or Long-Covid, which occurs among nearly half of students and can last up to 8 months ([Buonsenso, 2021a](#), [Buonsenso 2021b](#))

## ...and if school-based infections become too great, a return to virtual learning may follow

- Virtual learning is associated with...
  - Prolonged mental health concerns among students ([Golberstein, 2020](#))
  - Minimal or no learning gains ([Engzell, 2021](#))
- Recall: the risk of severe disease for COVID-19 *remains reduced* for those of younger ages, in the event they do become infected within school

***The best place for K12 children this fall is the classroom: universal masking and routine testing can ensure that they and their families remain safe and that their learning journey can continue smoothly***



For additional information, please visit [covsim.hosted-wordpress.oit.ncsu.edu/](https://covsim.hosted-wordpress.oit.ncsu.edu/) or write to us at [covsim-team@ncsu.edu](mailto:covsim-team@ncsu.edu)