Coronavirus (COVID-19)

Communicating Health Risks to

College Students

The presence and expansion of COVID-19 in the US has many colleges considering the closing of their institutions the Fall of 2020. The ramifications of such a decision would be manifold, given in 2018 there were ~14 million college students in the US enrolled in public colleges and ~5 million students in private colleges.

Therefore, Who makes this decision? Are students going to be involved in the decision-making process? Their parents? And, When should a ‘path forward, be determined? Furthermore - What is the most germane and important information re: COVID-19 that should be communicated to these students? Of equal importance - How should it be communicated?

As the current COVID-19 pandemic sweeps across the US, students, faculty and administrators become increasingly shut in, unsure of the meaning of all the charts and graphs and what is coming next. Scientists, doctors and the press who provide this information agree that, generally speaking, the level of certainty, for many parameters, is low. They also concur that current messaging to date has been far from perfect.

The result is devastating - uncertainty and fear is elevated. How prevalent is the virus? If we catch it, are we likely to die or get very sick? Will the virus return in the Fall, and if so, will it have the same effects? How many of us are already immune and, if so, can we catch the virus again? While it’s not intentional, many of those who provide us with statistics and facts are, unfortunately, confusing us and making us unsure and more nervous.

In light of this situation, we want to focus on a crucial question that is relevant to the health and welfare of America’s undergraduate and graduate students in the midst of this crisis—their ability to return to their institutions in the Fall of 2020—and assess it through the lens of their vulnerability to COVID-19. While we do not currently know how many of these young adults are immune and whether the virus will even return in the Fall, we do have basic data on how much this virus impacts this population.

Any decision to open up schools in the Fall should be more than somewhat contingent on this information. It can be argued the most important data presented is the death rate of students in higher education institutions. Fortunately, this data is not uncertain. Based on a recent CDC report of viral incidence and death rate through April 24th, we know who has died from exposure to coronavirus, their age, and other parameters.

It is also instructive to present this data when compared to other infections, not only this year, but also in previous years when diseases such as influenza caused death and illness in young adults. In past years, educational institutions were not closed despite infections that also had an impact on populations in higher education institutions. Are the data on COVID-19 alarming enough, when compared to these other infections, that policy should be altered during this pandemic? We also should look at the experience of other nations that did not close schools, as well as newly arriving antibody data that sheds a light on how many people actually have been infected by COVID-19.

Let’s look at numbers in a simple, accurate and comprehensible way: as seats in a theater. Everyone is familiar with a theater (stadium, church, concert…) setting. Out of 1000 seats in a theater (representing 1000 people), how many students (in appropriate age groups), will die who are infected by the COVID-19 virus? (Our theaters can be devised for death rates by age). **©**

By using these simple theaters, we can understand how dangerous various infections may be in young adults. Infection rate is derived by dividing the number of deaths in each age group by the total number of people who have the infection. Most young adults are not tested for COVID-19 and thus we do not know how many have had an infection. We also know—based on studies of enclosed areas such as cruise and navy ships—that a vast majority of young people with this virus have no symptoms or minimal symptoms.

Thus, until antibody testing is more widely used, it will be necessary to rely on other measures to define total incidence of infection, although as we will show below early antibody tests do reveal a far larger group of people have been infected by COVID-19 than our current testing has revealed, especially since many young people do not get testing.

**COVID-19 deaths in college age students:** CDC data, as of April 24th , shows a total of 22 young adults age 15-24 died of COVID-19 in the US. The CDC does not supply accurate data on how many people in this age group test positive, but we can use other data to estimate that number.\* We know through studies and observations in such places as enclosed Navy ships that about 60% of younger people are either asymptomatic and many more have minimal symptoms, and thus most young people even with COVID-19 would likely not pursue testing. Hence, our conservative calculations of disease incidence in young adults likely over-estimate the death rate.

It should be noted that during this year, while 22 young adults in this age group died of COVID-19, 39 died from influenza and 120 died of pneumonia both unrelated to COVID-19. Among children less than 18, 3 died of COVID-19 and 78 from Influenza, showing that the likelihood of death from COVID-19 is minimal at younger ages, even below that of influenza.

As is seen in the graphic theater below, when using the more conservative method of defining incidence of disease, approximately one young adult, age 15-24, died out of 4,000 infected (1.2/4000). {**See Figure 1}** This is somewhat lower than the death rate of influenza this year, in which the estimated death rate is approximately one out of 3,000 infected young adults.

**Comparing COVID-19 to seasonal influenza among college age students**: It is also illustrative to compare this year’s flu and COVID-19 death rates to that of an infection that occurred only three years ago and was lethal to young adults - the 2017 influenza outbreak. During that flu season, ~ 60,000 Americans died of influenza. In the age group, 18-49 (some of whom were college students, although it is difficult to know how many), 80,000 people were hospitalized and 3,000 people died; in younger kids, age 5-17, 20,000 were hospitalized and 528 died. The absolute death rate from the 2017 influenza outbreak far exceeded that of COVID-19 in young kids and adults. An estimate of the total influenza deaths in age group 15-24 using the same methods as we used in the COVID-19 calculation would be 783 deaths in the year 2017 from influenza, far higher than the number of deaths from either COVID-19 (22) or influenza (39) this year.

It is important to realize that COVID-19 behaves similar to typical strains of seasonal influenza in its impact on young adults. In both cases, some young people die but these viruses usually cause no to minimal symptoms in the young with the exception of the 2017 strain. Even in 2017, no policies were passed to close schools, prevent schools from re-opening, or immunizing young adults for influenza. Despite influenza deaths every year that surpass the number of young-adult COVID-19 deaths, no policies have ever been considered to close schools, even though flu can return the following year just as readily as can a virus like COVID-19.

**Comparing the United States response of closing schools to Sweden where schools were not closed:** It is helpful to look at Sweden because during the COVID-19 outbreak Sweden did not close its K-12 schools, although it transferred its higher education to remote. Some argue that COVID-19 deaths in this country may be lower because we closed schools. But Sweden’s experience tells a different story. As of April 24th, a total of 2192 Swedes died of COVID-19, the vast majority of whom (93%) were over the age of 60, and most of whom lived in nursing homes. Despite schools remaining open, a total of 4 Swedes under the age of 30 died of COVID-19, and it is unclear if any of them were school age kids. Thus, only 0.2% of all deaths in Sweden occurred in young adults and children despite schools remaining open.

**The impact of antibody testing on this analysis:** During the next few weeks, more antibody tests will be carried out across the country, and we will have a better idea of the true incidence of disease. Antibody testing in places like Germany have demonstrated that many more people have been infected by COVID-19 than current testing (nasal swabs) indicates. In New York City, recent antibody tests reveal that as many as 20% of people may have been infected by COVID-19, most not having any symptoms. In a city of over 8 million people, that would mean that 1,679, 689 people have had COVID-19 infections, far higher than the 155,000 New Yorkers who have tested positive using nasal swabs. In fact, if these numbers are accurate, than nasal testing only captures 1.8% of all people who have been infected. Even if we assume that the antibody test is not fully accurate and that only 10-15% of New Yorkers have been infected, that still implies that only about 3% of New Yorkers with the disease have had a positive nasal test.

How does this impact our analysis of the risks of death in young adults? If we assume that only 3% of young adults with COVID-19 had been tested and had a positive test, then that would mean that approximately 2.2 million young adults would have had COVID-19 infection already, most not knowing they had it. The death rate in this scenario is that one young adult age 15-24 has died out of 100,000 infected, or **one seat filled in 100 theaters**. Again, this is based on preliminary data, but there is no question based on antibody testing carried out in this and other countries that the death rate of COVID-19 will be shown to be much lower that our current estimates once such testing is more widely used.

**Conclusion:** When presented in a simple easy to understand ‘theater’ format, policy makers who are trying to determine the risk of re-opening schools in the Fall can have hard data to use in helping to formulate their decision. This graphic is very easy for most anyone to comprehend. While many uncertainties continue to exist as to the incidence, likely recurrence, and duration of immunity related to COVID-19, it is reassuring that when using very conservative estimates the death rate for this infection among college students is small, mirroring that of seasonal influenza, and is likely to be even lower once antibody testing is employed more widely.

Our ‘theater’ decision aid has been used in many circumstances to help patients and others fathom complicated health situations. When statistics are presented as confusing numbers, percentages or pie charts, it becomes difficult to relate risk and benefit to one’s particular conditions. Our ‘theater’ portrays risk in a very simple, relatable way.

This universal decision-aid format transcends other visual-aids, since it doesn’t require the use of text or confusing mathematics. To date, it has been used in medical offices to help patients grasp the risks and benefits of health screening and the use of medicines and tests. We have also used the ‘theaters’ in national conferences to explain how they can help improve shared decision-making and patient-centered care. As a recent Cochrane review concluded: “ Compared to usual care across a wide variety of decision contexts, people exposed to decision-aids feel more knowledgeable, better informed, and clearer about their values, and they probably have a more active role in decision-making and more accurate risk perceptions.”

Utilizing this comprehensible decision-aid to portray risks of death in various demographic groups can help people understand and ally some of their uncertainty in this tense and frightening time. Such a presentation of data can also help guide policy, as to when to open colleges to a group of Americans (and others) who are at very low risk of having disease complications from COVID-19.

\* By adding up 3 years age 15-17 (752 cases) and 7 years age 18-24 (66,206 cases), the total number of people with positive tests in the age group 15-24 is approximately 68,462. Thus, the death rate is 22 deaths out of 68,462 cases, or 1.2/4000. While the actual number of test-positive cases may be slightly different than this calculation given the uneven distribution of cases in the age group, it is important to remember that the vast majority of young people do not get testing since about 80% of them are either asymptomatic or have minimal symptoms, and test supplies are not readily available leading to a paucity of testing even in symptomatic people. Thus, the total number of cases in our analysis is likely a significant underestimation of the real disease burden, and the death rate is likely far lower than what we have calculated. However, we have chosen to use a very conservative estimate that uses only hard available data.

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**Figure 1. Each theater has 1,000 seats: Conservative approach. Out of 4,000 people with likely COVID-19 infection in people aged 15-24, approximately one will die of the infection.**



