

COVID-19, Youth, Emerging Adults, and School openings

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Overview

- Early on in the pandemic, and up until more recently, the majority of the data and research has been dedicated to adults and COVID-19.
- Presently, however, more attention is being paid to the effects COVID-19 has on children, especially in the context of whether children should return to in-person classes.
- This presentation will cover how COVID-19 affects children and the different aspects that need to be considered when deciding whether in-person instruction return.



How severe is COVID-19 in newborns

- The risk of COVID-19 disease in newborns due to maternal transmission is undefined but appears to be low.
- The worst perinatal outcomes in this pandemic have been associated not with newborn infection, but with maternal morbidity and mortality, and premature birth due to maternal COVID-19 disease.
 - In China, a country with over 80,000 symptomatic COVID-19 cases, there have been only six reported cases in infants born to COVID-infected women, and all six made a full recovery without requiring intubation.
- In the SARS coronavirus outbreak, infants of infected mothers did not develop infection in the neonatal period, though some were born prematurely or small for gestational age due to severe maternal illness during pregnancy

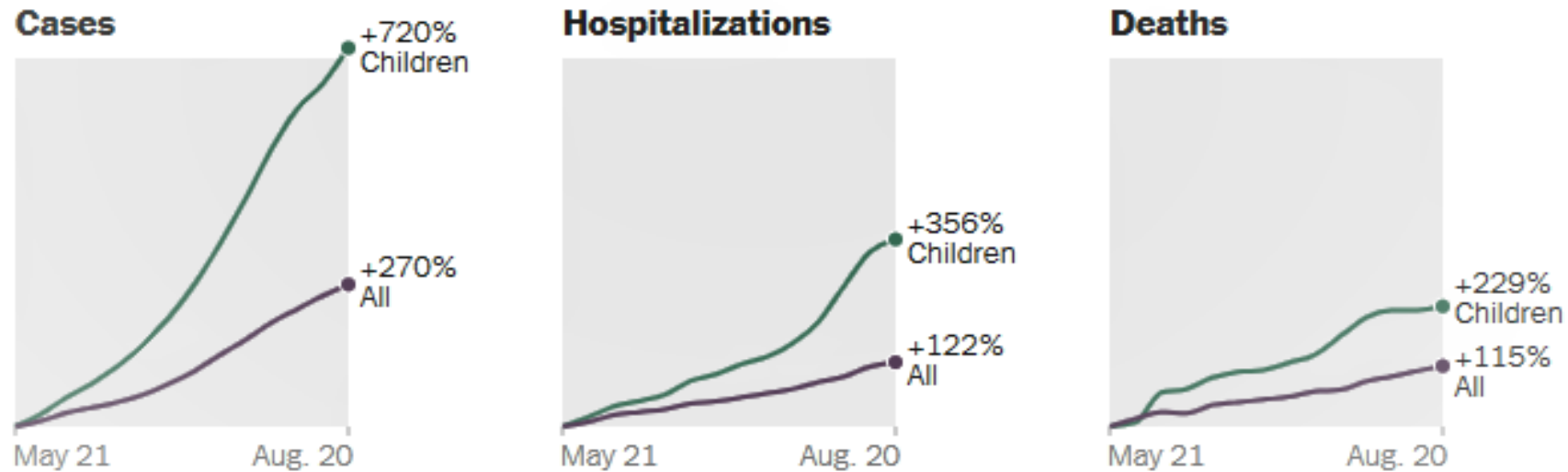


How often do children get COVID-19?

- Contrary to popular belief, children are not immune or unable to get COVID-19.
- In the US alone, **338,000 children** under 18, toddlers, and infants **have gotten COVID-19**.
 - In mid-May, children only made up 3.7% of the total amount of COVID-19 cases.
 - Now, they make up 8.4% of our cases in the US
 - **If 8.4 % holds constant, a large number of youth will become infected : $8.4 \% \times 74.2$ million children < 18 (2010 census data) = 6,232,800 cases**
 - **According to the American Academy of Pediatrics 97,000 children tested positive for COVID-19 from July 16 to July 30**
- The true number of cases in children is likely much higher than this due to the frequency that children experience more mild symptoms that may go unnoticed.
 - **I.e. If a child has the infection and presents with very mild symptoms, their parent may not know they are sick and they won't get tested.**
 - Most of the infections we know of are from children who develop more severe symptoms



As some schools begin in-person classes, data compiled by the American Academy of Pediatrics from the summer show that cases, hospitalizations and deaths from the coronavirus have increased at a faster rate in children and teenagers than among the general public.



Source: The American Academy of Pediatrics

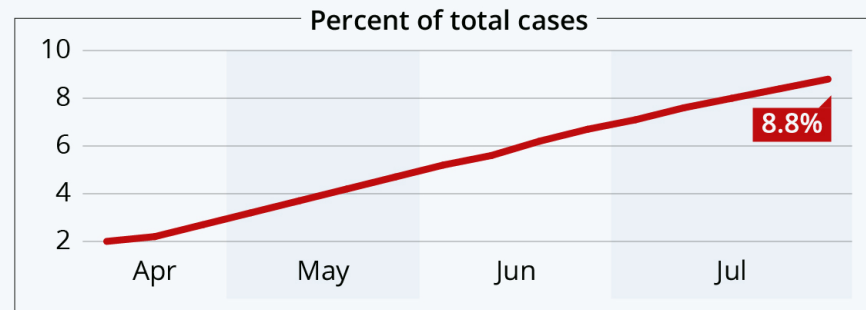
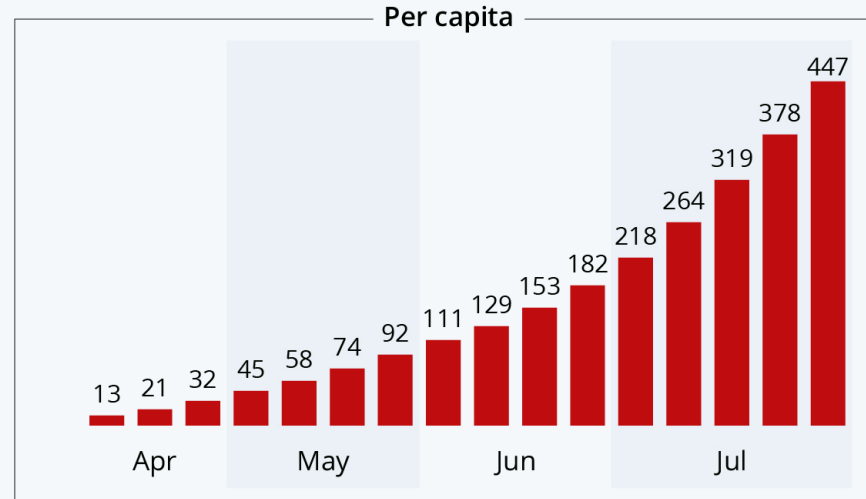


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Rate of COVID Infection in U.S. Children Rising

Number of COVID-19 cases per 100,000 children and percentage of total cases from Apr. 16 – Jul. 30



Majority age range used between states was 0-19; other states varied (0-14, 0-17, 0-18, 0-20, 0-24). Data represents cumulative counts since states began reporting
Sources: American Academy of Pediatrics, Children's Hospital Association



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How severe is COVID-19 in children?

- The risk of severe illness appears to be lowest among children between the ages of 2 to 4 years.
 - Between March 1st and July 25th, **children between 2-4 made up only 8.7% of pediatric hospitalizations** for COVID-19 in 14 States.
 - Children younger than 2 and older than 12 accounted for 74.5% of pediatric hospitalizations due to COVID-19.
- In one analysis of more than 550 confirmed cases among children under age 18 in China, Italy, and Spain, only nine children (1.6 percent) had severe or critical disease.
- In another study, approximately 5 percent (one out of 20) developed symptoms that required hospitalization, but only 0.6 percent required intensive care.





How severe is COVID-19 in children?

- A recent CDC report found that for kids under the age of 18, the hospitalization rate was 8 in 100,000.
 - The rate for adults is about 165 in 100,000.
- While the rate of hospitalization is lower for children compared to adults, this does not mean that those who are hospitalized have less severe illness.
- **One in three children that were hospitalized for COVID-19 were admitted to an intensive care unit (ICU).**
 - This is similar to the proportion of adults who are admitted to the ICU after being hospitalized for COVID-19.



**Young kids get less sick, so they
must not transmit COVID-19 as
much, right?**



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Short answer = NO

Just because it appears that they are less likely to experience severe illness, we can not assume that they don't spread COVID-19 at the same rate as adults.



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How often do children spread COVID-19?

- A recent study examining the amount of SARS-CoV-2 (the virus that causes COVID-19) in children and adults found that **children could be just as, or more likely, to get COVID-19 and spread it as adults.**
 - Even though children < 5 years of age had a milder illness, they had at least as much traces of the coronavirus (SARS-CoV-2 viral RNA) in their noses as older children and adults.
 - **Some were even found to have 10 to 100 times more viral RNA present in their noses than adults.**
 - **There is a correlation between high viral RNA levels and viral infections**
- **Another recent study found that viral load was highest in children in the first 2 days of symptoms, significantly higher than hospitalized adults with severe disease**
- A large contact tracing study of COVID-19 transmission in South Korea conducted during a time of mitigation found that:
 - Children were just as likely as adults to spread COVID-19 to other members of their household.
 - Household transmission of SARS-CoV-2 was high if the index patient was 10–19 years of age





Summary of what we know to date : 10 observations from Europe

Key messages from an overview of existing studies conducted by the European Centre for Disease Prevention and Control 8/6/2020

1. **A small proportion (<5%) of overall COVID-19 cases reported in the EU/EEA and the UK are among children (those aged 18 years and under). When diagnosed with COVID-19, children are much less likely to be hospitalized or have fatal outcomes than adults.**
2. **Children are more likely to have a mild or asymptomatic infection, meaning that the infection may go undetected or undiagnosed.**
3. **When symptomatic, children shed virus in similar quantities to adults and can infect others in a similar way to adults. It is unknown how infectious asymptomatic children are.**
4. **While very few significant outbreaks of COVID-19 in schools have been documented, they do occur, and may be difficult to detect due to the relative lack of symptoms in children.**
5. **In general, the majority of countries report slightly lower seroprevalence in children than in adult groups, however these differences are small and uncertain. More specialized studies need to be performed with the focus on children to better understand infection and antibody dynamics.**



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Summary of what we know to date : 10 points

6. Investigations of **cases identified in school settings suggest that child to child transmission in schools is uncommon and not the primary cause of SARS-CoV-2 infection in children, particularly in preschools and primary schools.**
 - **Most European countries that have reopened schools have not experienced outbreaks but almost all have had significantly lower rates of community transmission than the U.S.**
7. If appropriate physical distancing and hygiene measures are applied, schools are unlikely to be more effective propagating environments than other occupational or leisure settings with similar densities of people
8. **There is conflicting published evidence on the impact of school closure/re-opening on community transmission levels.**
9. Available evidence suggests that closures of **childcare and educational institutions** would be **unlikely to provide significant additional protection of children's health**, since most develop a very mild form of COVID-19, if any.
10. **Decisions on control measures in schools and school closures/openings should be consistent with decisions on other physical distancing and public health response measures within the community.**





What did we learn from closing schools in the USA in the Spring of 2020

- In the most comprehensive analysis of school closures to date* school closure was associated with decreased COVID-19 incidence
- School closure was associated with a 62% relative decrease in COVID-19 incidence per week.
- Taking into account the effectiveness of other concurrent interventions, the decline of 62% was equivalent to 39% of the projected value with schools open.
 - **I.e. If schools had remained open, the rate of new COVID-19 would have been more than 2 times greater than what we experienced with schools closed**
- Between March 9, 2020, and May 7, 2020, school closure in the US was temporally associated with a significant decrease in COVID-19 incidence and mortality
- Those states that closed schools earlier, when cumulative incidence of COVID-19 was low, had the largest relative reduction in incidence and mortality



Should we be reopening schools?

- There is no straightforward answer as to whether we should be rushing to reopen schools for in-person instruction.
- Communities use three basic metrics for assessing the virus's spread and consider trends over the course of two weeks.
 - **COVID-19 cases**
 - **Hospitalizations**
 - **How many tests for SARS-CoV-2 are coming back positive.**
- There is no threshold level of COVID-19 spread in a community that guarantees the safety of sending kids back to school.
- But if SARS-CoV-2 is under control, that reduces the risk that there will be outbreaks when schools reopen.
 - **One widely cited metric that provides evidence that community control exists is percent positive for COVID-19 tests of less than 5% over the last two weeks**



Other considerations: Length of the school day is an important consideration

Masks are uncomfortable to wear: How long can kids of different ages tolerate them?

- The school day needs to be adjusted to how long kids can tolerate mask wearing as well as where, when and how they are going to consume food.
- How long kids can tolerate a mask should determine the class day:
 - **If four hours every day with a mask is possible but six hours is not, then school needs to be four hours in person with the rest online etc.**
 - Shorter time spent in the classroom and indoors with others also reduces the risk infection regardless of whether students and faculty are wearing masks.



Other considerations: Ventilation is another key factor in reopening schools

- There's mounting evidence that SARS-CoV-2 (the virus that causes COVID-19) can linger in the air in small respiratory droplets people generate when they talk or breathe.
- Dilution of classroom air with fresh air from outside is critical. Doing so will reduce the amount of these small respiratory droplets that linger in the air which could reduce the chance of infection.
- School ventilation systems need to be upgraded and outdoor classes considered where feasible – outdoor classes have been conducted during other pandemics in the USA since the turn of the century



Other considerations: Transportation to school is a key issue

- More than half of schoolchildren take the bus to school. And many parents don't have the means to transport kids to and from.
- Because of this, bus riders will need to wear masks and physically distance, which may call for an increase in the number of buses and routes
 - With busses often full, this could also support the use of alternative scheduling so that busses are able to maintain physical distancing
- Bus drivers will need to be tested routinely



Lessons from reopening schools in other countries

To learn more about lessons learned from reopening schools see:

- **Reopening US Schools in the Era of COVID-19: Practical Guidance From Other Nations**
- ✓ Das, L.T., Abramson, E.L. and Kaushal, R., 2020, June. Reopening US Schools in the Era of COVID-19: Practical Guidance From Other Nations. In *JAMA Health Forum* (Vol. 1, No. 6, pp. e200789-e200789). American Medical Association.



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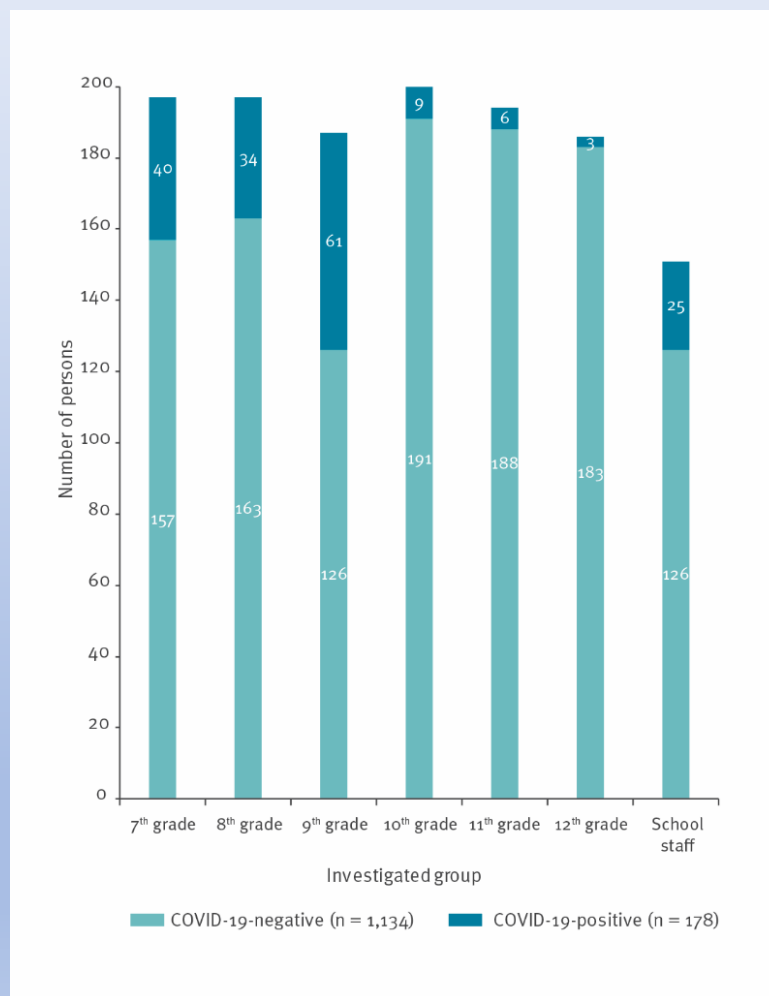
When should we reopen schools?

- The decision to reopen schools should be based on how well the spread of the virus is in the community they serve.
- If the outbreak is largely under control (have a less than 5% positivity rate) and has seen a consistent decline in new cases, in-person instruction could probably resume **as long as strategies to decrease the risk of infection in both children and adults at the school are implemented.**
 - They should also have a strategy in place to monitor the infection status among their students and the number of children who have become ill with COVID-19 so that they can isolate classrooms or institute temporary closures if transmission among their students and staff increases.
- If the positivity rate of COVID-19 is still greater than 5% in a community, then in-person instruction **should NOT** begin again.



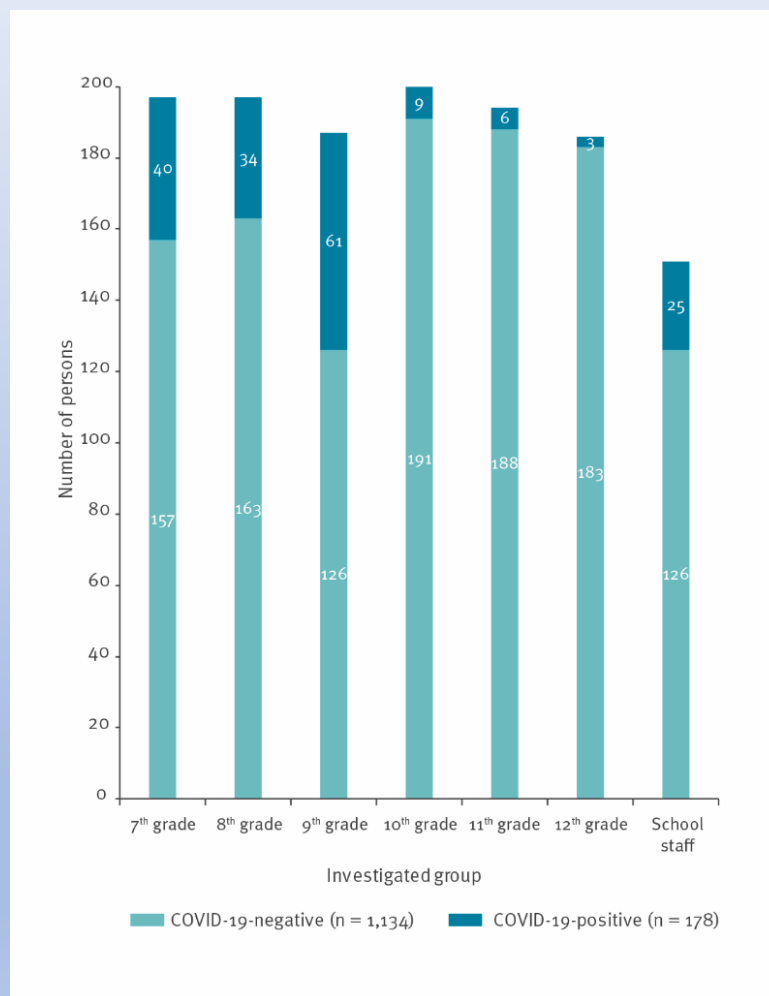
What can happen if we reopen schools too soon

- The risk may be greater in high school and college
- Israel began to reopen their high schools in late May
- When they reopened, **physical distancing among students and between students and teachers was not possible.**
 - Israel's secondary school classes are crowded (average: 29 students in public schools)
 - Furthermore, during the extreme heatwave, air-conditioning functioned continuously in all classes. The air-conditioning system was separate for each class.
- When the school year ended in late June, **the ministry said 977 pupils and teachers had contracted COVID-19.**
 - 60% of infected students were asymptomatic



What can happen if we reopen schools too soon

- Seeking to contain the spread of COVID-19, the Education Ministry vowed to shut any school with even **one** COVID-19 case.
- **It ultimately closed more than 240 schools and quarantined more than 22,520 teachers and students.**
- In an outbreak at one of the schools, approximately **17% of the school staff and 13% of the children** who attended the school ended up getting COVID-19.
 - **One third of the 9th grade class ended up acquiring the infection**





As schools reopen cases increase in the USA

- Some states are reporting astronomical increases in COVID-19 cases in children just as schools begin to reopen. **Over the past month, there's been a 90% increase in the total number of cases in children across the US.**
- One of the states with the highest increase is Florida, which has seen child cases [increase by 137% in the past month.](#)
 - This research suggests that children transmit COVID-19 just as often as adults
 - This also suggests that children can experience an illness as severe as adults do.
- A rising number of hospitalizations in children due to the disease has also coincided with the increased number of cases.
 - **Hospitalizations for child cases of COVID-19 have risen from 0.8 percent in late May to 1.4 percent in late July of total hospitalizations.**
 - Deaths have risen much slower, going from a total of 28 in late May to 86 as of July 30.



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What can happen if we reopen schools too soon: Georgia provides a case study where opening the entire school system effected community transmission

- Georgia is one state that has rushed to reopen schools without containing spread in communities first.
- Within two weeks of reopening schools in Cherokee County School District in Georgia, around 1,200 students (in high school, middle school and elementary school) and staff members needed to quarantine due to either getting COVID-19 or being exposed to someone who has it.
- Before reopening schools, Cherokee county was trending at around 10 new cases per day for the majority of June. **Now, they have been averaging 90 new cases or more daily.**



How can I track outbreaks in schools in my city?

- For those of you who have children in public schools, the National Education Association has a tracker that you can view to follow outbreaks in public schools.
- A description of their tracker can be found [here](#), and their actual tracker can be found at this address:

<https://app.smartsheet.com/b/publish?EQBCT=00a2d3fbe4184e75b06f392fc66dca13>



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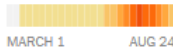
























Reopening Universities

- A New York Times survey of more than 1,500 American colleges and universities — including every four-year public institution, every private college that competes in N.C.A.A. sports and others that identified cases — has revealed at least 26,000 cases and 64 deaths since the pandemic began.
- Many colleges have reported major spikes in recent weeks as dorms have reopened and classes have started.
 - The Times has counted more than 20,000 additional cases at colleges [since late July](#).
 - To see an up to date tracking of cases at a more complete list of colleges and universities visit the NYT website*
- **It is important to consider differences in both the rules and regulations being implemented by Universities and student adherence to safety guidelines**
 - Universities will have different sets of policies and regulations related to testing, contact tracing, physical distancing, and mask wearing dependent on their local outbreaks
 - Adherence to safety guidelines by students will also vary. Local regulations for off campus settings such as bars and restaurants, health clubs and others will also influence how adherent students are to University guidelines.



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SCHOOL	CASES	LOCATION	WEEKLY CASES PER CAPITA IN THE COUNTY	
			FEWER	MORE
 University of Alabama at Birmingham*	972	Birmingham, Ala.		
 University of North Carolina at Chapel Hill	835	Chapel Hill, N.C.		
 University of Central Florida	727	Orlando, Fla.		
 University of Alabama	568	Tuscaloosa, Ala.		
 Auburn University	557	Auburn, Ala.		
 North Carolina State University	509	Raleigh, N.C.		
 University of Georgia	504	Athens, Ga.		
 Texas A&M University	500	College Station, Texas		
 University of Texas at Austin	483	Austin, Texas		
 University of Notre Dame	473	Notre Dame, Ind.		
 University of Illinois Urbana-Champaign	448	Champaign, Ill.		
 East Carolina University	392	Greenville, N.C.		
 Texas Christian University	384	Fort Worth		



Reopening college campus too soon: two examples

- **University of North Carolina:** During the first week of reopening, 130 students and five employees tested positive for COVID-19, with the positivity rate on campus surging from just under 3% to nearly 14%. Hundreds of students were placed in isolation and quarantine.
- **Notre Dame:** One day after University of North Carolina issued a two-week suspension and 8 days into the semester, Notre Dame halted in-person classes when 146 students tested positive for COVID-19

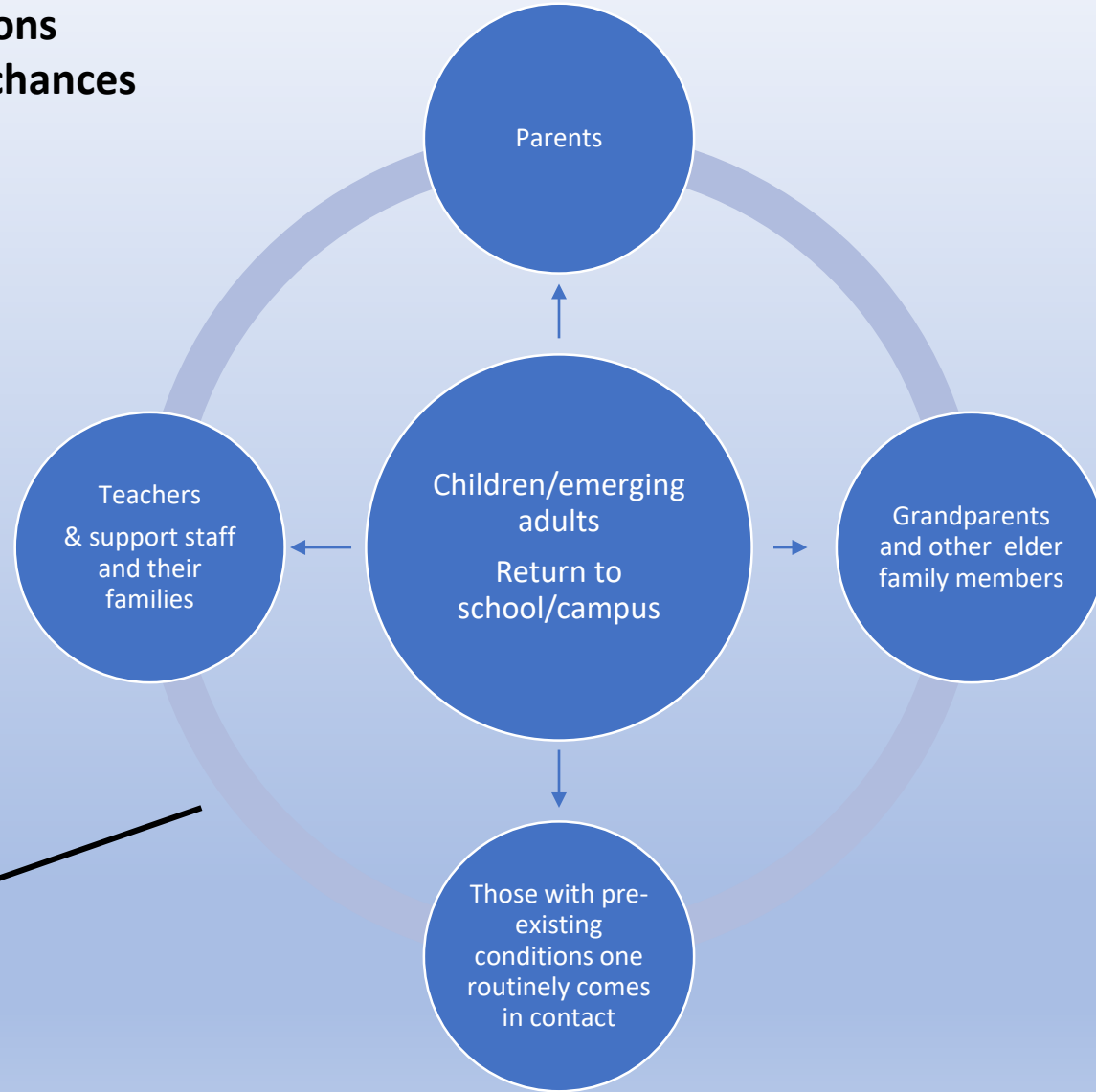


Schools are not a closed system: what happens in schools has a ripple effect in the community

- It's important to remember, **schools are not a closed system**. Children go to school, but then also come back to their households.
- Children are also not the only people that go to schools. **Administrators, teachers, and those that maintain operations and facilities are also present at these campuses.**
 - All of whom have a greater likelihood of experiencing a more severe illness and are at a greater risk of dying from COVID-19.
 - The greater number of moderate to severe cases the more the burden on the health care system and health care providers



Returning-to-school-decisions involve far more than the chances of a child becoming very ill



Mildly ill or Asymptomatic children/youth can transmit the virus to others at greater risk.

All of whom place a burden on the healthcare system and medical staff

Levels of contagion are being investigated by age group, the health status of children, household, and environmental factors



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