Reopening K-12 Schools During the COVID-19 Pandemic: Prioritizing Health, Equity, and Communities (2020)

National Academies of Sciences, Engineering, and Medicine 2020 prepublication July 15, 2020 summary

Recommendation 1: ***The Decision to Reopen***

Districts should weigh the relative health risks of reopening against the educational risks of providing no in-person instruction in Fall 2020. Given the importance of in-person interaction for learning and development, districts should prioritize reopening with an emphasis on providing full-time, in-person instruction in grades K-5 and for students with special needs who would be best served by in-person instruction.

Recommendation 2: ***Precautions for Reopening***

To reopen during the pandemic, schools and districts should provide surgical masks for all teachers and staff, as well as supplies for effective hand hygiene for all people who enter school buildings.

Recommendation 3: ***Partnerships Between School Districts and Public Health Officials***

Local public health officials should partner with districts to:

· assess school facilities to ensure that they meet the minimum health and safety standards necessary to support COVID-19 mitigation strategies;
· consult on proposed plans for mitigating the spread of COVID-19;
· develop a protocol for monitoring data on the virus in order to (a) track community spread and (b) make decisions about changes to the mitigation strategies in place in schools and when future full school closures might be necessary;
· participate in shared decision-making about when it is necessary to initiate closure of schools for in-person learning;
· design and deliver COVID-19 related prevention and health promotion training to staff, community and students

Recommendation 4: ***Access to Public Health Expertise***

States should ensure that in portions of the state where public health offices are short-staffed or lack personnel with expertise in infectious disease, districts have access to the ongoing supportfrom public health officials that is needed to monitor and maintain the health of students and staff.

Recommendation 5: ***Decision-making Coalitions***

State and local decision-makers and education leaders should develop a mechanism, such as a local task force, that allows for input from representatives of school staff, families, local health officials, and other community interests to inform decisions related to reopening schools. Such a cross-sector task force should:

· determine educational priorities and community values related to opening schools;
· be explicit about financial, staffing, and facilities-related constraints;
· determine a plan for informing ongoing decisions about schools;
· establish a plan for communication; and
· liaise with communities to advocate for needed resources.

Recommendation 6: ***Equity in Reopening***

In developing plans for reopening schools and implementing mitigation strategies, districts should take into account existing disparities within and across schools. Across schools, plans need to address disparities in school facilities, staffing shortages, overcrowding, and remote learning infrastructures. Within schools, plans should address disparities in resources for students

and families. These issues might include access to technology, health care services, ability to provide masks for students, and other considerations.

Recommendation 7: *Addressing Financial Burdens for Schools and Districts*

Schools will not be able to take on the entire financial burden of implementing the mitigation strategies. Federal and state governments should provide significant resources to districts and schools to enable them to implement the suite of measures required to maintain individual and community health and allow schools to remain open. Under-resourced districts with aging facilities in poor condition will need additional financial support to bring facilities to basic health and safety standards. In addition, State Departments of Education should not penalize schools by withholding state-wide school funding formula monies for student absences during the COVID-19 pandemic.

Recommendation 8: *High-Priority Mitigation Strategies*

Based on what is currently known about the spread of COVID-19, districts should prioritize mask wearing, providing healthy hand hygiene solutions, physical distancing, and limiting large gatherings. Cleaning, ventilation, and air filtration are also important, but attending to those strategies alone will not sufficiently lower the risk of transmission. Creating small cohorts of students is another promising strategy

Recommendation 9*: Urgent Research*

The research community should immediately conduct research that will provide the evidence needed to make informed decisions about school reopening and safe operation. The most urgent areas for inquiry are:

· children and transmission of COVID-19,
· the role of reopening schools in contributing to the spread of COVID-19 in communities,
· the role of airborne transmission of COVID-19, and
· the effectiveness of different mitigation strategies

Comment: This is an excellent report from a respected neutral source. The committee emphasized common-sense precautions, such as handwashing, masking, physical distancing and minimizing group activities, including lunch and recess. The report recommends surgical masks for teachers. They emphasize that online learning is ineffective for most elementary-school children and special-needs children. Most studies suggest the virus poses minimal health risks to children under 18. And the report said that evidence for how easily children become infected or spread the virus to others, including teachers and parents, is “insufficient” to draw firm conclusions, but recent studies suggest younger children may be less likely to spread the virus to adults unlike influenza. The committee did not address the level of community transmission at which opening schools might become unsafe. Schools need to decide how and when to open, close and reopen schools by taking into account many factors, including SARS-CoV-2 levels in the community — and should plan for what to do when students or teachers become infected.

Risk Factors for Mortality in Patients with COVID-19 in New York City

J Gen Intern Med published online June 30, 2020

This is a retrospective cohort study. This article described the clinical characteristics and risk factors associated with mortality in a large patient population in the Mount Sinai Health System. 6493 patients who had laboratory confirmed COVID-19 with clinical outcomes between March 13 and April 17, 2020, who were seen in one of the 8 hospitals and/or over 400 ambulatory practices in the New York City metropolitan area was included. A total of 858 of 6493 (13.2%) patients in the total cohort died: 52/2785 (1.9%) ambulatory patients and 806/3708 (21.7%) hospitalized patients. Cox proportional

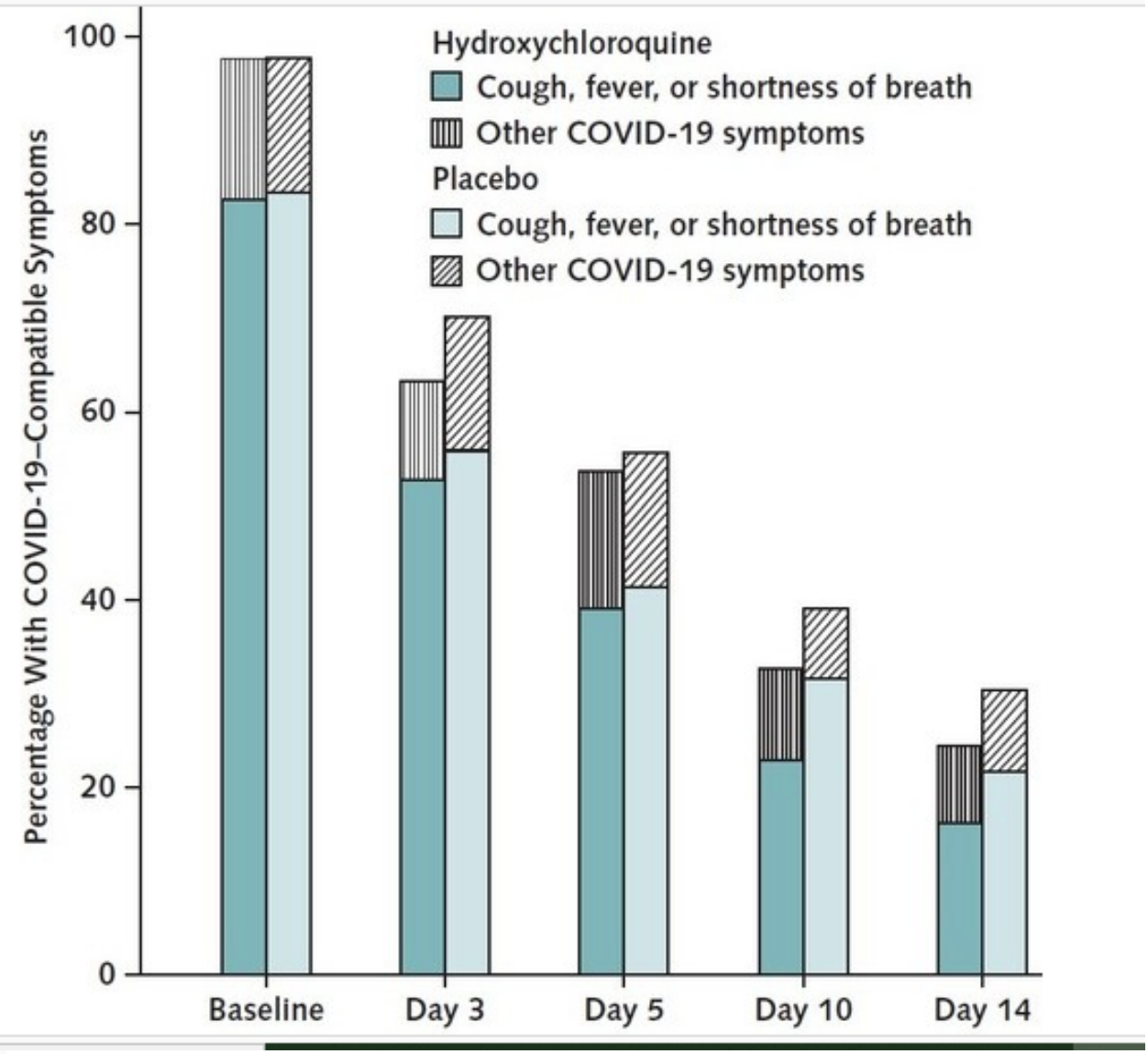
hazard regression modeling showed an increased risk of in-hospital mortality associated with age older than 50 years (hazard ratio [HR] 2.34, CI 1.47–3.71), systolic blood pressure less than 90 mmHg (HR 1.38, CI 1.06–1.80), a respiratory rate greater than 24 per min (HR 1.43, CI 1.13–1.83), peripheral oxygen saturation less than 92% (HR 2.12, CI 1.56–2.88), estimated glomerular filtration rate less than 60 mL/min/1.73m2 (HR 1.80, CI 1.60–2.02), IL-6 greater than 100 pg/mL (HR 1.50, CI 1.12–2.03), D-dimer greater than 2 mcg/mL (HR 1.19, CI 1.02–1.39), and troponin greater than 0.03 ng/mL (HR 1.40, CI 1.23–1.62). Decreased risk of in-hospital mortality was associated with female sex (HR 0.84, CI 0.77–0.90), African American race (HR 0.78 CI 0.65– 0.95), and hydroxychloroquine use (HR 0.53, CI 0.41– 0.67).

Comment: The study found patients treated with HCQ at New York's Mount Sinai Health System hospitals were 47% less likely to die after adjusting for confounding variables such as underlying health conditions and disease severity. The authors admit they were unable to adjust for unknown confounders that may affect the true treatment effect. This is another observational trial, but like the 2 articles reviewed last week, show HCQ could have a role in the treatment of SARS-CoV-2 infection, but these articles are not a substitution for more robust RCTs.

Hydroxychloroquine in Nonhospitalized Adults with Early COVID-19

Ann Intern Med published online July 16, 2020

This is a randomized, double-blind, placebo-controlled trial conducted from 22 March through 20 May 2020. Symptomatic, nonhospitalized adults with laboratory-confirmed COVID-19 or probable COVID-19 and high-risk exposure within 4 days of symptom onset were eligible. Oral hydroxychloroquine (800 mg once, followed by 600 mg in 6 to 8 hours, then 600 mg daily for 4 more days) or masked placebo were administered. Of 491 patients randomly assigned to a group, 423 contributed primary end point data. Of these, 341 (81%) had laboratory-confirmed infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) or epidemiologically linked exposure to a person with laboratory-confirmed infection; 56% (236 of 423) were enrolled within 1 day of symptoms starting. Change in symptom severity over 14 days did not differ between the hydroxychloroquine and placebo groups. At 14 days, 24% (49 of 201) of participants receiving hydroxychloroquine had ongoing symptoms compared with 30% (59 of 194) receiving placebo ($P = 0.21$). Medication adverse effects occurred in 43% (92 of 212) of participants receiving hydroxychloroquine versus 22% (46 of 211) receiving placebo ($P < 0.001$). With HCQ, gastrointestinal symptoms were the most reported adverse effect: 31% (66 of 212) of participants reported upset stomach or nausea, and 24% (50 of 212) reported abdominal pain, diarrhea, or vomiting. The dose of HCQ is higher than other studies. With placebo, 10 hospitalizations occurred (2 non–COVID-19–related), including 1 hospitalized death. With hydroxychloroquine, 4 hospitalizations occurred plus 1 nonhospitalized death ($P = 0.29$).



Comment: This is the first RCT evaluating HCQ as an outpatient. One of the major limitations was only 58% of participants received SARS-CoV-2 testing because of severe U.S. testing shortages at the time. Nonetheless, this RCT with HCQ did not substantially reduce symptom severity in outpatients with early, mild COVID-19. The numbers were relatively small and may not have been powered to see a significant effect with HCQ.

Factors Associated With Death in Critically Ill Patients With Coronavirus Disease 2019 in the US

JAMA Intern Med published online July 15, 2020

I believe this is the largest known multicenter cohort analysis of critically ill COVID-19 patients across geographically diverse US regions. They report that 784 of 2,215 adults (35%) admitted to intensive care units (ICUs) at 65 hospitals from Mar 4 to Apr 4 died within 28 days of hospitalization. Factors independently associated with death included older age (≥80 vs <40 years of age: odds ratio [OR], 11.15; 95% CI, 6.19-20.06), male sex

(OR, 1.50; 95% CI, 1.19-1.90), higher body mass index (≥40 vs <25: OR, 1.51; 95% CI, 1.01-2.25), coronary artery disease (OR, 1.47; 95% CI, 1.07-2.02), active cancer (OR, 2.15; 95% CI, 1.35-3.43), and the presence of hypoxemia (Pao_2:Fio_2<100 vs ≥300 mm Hg: OR, 2.94; 95% CI, 2.11-4.08), liver dysfunction (liver Sequential Organ Failure Assessment score of 2 vs 0: OR, 2.61; 95% CI, 1.30–5.25), and kidney dysfunction (renal Sequential Organ Failure Assessment score of 4 vs 0: OR, 2.43; 95% CI, 1.46–4.05) at ICU admission.

After adjusting for multiple risk factors, death rates ranged widely across hospitals, from 6% to 80%. The number of prepandemic ICU beds in the hospital was strongly linked to death rate. Patients admitted to hospitals with fewer than 50 ICU beds had a more than three-fold higher risk of death than those admitted to hospitals with at least 100 ICU beds. Hospitals varied widely in the proportion of patients given medications and supportive treatments, some of them unproven, for COVID-19. Hydroxychloroquine, azithromycin, and anticoagulants were commonly prescribed, and methods such as prone positioning were used. For example, prone positioning was used in only 4% of patients at one hospital, while it was used in 80% of patients at another. Hospitals also varied considerably in the percentage of patients who received hydroxychloroquine, tocilizumab, and other treatments and supportive therapies.

Comment: ICU patients with COVID-19 have a greater than 1-in-3 chance of short-term death. They also found that treatment and outcomes varied considerably between hospitals. I did not find the variability in treatment surprising given the time frame of the study which was early in the pandemic as treatment and knowledge was evolving. The authors did not collect detailed data on ventilator management strategies, hospital or ICU patient volume, or physician and nurse availability. They did not collect data on the socioeconomic status of the patients or collect data on do-not-resuscitate or do-not-intubate orders or the availability of palliative care for patients. These factors may have contributed to differing rates of intubation and ICU admission, and thus mortality, across centers.

Risk Factors Associated with Mortality Among Patients With COVID-19 in Intensive Care Units in Lombardy, Italy

JAMA Intern Med published online July 15, 2020

This is a retrospective, observational cohort study included 3988 consecutive critically ill patients with laboratory-confirmed COVID-19 referred for ICU admission in Italy from February 20 to April 22, 2020. Of the first 1,715 patients, 865 (50.4%) had been released from the ICU by May 30. Another 836 (48.7%) had died in the ICU, and 14 (0.8%) remained in the ICU. They included the second 2,273-patient subgroup, 1,926 of the 3,988 total patients died (48.3%) after a median follow-up of 69 days. Overall, 1,769 patients (44.3%) died in the ICU, while 91 patients (2.3%) remained in the ICU, and 2,049 (51.4%) were released from the ICU. Of the 3,988 total patients, 1,480 (37.1%) had been released from the hospital, and 501 (12.6%) remained hospitalized as of May 30. At ICU admission, 2,929 of 3,355 patients (87.3%) needed invasive mechanical ventilation. Another 350 needed extra oxygen delivered through a helmet or oxygen mask. Risk factors for death included advanced age, male sex, the need for high levels of oxygen support on admission, and

history of long-term illnesses such as chronic obstructive pulmonary disease, high cholesterol levels, and type 2 diabetes.

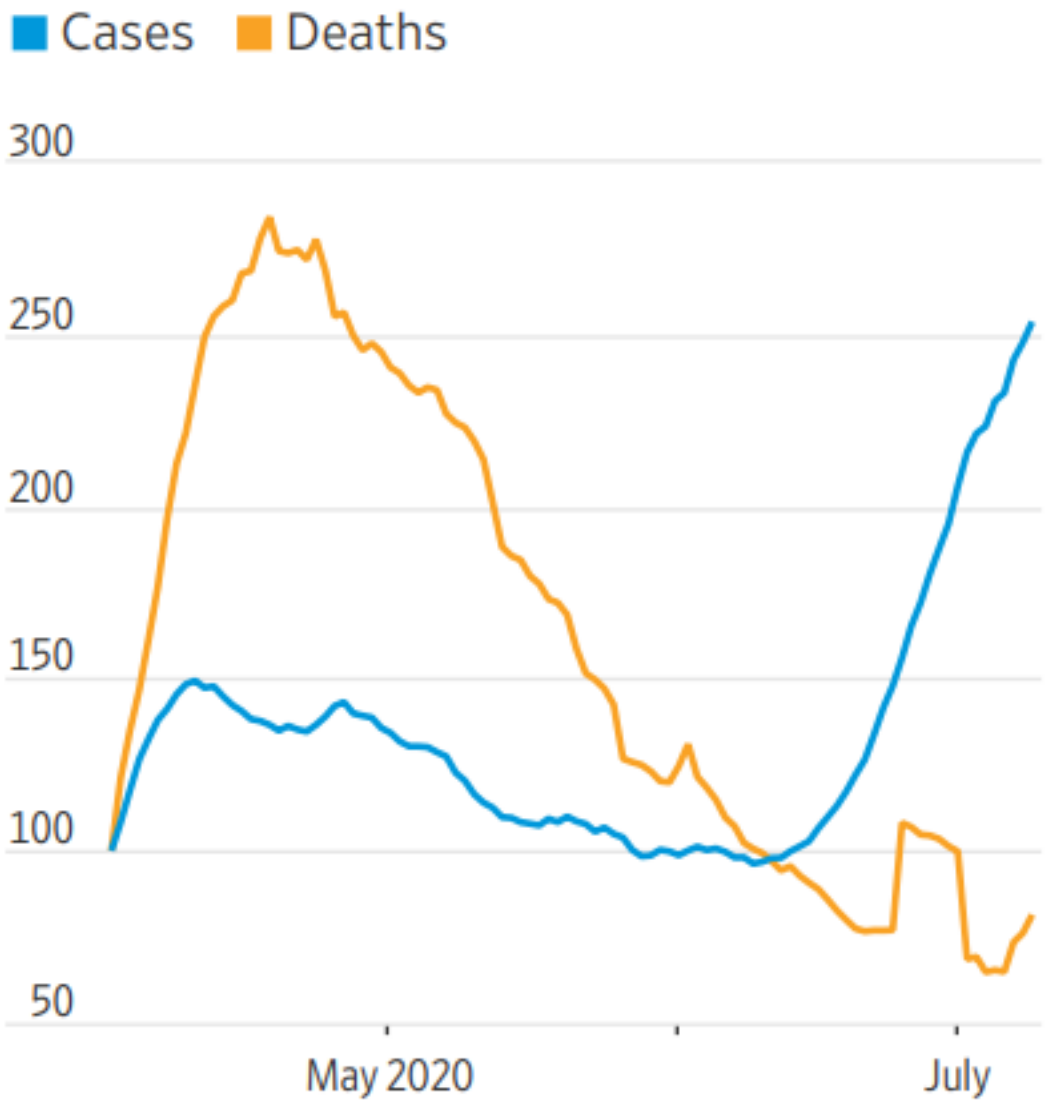
Comment: These are sobering statistics that highlight long ICU stays, prolonged need for respiratory support, and high mortality of COVID-19 in critically ill patients early in this pandemic. The authors admitted ICUs were crowded with COVID-19 patients needing high levels of treatment which compromised healthcare workers' ability to care for them. Both articles highlight the high mortality of patients with life threatening SARS-CoV-2. Current therapy and practice have dramatically improved including remdesivir, plasma, DVT prophylaxis, steroids, and IL-6 inhibitors etc.. (see below)

Outcomes from intensive care in patients with COVID-19: a systematic review and meta-analysis of observational studies
Anesthesia published online July 14, 2020
The authors searched MEDLINE, EMBASE, PubMed and Cochrane databases up to 31 May 2020 for studies reporting ICU mortality for adult patients admitted with COVID-19. The primary outcome measure was death in intensive care as a proportion of completed ICU admissions, either through discharge from the ICU or death. COVID-19. The primary outcome measure was death in intensive care as a proportion of completed ICU admissions, either through discharge from the ICU or death. Twenty- four observational studies including 10,150 patients were identified from centers across Asia, Europe and North America.

In patients with completed ICU admissions with COVID-19 infection, combined ICU mortality (95%CI) was 41.6% (34.0–49.7%), I2 = 93.2%). Sub-group analysis by continent showed that mortality is broadly consistent across the globe. As the pandemic has progressed, the reported mortality rates have fallen from above 50% to close to 40%.

Comment: Patients admitted to ICU were more likely to receive invasive mechanical ventilation and more likely to die. Intensive care provision and admission criteria differ across global healthcare systems, and so that admission to intensive care is unlikely to be consistent in all studies. In addition, the initial recommendation for early intubation has been replaced with high flow oxygen and self proning which has resulting in fewer patients needing mechanical ventilation. Nonetheless, it is clear the initial mortality rates for SARS-CoV-2 infections in the ICU has substantially declined with improved treatment as discussed in comments above. More recent analytics in the Houston area suggests even lower mortality for patients admitted to the ICU but risk adjustments etc. are needed before confirming this trend. See graph below

U.S. confirmed Covid-19 cases and deaths, seven-day rolling average (April 1 = 100)



Source: Johns Hopkins University