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School Attendance, Asthma Risk, and COVID-19 in Children



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In the face of tremendous uncertainty during the current pandemic, there is a need for clear and consistent recommendations and an understanding of the evidence in general, and for families of children with allergic conditions. A common concern of parents of children with asthma is the risk that in-person learning poses during the pandemic. This Rostrum examines the actual risk of in-person learning among children with asthma during novel coronavirus disease 2019 (COVID-19), the discrepancy between perceived and actual risk, the contributing factors to this discrepancy, and possible solutions to narrow this divide. Overall, the evidence does not support that children with asthma are at an increased risk of COVID-19 morbidity or mortality compared with children without asthma. Asthma medications do not appear to contribute to incidence or severity of COVID-19 disease. However, there is a high perceived risk of in-person learning that is partially related to how it is portrayed in the media. There is little guidance regarding transitioning asthmatic children back to school and how to properly counsel on mediation of risk. There are differences regionally and locally around school reopening, exemptions, and their implementation. To narrow the divide between perceived and actual risk, clear consistent and ongoing communication will be necessary. © 2021 American Academy of Allergy, Asthma & Immunology (J Allergy Clin Immunol Pract 2021;9:2145-50)

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The novel coronavirus disease 2019 (COVID-19), caused by the pathogen severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has afflicted more than 100 million people internationally and caused more than 2.1 million global deaths as of January 28, 2021.¹ Although much remains to be learned about the long-term impact of COVID-19 on the health and well-being of children, foremost on the mind of many parents of children with asthma in the fall of 2020 was the impact of COVID-19 on asthma, and what decisions should be made around return to in-person school learning. In the face of continued uncertainty, there is a need for clear perception of the competing risks associated with COVID-19, asthma, and virtual learning. It must be acknowledged that individuals appreciate risk with differing perspectives and with idiosyncratic biases, such that maintaining accurate risk perception is often realized as an iterative process reliant on engagement in shared decision-making.^{2,3}

There are 2 approaches to risk: the *realist approach* (actual risk, eg, risk independent of personalized context) and *social constructionist approach* (perceived risk, eg, risk inter-related with social/personal context). Pragmatically, there is often a great divide between actual and perceived risk.^{4,5} The goal of this Rostrum is to review the actual risk of in-person learning among children with asthma during COVID-19, the discrepancy between perceived and actual risk, the contributing factors to this discrepancy, and possible solutions to narrow this divide.

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Abbreviations used

CDC- Centers for Disease Control and Prevention

COVID-19- Novel coronavirus disease 2019

SARS-CoV-2- Severe acute respiratory syndrome coronavirus 2

THE ACTUAL RISK OF IN-PERSON LEARNING AMONG CHILDREN WITH ASTHMA DURING COVID-19

The evidence to date supports that children with asthma do not appear to be at increased risk of COVID-19 morbidity or mortality compared with children without asthma.⁶ Children, in general, have been observed to have a less symptomatic COVID-19 course than adults, and those children who do become symptomatic have uncommonly required hospitalization, to date.^{1,7} Based on data from the Centers for Disease Control and Prevention (CDC), children have comprised (to date) less than 0.1% of all COVID-19 mortality.⁸ A systematic review of the impact of asthma on COVID-19 in children noted only 2 reports describing asthma/recurrent wheeze as a COVID-19 risk factor, concluding that there are “scarcely any data on whether childhood asthma (or other pediatric respiratory diseases) constitute risk factors for SARS-CoV-2 infection or COVID-19 severity.”⁹ A recent retrospective review of COVID-19 infection among children with asthma (N = 212 children) investigated the association between asthma severity and severity of SARS-CoV-2 infection.¹⁰ COVID-19 symptoms noted in all of these children were mild (the most common symptom was fever), and neither asthma severity nor asthma control in the preceding year was associated with a worse clinical course.¹⁰ An Italian cohort of 100 Italian children with laboratory-confirmed COVID-19 assessed in the emergency department—the CONFIDENCE study—did not note asthma as a comorbidity in any of the children with severe disease or who required respiratory support.¹¹ The CDC morbidity and mortality report notes that asthma was the most commonly reported underlying condition although among school-aged children with laboratory-confirmed COVID-19.¹² However, only 1.2% of children infected with COVID-19 required hospitalization, and fatalities were exceptionally rare (<0.01% of cases or <1 in 10,000 cases).¹²

The data thus far are in keeping with conclusions drawn from previous coronavirus pandemics, such as severe acute respiratory syndrome (SARS). SARS, due to human coronaviruses HCoV-229E and HCoV-OC43, did not cause an increase in asthma exacerbations in children during the 2002 epidemic, nor induce bronchial hyperreactivity or eosinophilic inflammation.¹³ In fact, paradoxically, asthma exacerbations actually decreased during that time, which was attributed to improvements in hygiene measures related to the epidemic.¹³

The use of asthma controller agents may provide additional protection in both asthma control and attenuation of SARS-CoV-2 inflammation,¹⁴ whereas inhaled corticosteroids may be associated with lower angiotensin converting enzyme 2 and transmembrane protease serine 2 expression, proteins that mediate viral infection of host cells.¹⁵ A recent systematic review and meta-analysis of 744 asthmatic and 8151 non-asthmatic patients found no significant COVID-19 mortality risk associated with asthma (odds ratio = 0.96, 95% confidence interval: 0.70-1.30, $I^2 = 0\%$, $P = .79$).¹⁶

IN-PERSON LEARNING

- Improved school performance, in particular among those facing adverse social determinants



- Exposure to school-based medical programs and school lunch programs



- Workforce impact: As home childcare is not needed, parents can leave home to work or work at home more easily



- Beneficial social development through face-to-face contact with classmates

VIRTUAL LEARNING

- Fewer interruptions in the learning process



- Decreased travel time to school for children (and parents of younger children)



- Lower risk of infection (in general)

FIGURE 1. Benefits of in-person versus virtual learning.¹⁷⁻²²

Data support 3 conclusions to date:

1. Children are at significantly lower risk of COVID-19 morbidity and mortality than adults.
2. Children with asthma do not appear to be at increased risk compared with other children, and asthma medications do not seem to contribute to incidence or severity of COVID-19. As a result, asthma as a comorbidity does not appear to be a safety risk for children to attend in-person school with their peers during COVID-19, and this diagnosis alone should not require a transition to virtual learning to additionally protect the child.
3. Moving forward, there has been an interesting association between lower rates of viral-induced wheezing in children and virtual learning/social distancing (eg, masking), which underscores the effectiveness of measures to reduce respiratory pathogen spread and reinforces the strength of leverage that viruses have on asthma pathogenesis.

There are possible unintended consequences that could result from virtual versus in-person learning, which disproportionately impact vulnerable populations (Figure 1). However, these consequences have to be balanced with some of the possible benefits, for some families, of a virtual learning approach. The benefits and risks of in-person versus virtual learning may evolve as evidence grows, and may differ based on underlying population, adherence to other public health recommendations, and baseline susceptibility to infection.

THE PERCEIVED RISK OF IN-SCHOOL LEARNING AMONG FAMILIES OF CHILDREN WITH ASTHMA

The global media has publicized multiple stories about families concerned regarding the impact of in-person school

attendance on asthma during COVID-19.²³⁻²⁶ *The Washington Post*, in an article about back to school and COVID-19, quotes a child and adolescent psychologist describing her choice to transition to remote learning who states: "...safety is our top priority right now... We do have one asthmatic child, and that plays a role in our decision-making."²⁷ A story of a family in Sacramento, California, who chose to keep their child with asthma from in-school learning notes: "Keeping him healthy and out of the hospital for something as simple as getting a cold during a normal school year was hard enough... Physically sending him back to school among COVID-19 could kill him."²⁸ A story of families who deregistered their children from in-person learning in England quotes a mother who states: "if your child has...asthma...you could probably persuade the school to provide virtual learning at home."²⁹ These and other articles describe the sentiment that some families hold, indicating that the choice to send children to school in-person carries the perception that it is a matter of "life or death."

Although the extent to which parents have transitioned to virtual learning, and the extent to which the child's asthma has leveraged this decision, has not been studied in depth, a few research studies provide some insight. The Gallup poll's coronavirus tracking survey has found that 44% of parents favored virtual learning over in-person school for the fall 2020 season.³⁰ A cross-sectional nationally representative study of 730 US parents (of children aged 5-17) in June 2020 noted that 31% of participants indicated that they would probably or definitely keep their children home from school during the fall of 2020.³¹ Planning to keep children home was statistically associated with fear ($P < .001$) and lack of confidence in schools to prevent transmission ($P < .001$). A national Canadian survey by the Association for Canadian Studies found that 66% of parents were worried about return to in-person learning.³² Although these surveys did not differentiate whether concern about return to in-person learning was associated with perceived risk of chronic conditions such as asthma, a recent survey found that the majority of parents of school-aged children with asthma (64%) were worried about an asthma exacerbation during COVID-19, also poignantly noting that emotional well-being had impacted asthma control.³³ A clearer understanding of the motivation and beneficiaries of the decision to keep a child out of in-person school is needed.

FACTORS CONTRIBUTING TO THE DISCREPANCY BETWEEN ACTUAL AND PERCEIVED RISK

There are several factors that contribute to the discrepancy between the low actual risk of in-person learning for children with asthma compared with children without asthma, and the high perceived risk. The first is related to how risk was communicated on a national and international level. There is little guidance regarding transitioning asthmatic children back to school and how to properly counsel on mediation of risk.³⁴ There are differences regionally and locally around school reopening, exemptions, and their implementation.³⁵ For example, although multiple international organizations such as the CDC list asthma as a possible risk factor for severe COVID-19,³⁶ it has been noted that this classification is "based more on common sense rather than mounting evidence."³⁷ In addition, the implications of being a child "at high risk" are not defined, nor is how this definition should be implemented in terms of

back-to-school policies. The decision about which child is at "high risk" for return to school, despite an analytical approach, was made in a time where information was rapidly evolving and where the actual risk of disease transmission and disease severity among children, especially children with pre-existing conditions, remained unknown. There are multiple possible biases at play. The first is framing effect (the tendency to react to information based on how it is framed) whereby asthma was listed as a risk factor and hence was transmitted as a risk factor in policy, despite lack of scientific evidence to support it. The second is confirmation bias (as asthma is exacerbated by respiratory disease, there is an assumption that asthma is a risk factor despite evidence from prior epidemics that asthma is not). Finally, there is prominence effect (perhaps focusing on overcalling risk due to its prominence such as in the media without evaluating the unintended consequences of not attending school—which has been documented from a social and emotional perspective for children).^{13,38} There was also likely very significant political pressure in an environment where the decision was made during evolving available information and little to systematically or objectively assess risk.

Social and news media have a strong influence on public perception of risk, and this effect is amplified in times of heightened uncertainty.³⁹ Much of this information is false, or inflammatory, and has been described by the World Health Organization as an "infodemic," noting that incorrect information "spreads faster and more easily than this virus."⁴⁰ The media is full of stories noting that asthma may increase the risk of COVID-19. There are quotes such as "respiratory diseases like COVID-19 often affect asthmatics more seriously than the average person...airways, already prone to swelling, can become doubly inflamed when a virus takes hold,"⁴¹ and "people with asthma...face a higher risk of serious illness if they contract the virus."⁴² These stories are frequently publicized but unsubstantiated by specific evidence related to COVID-19. In the context of a social amplification and attenuation of risk framework, the volume and dramatization of information each contribute to heightened perception of risk.⁴³ This heightened perception also has a "trickle up" effect whereby the public perception of risk informs the risk perception of policymakers, who must to some degree support the perceptions of their constituents.^{4,5}

NARROWING THE DIVIDE BETWEEN PERCEIVED AND ACTUAL RISK

The CDC has a framework for effective risk communication during a pandemic/epidemic termed the Crisis and Emergency Risk Communication framework, which is broadly used within the field of risk communication.⁴⁴ This framework provides the opportunity to narrow the divide between perceived and actual risk and is based on 6 key principles: be right, be credible, be first, promote action, express empathy, and show respect. To be right and credible, it is essential that the message to families of children with asthma be clear: asthma is not a contraindication to school attendance during COVID-19.^{45,46} This recommendation is supported by multiple studies that have not shown that pediatric asthma is an increased risk for COVID-19 morbidity or mortality (and in fact, in some studies, actually support a protective effect).^{9,10,14,16,37,47-50} To be first, if this message is presented early, and clearly, it helps mitigate framing bias (the tendency to react to information based on how it is framed) as

well as anchoring bias (the tendency to be influenced by the earliest information presented).

It is key to keep risk in context.² In the United States, COVID-19 has claimed 429,230 lives as of January 28, 2021.¹ This is a devastating loss. However, it is important to appreciate that of 330,659,196 individuals living in the United States, the fatality risk of COVID is approximately 80 in 100,000 persons. The CDC estimates childhood COVID-19 fatality to be 16-fold lower, such that the US childhood COVID-19 fatality approximates 5 in 100,000.⁵¹ Evidence suggests that asthma does not increase this risk.^{16,52} For context, it seems that the risk of pediatric COVID-19 fatality (in a child with or without asthma) is exceeded by the estimated risk of death from every other cause (unrelated to COVID-19) in the United States or Europe.⁵³ Helping families understand and incorporate relative risks is important in maintaining perspective. This does not mean encouraging reckless or irresponsible behavior. For example, just as clinicians encourage seatbelt use when transporting children to school, they should advocate hand hygiene, physical distancing, and pandemic mask use in the classroom.

To promote action—such as discussing how families can reduce the risk of COVID-19 transmission during in-person school learning (including staying home and being screened if sick, avoiding close contact, masking, regular handwashing, and following public health regulations)—reduces helplessness and provides empowerment for families struggling with the decision of where to educate their child with asthma.^{44,45} To express empathy and respect, engaging families on an individual level, and also ensuring that this information is transmitted regularly and accurately on a broader level, improves confidence in, and understanding of, the message. As evidence and understanding evolve, it is essential to ensure that public health officials remain “first” in providing the community with the message around in-school learning to allow proper framing of the societal perception to counter misinformation.⁵⁴ Social media is essential in mitigating misinformation as it has the potential to reach diverse audiences, facilitating engagement and empowerment and extending transmission of the message.^{5,55} Allergy societies must ensure that the message about asthma and schools is conveyed on multiple forms of social media—such as Facebook and Twitter—and updated regularly.^{5,56,57} Allergy societies ideally would also establish ongoing communication with the CDC and other national health policy organizations as well. Hashtags such as the Canadian Pediatric Society’s #KidsNeedSchool⁴⁵ could also be considered, though these should focus on the specific disease state information rather than the broader context of school safety.

Any communication, whether it be individual, broad, or through social media, must incorporate elements of health literacy to ensure that it is easily understandable. Mitigating the impact of health literacy helps to narrow the divide between perceived and actual risk. Strategies include repeating and confirming key information about the benefits of in-school learning for children with asthma, speaking slowly, avoiding medical jargon, and limiting key information to 3 points or less.⁵⁸⁻⁶⁰ In addition, any communication should begin with engaging the families in what they have heard, and are potentially concerned about, with respect to their child’s asthma and school attendance.^{61,62} Open-ended questioning such as “What are you worried about during COVID-19 with respect to your child, and their asthma?” ensures a bidirectional conversation that focuses

on the specific perceptions of risk of the family and increases trust in the message.^{61,62}

Finally, children are stakeholders themselves in the conversation about risk—asthma and school and risk must be framed appropriately for children as well. Multiple guidelines around communicating risk to children during COVID-19 recommend an element of honest reassurance, including a bidirectional age-appropriate conversation that is truthful but provides children with a sense of control.⁶³⁻⁶⁵ Minimizing and monitoring screen time so children are not subject to broad misinformation is recommended, as is engaging children in a conversation about what they have read/seen online about asthma and school risk.⁶³⁻⁶⁵

CONCLUSION

At a time of great uncertainty, no decision is harder than that which impacts children. However, the preponderance of evidence regarding in-school learning for children with asthma is clear. Children are at low risk of COVID-19 morbidity, and children with asthma do not appear to be at higher risk than children without asthma. There is a divide between this actual risk and the public perception of risk, which is shaped partly by differences in guidance as well as social/news media. It is essential that information regarding the risk of in-person learning (or lack thereof) for children with asthma be conveyed regularly, through multiple channels, and in an age-appropriate way to ensure that families have the best information available when facing perhaps their most challenging decision—how to care for their children and ensure their ongoing development during this unprecedented time.

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