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Unexpected risks of COVID-19 on asthma control in children

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Outline

- Childhood Asthma in USA and California
- Asthma disparities
- Defining childhood asthma control
- Childhood asthma stakeholders
- Managing childhood asthma during the COVID-19 pandemic
- Stakeholder experiences during the COVID-19 pandemic
- Key takeaway points
- Q&A

Childhood Asthma in the USA: Disease burden by the Numbers

- Uncontrolled asthma can significantly impact on quality of life, school attendance, family well-being, missed work days, and cost to families and society
- US prevalence of childhood asthma: 1 in 12 (6 million children)
- Asthma related emergency department visits are higher among children than adults (88 vs 42 per 10,000 population)
 - Higher rates among non-Hispanic Black children (297) and Hispanic or Latino children (84) than non-Hispanic White children (48)
- Higher rates of asthma related physician office visits in children than adults (431 vs 321 per 10,000 population)

Childhood Asthma in the USA (continued)

- Half of children with asthma have uncontrolled asthma
 - Uncontrolled asthma more common in non-Hispanic Black children (63%)
- Asthma deaths are rare and largely preventable, and lower in children than adults nationally (2.8 vs 10.0 per million), but disparities remain among children (1.2 non-Hispanic White vs 1.7 Hispanic or Latino vs 11.4 non-Hispanic Black)

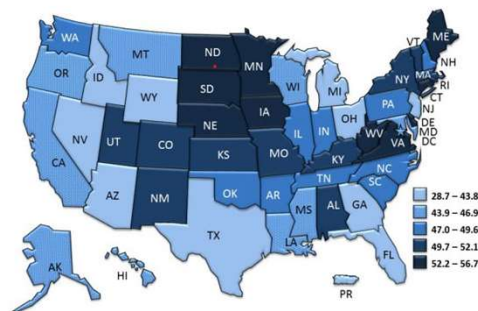
Asthma Disparities

- In 2018, prevalence of asthma in US children <18 years was 7.5%
 - Higher rates in children aged 5-14 years (8.6%)
 - Higher rates in non-Hispanic Black children (14.3%)
 - Higher rates in Puerto Rican children (17.0%)
 - Higher rates in children in the Northeast (8.9%)
 - Higher rates in children with the lowest household incomes (10.2%)
- Children with a family history of asthma have 2-fold increased risk of developing asthma by age 4 years
- Regardless of family history of asthma, increased asthma rates among non-Hispanic Black children compared to non-Hispanic White children in preschool years
- Boys have higher incidence in earlier years, then decline with age; girls have steady rates across childhood

Asthma: California

- Childhood asthma prevalence: 7.9%
- Adult lifetime asthma prevalence of 15.1% in 2020
- Average rates of seasonal influenza vaccine among adults with asthma (46.7% nationally vs 47.0-49.6% CA , 49.7-52.1% MA) (no data available in children)

Percentage of flu vaccination among adults with asthma



- Average rates of co-occurrence of obesity and asthma in adults (38.8% nationally vs 38.4% in CA , 31.5% in MA)

Managing Asthma

Asthma control in Children: Well controlled if...

- Have symptoms no more than 2 days a week, and
- Symptoms don't wake you from sleep more than 2 nights a month
- Can do all your normal activities
- Have no more than 1 asthma attack a year requiring oral medications
- Do not need to take quick-relief medicines more than 2 days a week
- Peak-flow measurement (how well air moves in and out of the lungs) does not drop below 80% of your personal best

Childhood Asthma Management: Stakeholders

- Child with asthma
- Parents/Families
- Doctors and Nurses
- Schools
- Health/Medication Insurance Plans
- Government (setting guidelines, public resources, air quality)
- Non-Government Entities and Community Organizations (Community Action to Fight Asthma)

Childhood Asthma Management During the COVID-19 Pandemic

Rostrum

The Unexpected Risks of COVID-19 on Asthma Control in Children



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Much is being learned about clinical outcomes for adult COVID-19 patients with underlying chronic conditions; however, there is less coverage on how the COVID-19 pandemic impacts the management of chronic medical conditions, such as asthma, in children and youth. Asthma is a common chronic medical condition in children that is uniquely susceptible to changes brought on by COVID-19. Sudden dramatic changes in the environment, medical practice, and medication use have altered the asthma management landscape with potential impacts on asthma outcomes. In this paper, we review how changes in transportation and travel patterns, school attendance, physical activity, and time spent indoors, along with changes in health care delivery since the start of the pandemic, all play a contributing role in asthma control in children. We review potentially important influences of asthma control in children during the COVID-19 pandemic worthy of further study. © 2020 American Academy of Allergy, Asthma & Immunology (J Allergy Clin Immunol Pract 2020;8:2489-91)

Key words: COVID-19; Coronavirus; Asthma; Pediatrics

As the COVID-19 pandemic unfolds, we are learning about the multitude of ways, many unforeseen, that response efforts to contain COVID-19 affect people's illnesses and chronic diseases. Although the risk of existing chronic disease on COVID-19 outcomes receives much attention, less discussion has focused on the impact of societal changes resulting from the COVID-19 pandemic on the course of specific chronic conditions. Changes in the environment, medical practice, and medication management and use have rapidly altered the immediate asthma management landscape with likely long-term impacts on asthma outcomes. Where people spend time, daily habits, and travel patterns have altered the natural environment in ways that affect asthma. Changes in health care availability, delivery, and utilization have important implications for asthma and other chronic conditions that require ongoing medical attention. Finally,

changes in medication management in asthma represent another important COVID-19-related trend. Chronic asthma has particular vulnerabilities to the changes brought on by COVID-19, with many shared pathways and risk factors, including air quality, the indoor environment, physical activity, weight control, medication management, and health care delivery (see Figure 1). Below, we review and postulate how significant changes in 3 domains, environment, medical practice, and medication management, have altered asthma management in the United States with likely longer term implications for asthma outcomes.

ENVIRONMENTAL CHANGES

As different municipalities and states implement social distancing, including stay-at-home orders, to control the COVID-19 pandemic, they impact many factors that relate to asthma control, morbidity, and mortality. School cancellations mean that children no longer have exposure to viruses from other schoolchildren that can cause upper respiratory illnesses that may exacerbate asthma. Staying at home limits children's opportunities for physical activity, known to be beneficial in asthma. Children now confined to small indoor spaces, without access to school playgrounds or outdoor parks, lose use of spaces that are conducive to physical activity. Children who actively commute to school by walking or bicycling have also lost daily opportunity for physical activity. At the same time, remaining indoors means children have greater exposure to indoor environments that can exacerbate asthma, including secondary tobacco smoke exposure and indoor allergens including mold, mice, and roaches.

With fewer cars on the roads and children spending more time indoors, children will have less exposure to outdoor air pollution. High concentrations of ambient air pollutants, primarily sulfur dioxide, ozone, carbon monoxide, and particulates worsen asthma. During the summer 1996 Olympics, driving restrictions imposed in downtown Atlanta resulted in lower traffic volume with an accompanying improvement in air quality, all associated with a decrease in emergency department (ED) visits for childhood asthma.¹ Air quality has already improved since the start of the COVID-19 pandemic,² and this improvement should contribute in a positive way to asthma.

MEDICAL CARE

Dramatic changes in health care delivery during the COVID-19 pandemic will also impact asthma management and control. Many medical practices in the United States, including primary care and pulmonology practices, have limited office visits to urgent patient needs and have largely moved to telehealth visit formats. These changes have decreased visit volumes in the immediate term; however, the availability of telehealth offers new

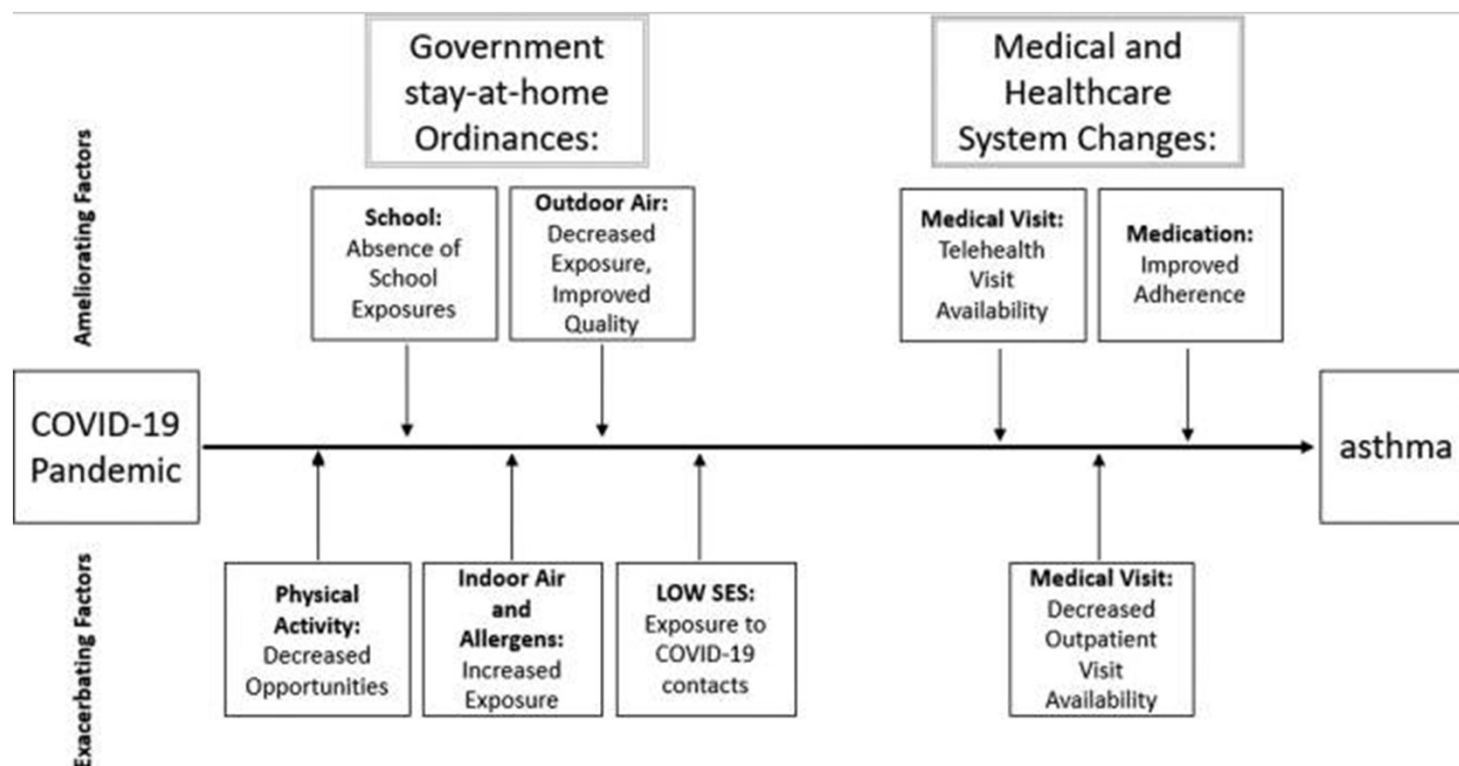
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Managing Asthma:

Childhood asthma during the COVID-19 pandemic

- Focus on the COVID-19 pandemic, not SARS-CoV-2 infection
- Sudden substantial changes in **environment, medical practice,** and **medication management** during the COVID-19 pandemic
- Asthma has unique vulnerabilities to changes brought upon by the pandemic
 - Shared pathways and common risk factors
 - Physical activity
 - Food availability and consumption patterns
 - Weight control
 - Air quality
 - Indoor Environment
 - Medication Management
 - Health care access and delivery

Potentially important influences on asthma control during the COVID-19 pandemic



Environmental Changes

- Differences by state and municipality in implementing social distancing, stay-at-home, and masking mandates during the pandemic
- Potential impact on asthma control and complications
- School considerations - Virtual school classes:
 - Pro: no exposure to viruses from other children/teachers
 - Pro: less exposure to outdoor air pollution (improved air quality during early pandemic with fewer cars on the road)
 - Con: decreased opportunities for daily physical activity (active commuting, recess, PE class, after school play/sports)
 - Con: possible exposure to harmful indoor environments (tobacco smoke & indoor allergens including mold, roaches, rodents)

***Studies have shown both positive and negative effects of confinement in children with asthma depending on the environmental changes

Medical Care Changes

- Dramatic changes in care during COVID-19 pandemic
- Decreased visit volumes
- Rapid switch to virtual care
- Technology barriers
- Delayed/postponed routine care
- Parental fears /avoidance of medical settings
- Pro: new access to care opportunities (overcome distance, transportation, cost, daycare, work, etc barriers)
- What we saw... Decreased pediatric asthma ED visits at MGH during first several months of pandemic (compared to increased overall ED visits and hospitalizations)

Medication Management Changes

- Medication use/adherence: possibly improved?
- Early Concern: avoidance of corticosteroids – an important medication in asthma management - due to concerns about delayed virus clearance and risk for increased mortality. Current recommendation is to *not* modify routine asthma treatment out of concern about COVID-19 infection
- Metered dose inhalers with spacer/face mask, avoid nebulizers to reduce the risk of spreading infection
- Importance of proper infection control techniques for respiratory diseases (Peak Flow measurements, etc)

Other Pandemic-Related Challenges and Changes

- Importance of having a system in place for differentiating asthma exacerbation from COVID-19 infection, given often overlapping symptoms
- Primary Prevention: Importance of vaccination (COVID-19, influenza, Pneumonia)
- Increased anxiety and mental health problems in children during the pandemic; known impact on asthma control

Variations & Disparities:

Important considerations in asthma management

- Urban vs Rural
 - Outdoor air quality
 - Access to care
 - Population density and “Hot Spots”
 - Government ordinances (stay-at-home, social distancing, masking)
- Socioeconomic status
 - Employment status and resulting household exposure load
 - Public transportation requirement
 - Access to safe spaces for physical activity
 - Access to healthful foods/school meals
 - Likelihood of exposure to indoor air pollutants and irritants (mold, mice, roaches, tobacco smoke)
 - Likelihood of school closure (public vs private school)
 - Psychosocial stressors/Stress load



Caregiver Experience:

- Most (80%, n=93) caregivers of children with asthma report concern that COVID-19 will affect their child's health
- More than half of caregivers restricted their child's physical activity to avoid asthma symptoms
- Dose dependent relationship between worrying about COVID-19 and physical activity restriction → risk for worsening asthma control and obesity
- Caregivers (n=16) reported increased asthma symptom awareness, and asthma control
- Avoidance seeking medical care driven by fear

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Caregiver Experience: Disparities

- Black, Indigenous, or other People of Color (BIPOC) parents of children with asthma reported that COVID-19 resulted in greater resources losses and access to healthcare than parents of non-Hispanic White children (n=321)

Healthcare Provider Experience

- International study in early pandemic (summer 2020), healthcare professionals (n=339, from 52 countries) reported overwhelming shift in care to telephonic (79% of asthma follow-up consultations were replaced by phone calls)
- Most providers stopped using lung function tests to diagnose and manage asthma, relying instead on clinical information

School Experience

- Differentiating COVID-19 from asthma and from seasonal allergies is difficult
- Importance of messaging from school leadership:
 - Strong evidence that masks do not exacerbate underlying lung conditions including asthma
 - Children with asthma can learn in-person at school as they do not appear to be at increased risk of COVID-19 infection or severe disease
 - The COVID-19 vaccine has been demonstrated to be safe and effective in children, including children with asthma
 - Continue regular asthma medication management (inhaler use)
 - Promote physical activity during the school day

Key Points:

- National and International asthma guidelines have been updated to account for COVID-19
- Asthma treatment in children should follow published guidelines but be ready to accommodate and innovative care delivery and disease management during a pandemic
- Knowledge of local factors, including infectivity rates, healthcare capacity, outdoor air quality, masking adherence, and school closure status, can play an important role in guiding local guidelines and treatment decisions
- Awareness and understanding of upstream factors that influence asthma control is essential (environment, medical care, medication management)
- Socioeconomic disparities can have a large impact on childhood asthma (housing, school, parental employment, public transportation use, exposure risk)
- Telehealth and digital monitoring may play an important role in asthma management during a pandemic
- The needs of the community will evolve as new challenges arise during a pandemic

Thank you!

Q & A