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Considerations for Safely Reopening American Schools

The following documents support making decisions about reopening schools and procedures to facilitate safe and successful reopening. We are providing COVID-19 perspectives, information, and guarded advice based on our present understanding of immunology, public health, and 40+ years of providing practical health and safety advice to schools. However, we are dealing with a historic unknown and perspectives and preferred practices will evolve. We have learned much about COVID-19 and schools safely operating which is important to share.

Educational leaders are facing their professional lifetime career challenge—we are committed to providing support.

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WE AGREE WITH THE AMERICAN ACADEMY OF PEDIATRICS, reopening school decisions must subordinate to our evolving understanding of health and safety risks related to school facility closure and reopening. The safety of students, district employees and the community must be considered. Yet, the prolonged closure of schools and school facilities introduces costly social distortions as well as health and safety risks. The objective is to open schools in a pattern that focuses on safety while fulfilling the educational mission.

The SARS-CoV-2 unique novel virus initially stunned and confused the world's most respected medical virologists and public health epidemiologists. Contradictory messages flowed from respected public leaders and health experts alongside promotions of controversial products and erratic perspectives from some internet sources. Amid this confusion there was/is the destabilizing reality of COVID-19 disease and death.

Today, we have come to understand some of the characteristics of exposure to SARS-CoV-2 and preventive approaches to avoid COVID-19 disease. There is always risk but it can, to a large extent, be controlled through responsible management, typically allowing at least partial school facility reopening for most students and school employees.

The following considerations are important:



1. Collateral Damage with School Facility Shutdown is Serious

Following the 2003 SARS-1 epidemic (not pandemic), the Centers for Disease Control conducted meta-research involving hundreds of analyses regarding the damage from prolonged school shutdowns. There were serious physical and mental health casualties alongside tragic developmental damage and community disruption. Because of unlikely vaccination availability for children in the near future, the COVID-19 pandemic concerns will continue for schools. While being sensitive to community incidence and prevalence, eliminating our established educational infrastructure in perpetuity is unacceptable.

Definitions Relating to Discussions of School Openings and Covid-19

SARS-1 – A severe acute respiratory syndrome virus of the coronavirus family which emerged in 2003 causing an epidemic or “small pandemic.” It resulted in some 8000 +/- deaths, approximately 20% of which were healthcare providers. It served as a warning to public health professionals and immunologists that a more serious SARS coronavirus pandemic could occur in the future.

SARS-CoV-2 or SARS-2 – Similar to SARS-1, emerging in 2019, it caused a worldwide pandemic due to its propensity to harm and rapidly contaminate.

COVID-19 – The clinical disease caused by SARS-2, usually involving lung damage and consequently creating a range of symptoms, many serious. The term is also often used to refer to the pandemic which it created.

NPI – Non-pharmaceutical interventions such as the use of facemasks, distancing, hygienic cleaning, isolating those who may be contaminated and control of ambient air.

PPE – Personal protective equipment such as face-masks, gowns and gloves and face shields.

Fomite Exposures – Contracting an infection from touching contaminated surfaces. Initially thought to be a primary source of COVID-19 contamination, now understood to represent a risk significantly secondary to air-borne person-to-person exposures.

Incidence and Prevalence – The public health measures used to determine the levels of illness suffered by a specific disease. Incidence measures the rate of occurrence of new cases of a disease or condition. Prevalence measures the level of a disease or condition in a particular population at a particular point in time. These two measurements are presently used in a community to determine relative risk and influence voluntary or mandated restrictions on school facilities.

Universal Precautions – A public health or medical determination that all individuals, regardless of characteristics of health or other variables will be subjected to standardized mandated hygienic controls.

Differential Carbon Dioxide (dCO₂) – A numerical representation of the propensity for individuals in the school or other indoor areas sharing breathing zones, serving as a proxy for potential risk of viral infection. The number does not measure the SARS-2 virus but the differential between the outside ambient air and the inside burden of carbon dioxide. Research has determined that this number typically corresponds to the risk of COVID-19 contamination within an indoor area.

2. Universal Precautions

The public health concept of “universal precautions” must be followed. This means that everyone should be considered capable of contaminating others or being contaminated. Individuals that show no symptoms often contaminate others. The testing protocols we presently employ may provide false-negative results. People can rarely, but potentially contaminate after negative test results. When precautions are established to ensure safety, **they must apply to everyone**. All human cross-contact should be considered a potential risk and responsible personal conduct and facility management applies to all school facility occupants.

3. Identification and Isolation

The infrastructures for both identifying and responding to COVID-19 are unquestionably effective in restricting contamination. The introduction of cyber-monitoring for rapidly identifying contact points may be of special value in schools. Also, the protocols for isolation have become more effective and humane. The reopened schools must have procedures for identifying and temporarily isolating individuals considered at risk. Similarly, if there is parental concern regarding cross-contamination, possibly relating to a vulnerable student or an at-risk adult at home, a protocol for isolation options, typically involving remote learning should be available. Offering parents and guardians carefully described options is typically appreciated.

4. Hygiene

Insisting upon and vigorously promoting hygiene etiquette is important and is becoming socially understood and accepted. Clear warnings and hygiene supportive signage along with the self-reporting of potential contamination are critical. Signage examples are available and may be downloaded from this site and used as posters or school supportive electronic postings accompanying school specific messaging. *(See the poster and postings section on our home page.)*

5. Facility Controls

The rapid spread of contamination in facilities, including hospitals, certain work sites and communal living situations, demonstrated that management of the facility, including personal protection (face masks), selective isolation, personal distancing, cleaning protocols, and most especially, controlled ambient air are fundamental to limiting risk. Administrators and facility managers can create operational options assuring distancing. This may involve scheduled partial attendance, seating arrangements and the cautious use of barriers.¹ There are numerous publications to support the above. Personal hygiene guidelines are always critical.

¹ Reliance on barriers alone to limit viral exposure has sometimes proven to be problematic in schools. The typical Plexiglas barriers have disrupted air flow creating “dead zones” and increased exposures. They may be safely employed if area/classroom air exchange is monitored.



We have learned that fomite transmissions, or becoming contaminated from touching surfaces, is a potential, but not a major source of SARS-2 contamination. Hygienic cleaning is important, but should not be the primary source of contamination control within a school. The most serious risk typically relates to shared breathing zones.

The most complex, and significant aspects of school facility management involve ambient air controls and the dilution of occupant emissions of the SARS-2 virus. Over the last six months, research has made it clear that while sanitation-oriented



actions, such as wiping down potentially touched surfaces, are important, the control of personal emissions and ambient air represents the greatest opportunity to limit contamination. This may be a special problem for many school facilities constructed between the 1950s and 1990s. In that period schools followed standardized guidelines for air exchange that minimize the introduction of fresh air. Those guidelines initially did not allow for proper indoor air dilution, thereby promoting virus exposures. We have discovered high levels of contamination in buildings where hygienic controls were rigidly enforced but mismanaged airflow

supported spreading viruses. Similarly, even tightly packed gatherings in outside environments, where ambient air was naturally diluted typically resulted in limited contamination.

In our view, indoor air quality is an issue that must be addressed within the school facility to allow reasonably safe reopening. **Public health-sensitive air handling must be introduced, monitored, and maintained in the school setting.**

Several years ago, we published a widely distributed book for school facility administrators which strongly promoted enhanced and public health sensitive air exchange in American schools. We knew then that the incidence of influenza (a viral disease) was much higher in post-World War II schools. The pre-1950s schools with elevated ceilings, large windows that could be opened, and plenums over the door to permit air exchange had better air and less illness. The book was published years before the COVID-19 pandemic and a revised version of the book will be available for download from this site incorporating COVID-19 issues in schools. Quality air exchange absolutely reduces viral exposure.

Recent research by medical engineers has found that simply upgrading air exchange in itself does not necessarily limit the risk of shared-air contamination. The use of HEPA air purifiers and appropriate diffusion of makeup air introduced into air handling systems needs to be carefully managed. It is likely that the “sealed-up” construction design of schools built post-World War II and not subsequently re-engineered will represent the greatest challenge in securing a safe reopened school environment. Schools should consider low-cost monitoring of classrooms and other gathering areas to provide real-time profiles of breathing-zone hygiene. A description of such a process involving inexpensive measuring of carbon dioxide burdens or dCO_2 is described on this site. (See *Benchmarking School COVID-19 through Differential Carbon Dioxide (dCO_2)*.)

6. Relationship with the Public

A comprehensive survey of parents was recently conducted asking opinions regarding school re-openings in Texas. There was an almost perfect 50-50 split regarding reopening. Once the rate of COVID-19 had diminished, but not abated,

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it was clear that a substantial majority of parents trusted the school district to “advise them on making the right decision.” The majority of the public likely will have confidence in the path chosen by the local school district within the parameters of state regulation, if the decision and procedures are clearly explained. On-going contact with the public must be a vital part of any re-opening plan.

Early on in the pandemic, two major school districts, Arlington, Texas, and Boise, Idaho stated that they would offer an option to parents for selecting in-person or remote learning. In both cases, most parents requested input from the district to advise them on making their decisions. With support from the local public health authorities, the district presented the options to the parents along with descriptions of the safeguards and programs they would implement for in-place and distance learning and for responding to changes in the incidence and/or prevalence of COVID-19 in their local areas. Their approach was and has been well accepted, and makes sense from a public health perspective. While there will be outliers, most parents and students will respond to responsible communications from school districts providing responsible information and options.

It's important to recognize that the school district is in a position to optimize the sharing of information compatible with that from local public health authorities. Local schools represent a trusted and relied upon resource for safeguarding the whole community.

7. Learning Experience

Two monumental dynamics are occurring throughout the world regarding COVID-19, as it profoundly impacts the lives of every child. The school can enable student understanding of them both to valuable social benefit.

The first involves the nature of the human immune system and the consequence of responsible public health and personal health decisions. The lives of every student will be changed because of the characteristics of the pandemic which can be addressed through conscientious personal conduct and wise public policy decisions.

The second dynamic is the powerful negative and positive role internet/cyber-space has played in spreading misunderstanding, but more especially in promoting enlightenment regarding this complex but critical event. How electronic communication information is used, evaluated, and rejected or accepted has become vital to not only thriving, but surviving in the face of crisis.

It will be the school that can recast these historic dynamics in educational events that will ultimately enrich students and society. Perhaps, in a way, the suffering and destabilization may provide something of value to our children as they come to terms with a dangerous, but potentially a safer and better world.