

Association of Asthma Educators
2022 Conference
COVID-19: Its Multifaceted Impact on Asthma
Karen L Gregory, DNP, APRN, RRT, AE-C, FAARC
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COVID-19: It's Multifaceted Impact on
Asthma and Health Disparities

Karen L. Gregory, DNP, APRN, CNS, RRT, AE-C, FAARC
Oklahoma Allergy and Asthma Clinic
Georgetown University School of Nursing



Disclosures

Pfizer -- Speaker

No conflict



Objectives

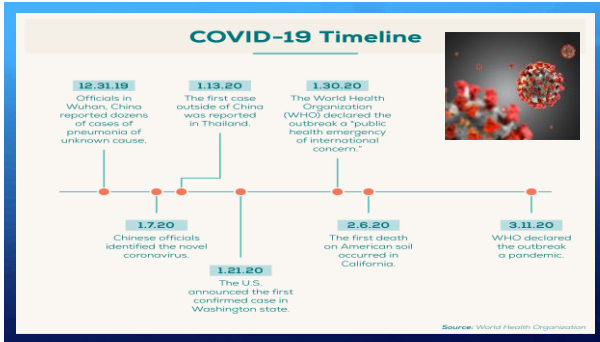
1. Discuss the threat of COVID-19 in patients with asthma.
2. Examine the relationship between COVID-19 and type 2 inflammation.
3. Evaluate factors contributing to health disparities in patients with asthma during the COVID-19 pandemic.

COVID-19: It's Multifaceted Impact on Asthma and Health Disparities

SARS-CoV-2 pandemic has presented an unprecedented challenge for patients and health care professional, including asthma educators

COVID Statistics

- + As of August 4, 2022, Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) has caused more than _____infections and more than _____deaths.
- + As of August 4, 2022, more than _____vaccine doses have been administered



COVID-19

1. Bognardo S, Almonacid C, González Y, et al. Eur Respir J 2021; 57: 200344.
2. Palmer RA, Jackson DJ, Dellinger LC. J Allergy Clin Immunol Pract 2021; 9: 558-65


- + Coronavirus disease 2019 (COVID-19) is the disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)
- + Severity and mortality of COVID-19 has been strongly related to adults aged ≥5 years and risk factors
- + Well-established risk factors associated with severe disease and increased mortality
 - + older age
 - + race
 - + sex
 - + obesity
 - + hypertension
 - + cardiovascular disease
 - + chronic obstructive pulmonary disease

Pathogenesis of COVID-19

fdas.gov

- + The virus is transmitted via respiratory droplets and aerosols from person to person
- + Once inside the body, the virus binds to host receptors and enters host cells through endocytosis or membrane fusion
- + The coronaviruses are made up of four structural proteins:
 - + Spike glycoprotein S
 - + Membrane Protein M
 - + Envelope Protein E
 - + Nucleocapsid (N) proteins
- + Inside the host cell, the virus undergoes replication and formation of a negative strand RNA by the pre-existing single-strand positive RNA through RNA polymerase activity (transcription)

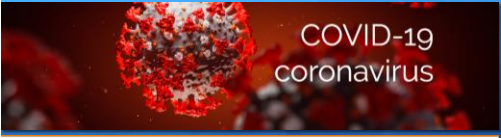
Lamers MM, Haagmans BL, 2022. www.nature.com



Pathogenesis of COVID-19

- + Angiotensin-converting enzyme-2 (ACE2) is the major receptor mediating the entry of SARS-CoV-2 into cells via its structural spike glycoprotein¹
- + SARS-CoV-2 infects the respiratory epithelium through a process that involves binding the angiotensin-converting enzyme-2 (ACE2) receptor and cleavage of the viral spike protein by the transmembrane serine protease²

1. Hou YJ, Okuda N, Edwards CE, et al. Cell 2020;182:429-46. doi:10.1016/j.cell.2020.02.028
2. Jackson CB, Farzan M, Chen B, Chew H, et al. Nature Reviews Molecular Cell Biology 2020;21:517-533. doi:10.1038/s41578-020-00438-x




COVID-19 coronavirus


COVID-19: Impact on Asthma

Impact of COVID-19 and Asthma

What are the threat of COVID-19 to individuals with asthma?



COVID-19 and Asthma




- + Asthma is a disease in which patients are susceptible to viral-exacerbated morbidity
- + Impact of COVID-19 on individuals with asthma is complex, likely to vary depending on various factors :
 - + underlying phenotype
 - + severity of asthma
 - + how well it is controlled
 - + effect of medications including inhaled and oral corticosteroids^{1,2}
- + COVID-19 severity, duration and recovery are highly variable, with symptoms frequently overlapping and interacting with their pre-existing respiratory condition³

1. Zhu Z, Hosogawa K, Ma B, et al. J Allergy Clin Immunol 2020;146:1327-9.
 2. Philip KE, Buttery S, Williams P, et al. BMJ Open Respiratory Research 2022;9:e001056.
 3. Sugiura AP, Allada SM, DiTanna G, et al. J Asthma 2021;1-14.


COVID-19 and Asthma

There was significant concern at the onset of the COVID-19 pandemic that patients with asthma could be particularly at risk for severe outcomes with SARS-CoV-2 infections




Asthma has not been consistently linked to increase COVID-19 risk

Palmon RA, Jackson DL, Denlinger LC. J Allergy Clin Immunol Pract 2022;10:658-63



Impact of COVID-19 and Asthma



- + Patients with controlled asthma showed a tendency of lower death risk compared with patients without asthma, and no increase in need for intubation/mechanical ventilation¹
- + Patients with severe asthma appear to be more susceptible to viral triggers including severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)²
- + Unlike influenza and other respiratory viruses, the impact of COVID-19 in patients with asthma has been less evident

1. Liu S, Cao Y, Du R, Zhu Y. Prevalence of comorbid asthma and related outcomes in COVID-19: a systematic review and meta-analysis. J Allergy Clin Immunol Pract 2021;9:639-361.
 2. Trivedi SK, Shroffman K, Grayson MH. Asthma, severe acute respiratory syndrome coronavirus 2 and coronavirus disease 2019. Curr Opin Allergy Clin Immunol 2021; Apr 14;21:181-87.

Impact of COVID-19 and Asthma



Studies suggest asthma may be a protective factor in COVID-19 infection for various proposed mechanisms including:

- + differences in TH2 inflammation
- + decreased expression of angiotensin-converting enzyme
- + use of inhaled corticosteroids

1. Surjaya AP, Allida SM, Di Tanna GL, Jenkins C. *J Asthma*. 2021;1-14. 28. Huang BZ, Chen Z, Sidell MA, Eckel SP, Martinez MTerry PD, Heidel RE, Dhand R. *Am J Respir Crit Care Med*

Impact of COVID-19: Pediatric Asthma



- + COVID-19 disease in children is well known to be milder than in adults, with less morbidity and mortality and mild presenting respiratory symptoms^{1,2}
- + Milder disease in children possibly include:
 - + decreased ACE2 expression in respiratory epithelium
 - + robust innate immune response, cross protection from other respiratory infections → RSV, rhinovirus
 - + fewer comorbidities
- + Children with asthma, with or without concurrent allergic diseases, there was no association with an increased risk of hospitalization for COVID-19⁴

1. Ali AS, Al-Hakami AM, Shati AA, et al. *Front Pediatr*. 2020;8:584694. Zheng F, Liao C, Fan Q-H, et al.
2. Asseri AA. *J Asthma Allergy*. 2021;14:1139-1146.
3. Zimmerman P, Curtis N. *Pediatr Infect Dis J*. 2020;39:355-68.
4. Bolen B, Ozburk GK, Aygen FD, et al. *Ann Allergy Asthma Immunol* 2021;126:569-75

Impact of COVID-19: Adult Asthma



- + Multiple studies demonstrating that there is no increased risk in general between adult patients with asthma and severe COVID-19 infection¹
- + Adults with a history of an asthma exacerbation in the preceding 24 months (defined by either two or more oral corticosteroid prescriptions or previous asthma hospitalization) had an increased risk of COVID-19 hospital admission and an ICU admission or death, when compared with those with no asthma²
- + A subset of patients in the with asthma who are not optimally controlled are at more risk for severe disease

Palmon RA, Jackson DJ, Denlinger LC. *J Allergy Clin Immunol Pract* 2021;10:658-69
Shi T, Pan J, Vasilev, et al. *Lancet Respir Med* 2022; 10: 347-54

Impact of COVID-19: Adult Asthma



- + Huang et al. demonstrated that adult patients with asthma who required clinical care in the previous 12 months before COVID-19 diagnosis were at increased risk of severe disease
Those who did not receive clinical care were not at increased risk for severe disease
- + Kasela et al. identified active smoking, hypertension, and obesity to be associated with greater ACE2 expression in bronchial epithelium

1. Hoffmann M, Kleine-Weber H, Schroeder S, et al. Cell. 2020;181:271-280.e8.
2. Kasela S, Ortega VE, Martorella M, et al. Genome Med. 2021;13:66.

Type-2 Inflammation in Asthma

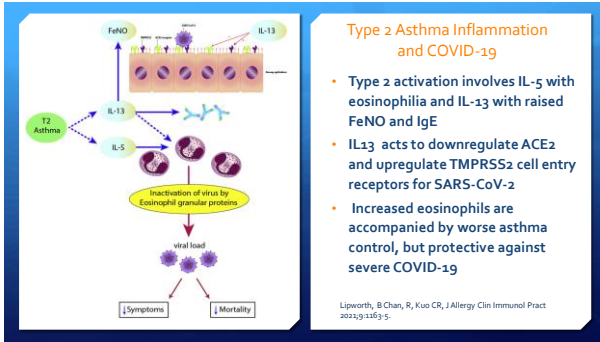
- + Inflammation occurs in the airway due to systemic allergic response that may lead to aggravation of asthma and lowers the functioning of the lungs
- + Cytokines are majorly held responsible for inflammation
- + Type-2 immune responses are established with the stimulation of cytokines including:
 - + IL-4
 - + IL-13
 - + IL-17
 - + IL-33
 - + thymic stromal lymphopoietin (TSLP)

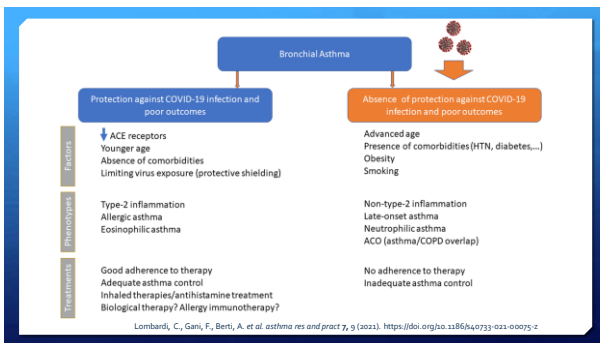


Covid-19 and Type 2 Inflammation

- + Activation of the ACE2 receptor, the gateway for the virus into cells
- + The presence of activated eosinophils may protect individuals from infection by this virus, in a similar way to that already described for other viruses
- + An observational study found that patients with non-allergic asthma were at higher risk of SARS-CoV-2 infection and more severe COVID outcomes compared with those with allergic asthma¹
- + Eosinophilic antiviral insufficiency may occur in asthma whereby there is a defective virus sink in the lungs with attenuated viral clearance²

1. Yang J.M., Koh H.Y., Moon S.Y. J Allergy Clin Immunol. 2020;146:1790-1798.
2. Lipworth B, Chan R, RuiWen Kuo C. J Allergy Clin Immunol Pract. 2021 Mar;9(3):1163-1165.





Phenotype: Allergic Asthma

- + ACE2 receptor has is identified as the cellular receptor for SARS-CoV-2
- + Reduced ACE2 expression has been reported in patients with allergic asthma, which would support a possible protective effect of an allergic asthma phenotype on COVID-19 disease severity^{1,2}
- + Concern that higher expression of transmembrane protease serine 2 (TMPRSS2) found among patients with asthma may facilitate SARS-CoV-2 cell entry given TMPRSS2's role in the necessary cleavage of the spike protein^{1,2}

1. Jackson DJ, Bouse WW, Bacharter LB, et al. J Allergy Clin Immunol. 2020;146(3):203-206.e9.
2. Rafizabowska U, Ding M, Fan G, et al. Allergy. 2020;75(11):2829-2835.

Phenotype: Allergic Asthma

- + Asthma is not a risk factor for more severe COVID-19 disease
- + Patients with allergic asthma 50% less likely to be hospitalized with COVID-19 compared with patients with non-allergic asthma
- + Lower levels of eosinophil counts (allergic biomarkers) were associated with a more severe COVID-19 disease trajectory
- + Non-allergic asthma phenotype may be at increased risk for severe COVID-19 disease when compared to patients with allergic asthma
- + In patients with a non-T₂ phenotype, a greater severity of COVID-19 disease is observed

1. Eggert LE, He Z, Collins W, Lee A et al. *Allergy*. 2022 Jan;77(1):173-185.
2. Lipworth BJ, Chan R, Ru Wen Kuo C. *J Allergy Clin Immunol Pract*. 2022 Mar;9(3):1263-1265.

2.

Asthma Phenotype and COVID-19

- + Asthma phenotypes and comorbidities are important factors in evaluating the risk for SARS-CoV-2 infection and disease severity
- + Studies suggest that Th₂-high inflammation may reduce the risk of SARS-CoV-2 infection and disease severity in contrast to increased risk in patients with Th₂-low asthma

1. Bloom CJ, Cullinan P, Wedzicha JA. *Am J Respir Crit Care Med* Vol 205, Iss 1, pp 38-45, Jan 1, 2022
2. Adiri Y, Saliba W, Bevrone A, Humbert M. *Eur Respir Rev*. 2021 Dec 15;10(43):2021072.

Asthma Phenotypes and COVID-19 Risk

Bloom and colleagues performed a longitudinal study, using individually linked community, hospital and SARSCoV-2) test data

- Patients with asthma with higher use of asthma maintenance medication and more frequent exacerbations were significantly associated with severe COVID-19 outcomes, including hospital admission, ICU admission, and death
- Patients with markers suggestive of having type 2 inflammation were not found to be associated with more severe COVID-19 outcomes

Bloom CJ, Cullinan P, Wedzicha JA. *Am J Respir Crit Care Med* Vol 205, Iss 1, pp 38-45, Jan 1, 2022

Why might asthma protect against poor outcomes in COVID-19?

- + Several studies have suggested possible non-harmful or protective effects of asthma on the clinical outcomes of COVID-19
- + People with mild and/or well-controlled asthma are neither at significantly increased risk of hospitalization with nor more likely to die from COVID-19 than adults without asthma
- + Asthma might protect against poor outcomes in COVID-19 due to several possible mechanisms
 - + altered viral entry receptor expression
 - + chronic type-2 inflammation
 - + younger age and/or absence of comorbidities
 - + increased adherence to therapy and ICS use

Lombardi, C., Gani, F., Bari, A. et al. Asthma Risk and Prognosis in COVID-19. *Frontiers in Immunology* 12:1009646 (2021). <https://doi.org/10.3389/fimmu.2021.690964>

Why do some people develop serious COVID-19 disease while others only exhibit mild symptoms?

COVID-19

- Surveillance studies indicate that the black population and possibly the Hispanic population are disproportionately affected by COVID-19
- Meltzer et al. reported that patients who were vitamin D deficient (<20 ng/mL) had an increased risk of COVID-192
- Immune imbalance and dysregulation of innate and adaptive immune response results in severe COVID-19
- Generalized decline and remodeling of the immune system as a result of the aging process, may play a significant role in the early response to SARS-CoV-2 infection
- Hospitalized young adults often present with significant risk factors and comorbidities for severe COVID-19 such as obesity, diabetes, and hypertension

Ballow M, Haga CL. J Allergy Clin Immunol Pract 2021;9:1442-8
Meltzer DO, Best TJ, Zhang M, et al. JAMA Netw Open 2020;3:e2020722

COVID 19 in Pediatric Asthma: Why the lower percentage rates of children infected with COVID-19?



- A difference in the distribution, maturation and functioning of viral receptors is a potential reason of the age-related difference in incidence
- The SARS virus, SARS-CoV-2, and human coronavirus-NL63 use the angiotensin-converting enzyme-2 (ACE2) as the cell receptor in humans¹
- Reduced number and the immaturity of ACE2 receptors in children compared to adults
- Innate immune response, the first line of defense, seems to be more active in children

1. Lu R, Zhao X, Li J, Niu P, Yang B, Wu H, et al. Genomic characterization and epidemiology of 2019 novel coronavirus: implications for virus origins and receptor binding. *Lancet* 2020.

Impact of COVID-19 and Asthma

- + Huang et al. demonstrated that adult patients with asthma who required clinical care in the previous 12 months before COVID-19 diagnosis were at increased risk of severe disease
- + Those who did not receive clinical care were not at increased risk for severe disease

Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 2020;395: 497-506.

COVID-19: Clinical and Epidemiologic Features

- COVID-19 disease is less severe and may be asymptomatic in children, but a small minority develop a multisystem inflammatory syndrome (MIS-C) with similarities to Kawasaki's disease^{1,2}
- Sudden deterioration with progressive pulmonary failure can occur in younger individuals¹
- Clinical outcomes, including mortality, in COVID-19 are worse in males, older individuals and patients with diabetes, cardiovascular disease and obesity^{3,4}
- Death is usually the result of anoxia due to pulmonary failure, although there is increasing evidence of dysfunction in other organs, including heart, kidneys, and tissues affected by dysregulated coagulation and thrombosis¹
- Asymptomatic infected individuals can transmit SARS-CoV-2, implying viral shedding¹

1. Profili L, Arturo Casadevall A. Pathogenesis of COVID-19 from the Perspective of the Damage-Response Framework. *mBio American Society for Microbiology* May/August 2020 Volume 11 Issue 4 e01070-20

2. Wang Y, Lu X, Li Y, et al. Clinical course and outcomes of 100 intensive care patients with COVID-19. *Am J Respir Crit Care Med* 2020; 201: 1430-1436. doi:10.1164/rccm.202003-0761LE

3. Semelitsky A, Chelidze M, Pirov A, et al. High prevalence of obesity in severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) requiring intensive mechanical ventilation. *Obesity (Silver Spring)* 2020; 28: 1955-1959. doi:10.1002/oby.22831

COVID-19: Clinical and Epidemiologic Features

- Prevalence and severity of the disease increase with age¹
- Many infections are asymptomatic or produce only mild disease
- Individuals with cardiovascular disease, diabetes, obesity, diabetes and pulmonary disease have higher mortality²
- Clinical outcomes, including mortality, are worse in males, older individuals and patients with comorbidities²

1. Lisse-anna Pitofski, Arturo Casadevall. Pathogenesis of COVID-19 from the Perspective of the Damage-Response Framework. mBio American Society for Microbiology July/August 2020 Volume 11 Issue 4, e01175-20
 2. Higham A, Mathiossakakis A, Westbrook J, et al. COVID-19 and COPD: a narrative review of the basic science and clinical outcomes. Eur Respir Rev 2020; 29: 2000599 [https://doi.org/10.1183/16005965.2020.200599]

Prevention of COVID-19

- + CDC recommends everyone ages 6 months and older stay up-to-date with their vaccines, which includes everyone 5 years and older getting boosters if eligible, for the best protection against COVID-19
- + Hand hygiene measures, shielding of the vulnerable, isolation and quarantine, lockdowns and mask wearing have all helped with reduced viral transmission.
- + Multiple studies have demonstrated the safety and effectiveness of appropriate masks decreasing transmission of SARS-CoV-2 and other viruses when worn properly


Centers for Disease Control and prevention. 2022. cdc.gov/coronavirus/2019
 Brooks JT, Butler JC. JAMA. 2021;325:998-9.

Highlights: Impact of COVID-19 and Asthma



- + There appears to be no indication that asthma is a risk factor for developing COVID-19 disease^{1,2}
- + Asthma is not associated with a higher COVID-19 severity or worse prognosis^{1,2}
- + Patients with asthma have a lower risk of death compared with patients without asthma^{1,2}
- + Paradoxically, asthma may also be protective as the angiotensin-converting enzyme 2 (ACE2) receptor, required for coronavirus recognition and infection, maybe underexpressed in the lungs of atopic children³

1. AAAA. <https://pubs.aap.org/doi/10.1177/0885066621101402>
 2. CDC. <https://www.cdc.gov/media/releases/2021/s0811-covid-19-and-asthma.html>
 3. AAAA. <https://pubs.aap.org/doi/10.1177/0885066621101402>



COVID-19 coronavirus

Impact of COVID-19 and Health Disparities

Asthma Facts

- Asthma is the most common and racially/ethnically disparate chronic respiratory disease in children¹
- Lifetime asthma prevalence is greater among Puerto Rican (23.6%) and African American children (18.1%) than among Mexican American (11.5%) and White (9.5%) children²
- Populations with the highest asthma prevalence and mortality also tend to be the least responsive to commonly prescribed asthma therapies³

1. Front Pediatr. 2020;6:e86.
2. <https://www.cdc.gov/asthma/nhi/2018/facts-1.htm>
3. Front Pediatr. 2020; 7: 246.

COVID-19 and Pediatric Asthma

- Racial and ethnic discrepancies in COVID-19 infection have a 3-fold higher rate of COVID-19 infection in primarily non-Hispanic black counties in the US, and a 6-fold higher mortality rate¹
- Impact of adverse social determinants and COVID-19 outcomes are likely amplified in children with asthma²
- Food insecurity has increased by up to 35% during COVID-19, which can have persistent effects on childhood asthma outcomes³

1. Pediatric Pulmonology. 2020;55:3573-3578.
2. Lancet Respir Med. 2020;8:609-614.
3. Lancet Respir Med. 2020;8:762-763.

Centers for Disease Control and Prevention

COVID-19

- The health impact of COVID-19 has exposed decades of inequities that have systematically undermined the physical, social, material, and emotional health of racial and ethnic minority groups
- Racial minorities experience higher rates of chronic medical conditions, including obesity, diabetes, and kidney disease, which are risk factors for severe illness from COVID-19

www.cdc.gov

COVID-19

Early surveillance reports highlight that persons of Hispanic, Black, and American Indigenous race and ethnicity are disproportionately affected by the COVID-19 pandemic¹

Essential positive public health inferences can be achieved if we identify and understand the causes of COVID-19 related disparities among our patients with asthma

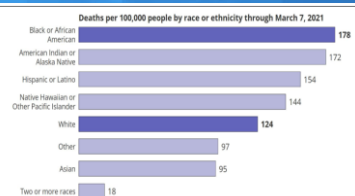
JAMA. 2020;323(24):2466-2469 (PubMed: 32990864)

The COVID Racial Data Tracker

Collaboration between the COVID Tracking Project and the Boston University Center for Antiracist Research

April 12, 2020 –March 7, 2021

Nationwide, Black people have died at 1.4 times the rate of white people



Race or Ethnicity	Deaths per 100,000
Black or African American	178
American Indian or Alaska Native	172
Hispanic or Latino	154
Native Hawaiian or Other Pacific Islander	144
White	124
Other	97
Asian	95
Two or more races	18

<https://covidtracking.com/race>

Risk for COVID-19 Infection, Hospitalization, and Death By Race/Ethnicity (June 24, 2022)

Race and ethnicity are risk markers for other underlying conditions that impact health

Rate ratios compared to White, Non-Hispanic persons	American Indian or Alaska Native, Non-Hispanic persons	Asian, Non-Hispanic persons	Black or African American, Non-Hispanic persons	Hispanic or Latino persons
Cases ^a	1.5x	0.8x	1.1x	1.5x
Hospitalization ^b	3.0x	0.8x	2.3x	2.2x
Death ^{a,b}	2.1x	0.8x	1.7x	1.8x

<https://www.cdc.gov/coronavirus/2019-ncov/ovid-data/investigations-discovery/hospitalization-death-by-race-ethnicity.html>

COVID-19: Racial and Ethnic Disparities

Why are some racial and ethnic minority groups disproportionately affected by COVID-19?

What causes racial and ethnic disparities in asthma?

Social Determinants of Health



Social determinants of health are the economic and social conditions that influence individual and group differences in health status

cdc.gov

Causes of Racial and Ethnic Disparities in Asthma

Structural determinants

Social determinants

Biological determinants

Behavioral determinants

Social and Structural Determinants



World Health Organization

https://www.who.int/dh/conferences/resources/conceptual-framework-for-action-on-sdh_eng.pdf

Social Determinants

"conditions in which people are born, grow, live, work, and age."
→ socioeconomic status, education, neighborhood and physical environment, employment, social support networks, and access to health care

Structural Determinants

"the wider set of forces and systems shaping the conditions of daily life."
→ deeply embedded in society and have historically influenced policies and governance, lead to systemic disadvantages of a particular social group.
Examples include structural racism, discrimination, and segregation

<https://www.aafa.org/medialibrary/asthma-disparities-in-america-burden-of-social-ethnic-racism.pdf>

Asthma Disparities

- + Highly driven by socio-environmental and economic factors structural injustices over time have led to a situation of accumulated disadvantage for specific racial and ethnic subpopulations in the U.S.
- + Cumulative risk from these overlapping social determinants increases asthma disparities

- Structural racism is a significant driver of asthma disparities: socioeconomic disadvantage
 - Socioeconomic disadvantage
 - Poverty
 - Poor housing conditions
 - Lack of access to health care

Perez MF, Coutinho MT, Yale J Biol Med. 2021 Sep 30;94(3):497-507.

Asthma Disparities

- + **Biological determinants** such as genes and ancestry
- + **Behavioral determinants** such as tobacco use and adherence to medicines

Social determinants and structural inequities largely drive disparities in asthma.

Factors such as genetics and individual behaviors contribute less to asthma disparities

Perez MF, Coutinho MT. Yale J Biol Med. 2021 Sep 30;94(3):497-507.

EQUITY

Health Equity



EVERYONE has the opportunity to have the best health possible

Equitable opportunity includes equal access to and distribution of resources



When policies, programs, and systems that support health are equitable, poor health outcomes can be reduced, health disparities can be prevented, and the whole of society benefits

What are the major barriers to health equity?

Socioeconomic statuses

Lack or insurance or underinsured

Race and ethnicity

Age

Geographic region



Asthma Disparities During the COVID-19 Pandemic

Are race and ethnicity–based COVID-19 outcome disparities in the United States associated with socioeconomic characteristics?

COVID-19 has disproportionately affected racial and ethnic minority groups, and race and ethnicity have been associated with disease severity

- Magesh et al. Systematic review and meta-analysis of 4.3 million patients from 68 studies, African American, Hispanic, and Asian American individuals had a higher risk of COVID-19 positivity and ICU admission, but lower mortality rates than White individuals
- Members of racial and ethnic minority groups had higher risks of COVID-19 positivity and disease severity
- Socioeconomic determinants were strongly associated with COVID-19 outcomes in racial and ethnic minority populations

JAMA Network Open. 2021;4(12):e2136147.

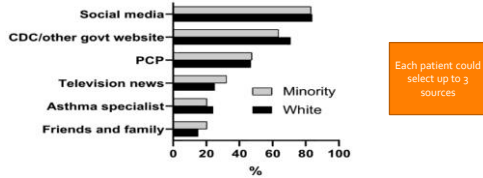
Asthma Disparities During the COVID-19 Pandemic

Baptist et al. anonymous survey was sent through social media to adult patients with asthma, and a separate survey was sent to physicians who provide asthma care

- + Patient surveys: addressed demographic information including socioeconomic status, asthma control, and attitudes/health behaviors during COVID-19
- + HCP surveys: obstacles when managing black patients' asthma, outcomes of black patients with asthma during COVID-19, additional challenges during COVID-19, and compliance of black patients with asthma medications during COVID-19

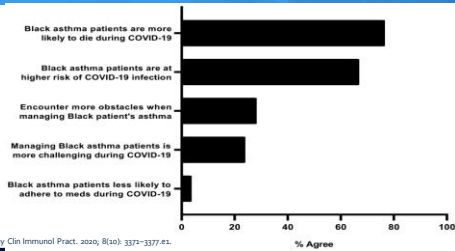
J Allergy Clin Immunol Pract. 2020; 8(10): 3371-3377.e1.

Asthma Patient's Source for Information About COVID-19



J Allergy Clin Immunol Pract. 2020; 8(10): 3371-3377.e1.

PCP Agreeing with Statements Regarding the Care of Patients with Asthma during COVID-19



J Allergy Clin Immunol Pract. 2020; 8(10): 3371-3377.e1.


Challenges Faced by Patients with Asthma during COVID-19




Challenges	White	Minority	P value
Unemployed due to COVID-19	16.1 (135)	29.1 (34)	.001
Difficulty getting asthma medicines during COVID-19	12.8 (108)	20.5 (24)	.023
Live in community with high number of cases	44.1 (371)	54.2 (64)	.038
Diagnosed with COVID-19	1.5 (13)	3.4 (4)	.153
Lost health insurance because of COVID-19	2.3 (19)	4.2 (5)	.197
Have had symptoms of COVID-19	34.8 (293)	38.5 (45)	.432
Essential employee	25.3 (213)	23.9 (28)	.750

- ### Racial/Ethnic Differences in Eligibility for Asthma Biologics Among Pediatric Populations
- + Wohlford, et al. found clinical blood profiles affect asthma outcomes and determine many clinical and therapeutic options
 - profiles differ by race/ethnicity
 - + Eosinophilic asthma was significantly associated with worse asthma severity, control, and exacerbations in Puerto Ricans only
 - suggests that eosinophil-directed biologic therapies may benefit Puerto Ricans more than other populations
 - + Increased levels of serum total IgE were highly associated with asthma status across African American, Mexican American, and Puerto Rican children

- ### Factors Associated with Health Disparities in COVID-19 and Asthma
- + Minority patients are disproportionately represented in essential worker and service positions, with less ability to engage in risk-mitigating behaviors^{1,2}
 - + Misinformation³
 - + Challenges with outreach to the most vulnerable patients⁴
 - + Medical mistrust due to historical and intentional medical atrocities performed against Black persons¹
 - + Socioeconomic factors and environmental influences¹
 - + Differences in cultural beliefs, attitudes, and health-seeking behaviors³
 - + Institutional racism (which refers to the systemic practices or individual attitudes that result in the blocking of people of color from the distribution of resources)^{3,4}
1. Allergy Clin Immunol 2021;148:1171-5
 2. https://www.healthaffairs.org/doi/10.1137/hlthaff.2020.00040
 3. Allergy Clin Immunol Pract 2020;8:337-7

Patients with Asthma Must Understand Asthma Medications and the Risk for SARS-CoV-2



	Previous treatment with SCS 	ICS 	Biologics 
Infection with SARS-CoV-2	No increased risk	No increased risk	No increased risk
COVID-19 severity	Increased risk	No increased risk	No increased risk
COVID-19 mortality	Increased risk	No increased risk	No increased risk

European Respiratory Review 2021 30: 210152

Racial & Ethnic Disparities in Receipt of Medications for Treatment of COVID-19

- **MMWR Early Release on the MMWR website (1/14/2022)**
 - Using COVID-19 patient electronic health record data from 41 U.S. health care systems that participated in the PCORnet, the National Patient-Centered Clinical Research Network, assessed receipt of medications for COVID-19 treatment by race (White, Black, Asian, and Other races [including American Indian or Alaska Native, Native Hawaiian or Other races]) and ethnicity (Hispanic or non-Hispanic)
 - Found lower use of monoclonal antibody treatment among Black, Asian, and Other race and Hispanic patients with positive SARS-CoV-2 test results, relative to White and non-Hispanic patients
 - Racial and ethnic differences were smaller for inpatient administration of remdesivir and dexamethasone

<https://www.cdc.gov/mmwr/volumes/71/wr/mm7103a3.htm>

How has COVID-19 worsened disparities for underrepresented minority individuals?

More likely to:

- + become unemployed because of COVID-19
- + live in communities with a high number of COVID-19 cases
- + have lost insurance coverage resulting in loss of health care

COVID-19

- The COVID-19 pandemic has magnified and amplified inequities that must be addressed to achieve equitable health outcomes
- Vaccines and preventive measures are the best defense against infection
- COVID-19 medications reduce morbidity and mortality and relieve strain on hospitals

<https://www.cdc.gov/mmwr/volumes/71/wr/mm7103e1.htm>

COVID-19 Pandemic Key Messages

- + Social determinants of health have helped contribute to the detrimental impact of coronavirus disease 2019 (COVID-19) on pediatric health, apart from direct disease manifestations.
- + COVID-19 has affected Black communities disproportionately, including higher infection and fatality rates and lower vaccination rates.
- + Households experiencing homelessness and housing insecurity as a result of the pandemic were associated with increased COVID-19-related morbidity and mortality, secondary to reduced access to public health measures to reduce disease transmission.
- + Food insecurity among children has risen dramatically as a result of the pandemic, influenced in part by reduced access to school lunches, fragility in the food supply chain, rising food costs, and risks of unemployment.
- + Rates of extreme poverty (living on <\$1.90 per day) are anticipated to rise for the first time in 20 years. Poverty is a negative influence on child health, in particular long-term conditions and mental health.
- + Domestic violence, including child abuse and intimate partner violence, has increased during the pandemic, both of which are associated with long-term adverse health outcomes in children.

Abrams, et al. Ann Allergy Asthma Immunol. January 2022;128(1):19-25



thank you

Karen L. Gregory, DNP, APRN, CNS, RRT, AE-C, FAARC
karengregory07@gmail.com
