Population Health Situational Awareness: Getting the Data You Need to Build Equity in Child Asthma Outcomes

Part 2 of 3 in a Webinar Series on Solutions for the Indoor Environmental Determinants of Health (IEDOH)

Hosted by

U.S. Environmental Protection Agency (EPA)

December 13, 2022, 1:00—2:30 p.m. EST

Agenda

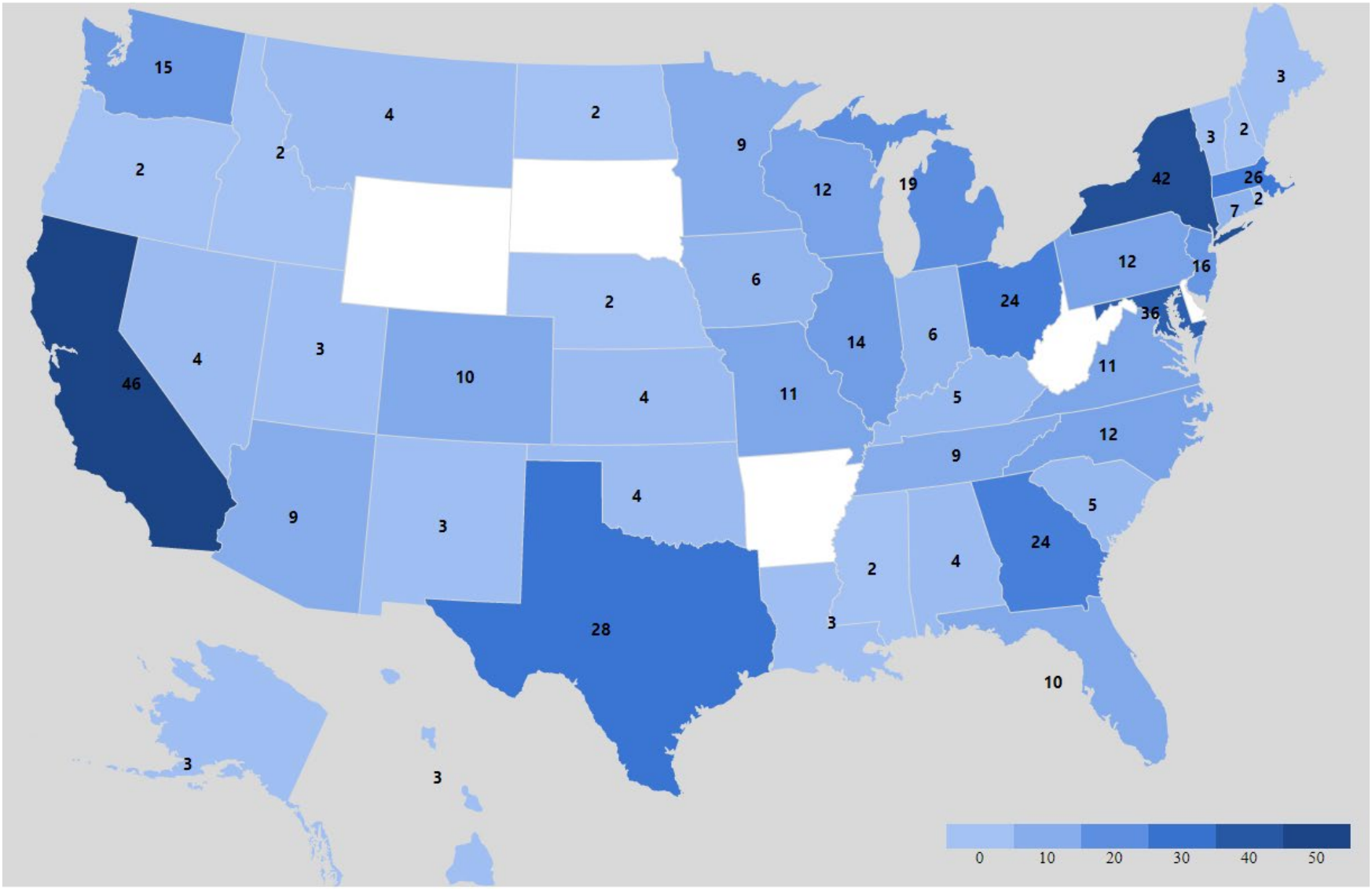
Welcome to a Series on Solutions for the Indoor Environmental Determinants of Health (IEDOH) in Asthma and Community Health.....**1:00 p.m. EST**

Part 2: *Population Health Situational Awareness: Getting the Data You Need to Build Equity in Child Asthma Outcomes*

Discussion Among Panel of Questions from Audience.....**30 minutes**

Closing: Requests and Offers to Build National Asthma Impact.....**3:30 p.m. EST**

Who Is Here Today?



Polling Question 1

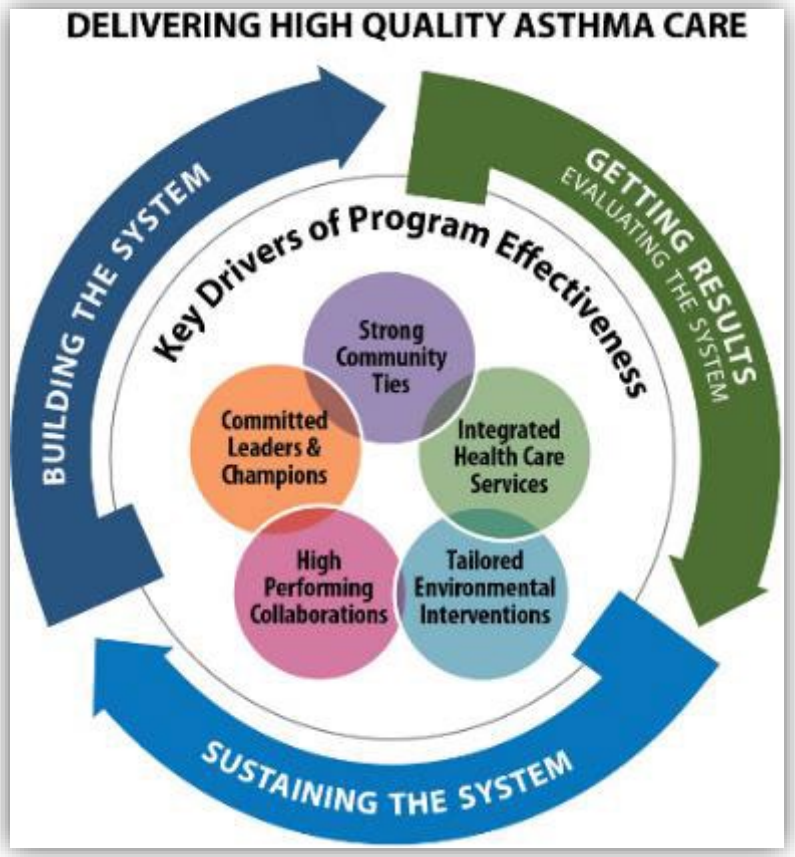
Do you know much about using data and analytics to reveal where indoor environmental factors may be contributing to community asthma burden?

1. Yes, I know about population data and analytics to focus on community-level environmental asthma burden.
2. No, I am not familiar (yet) with terms like population-level data and analytics in asthma care.
3. I know a little and want to learn more.
4. I do not want to use data and analytics in my indoor environments and asthma work.

Welcome to Solutions for the Indoor Environmental Determinants of Health

- EPA is a **federal lead for environmental risk reduction** in health care standards.
- EPA's Indoor Environments Division (IED) studies, supports and spotlights technical **solutions for the indoor environmental determinants of health**, the **IEDOH**, particularly in asthma.
- For 15+ years, with 4,500+ champions, IED has developed proven **solutions communities can use** to address the IEDOH in asthma.

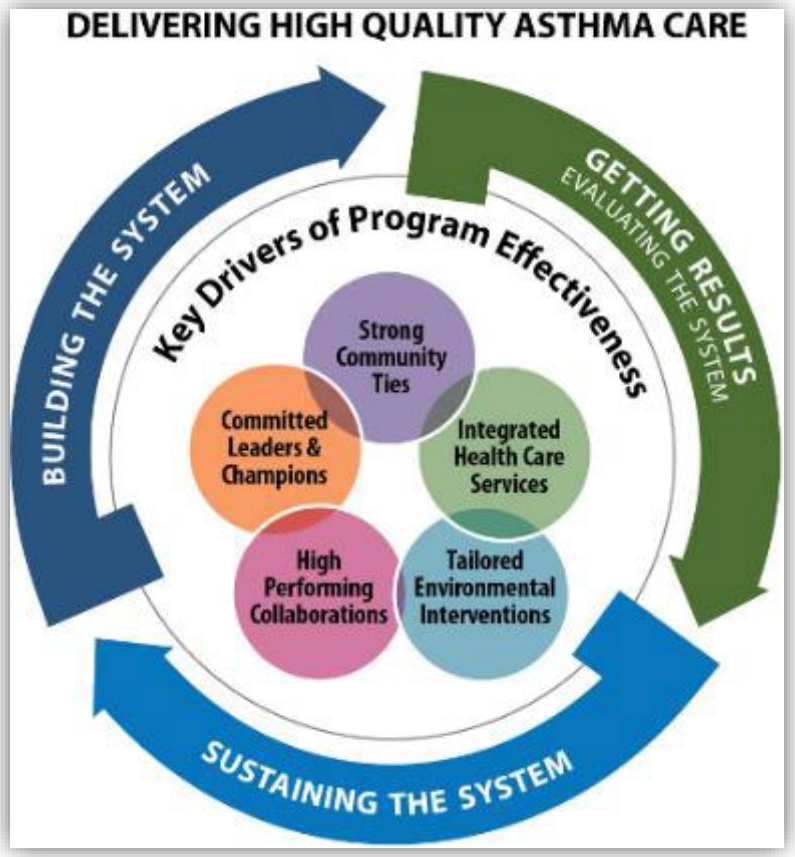
IED's System for High Quality Asthma Care



Welcome to Solutions for the Indoor Environmental Determinants of Health

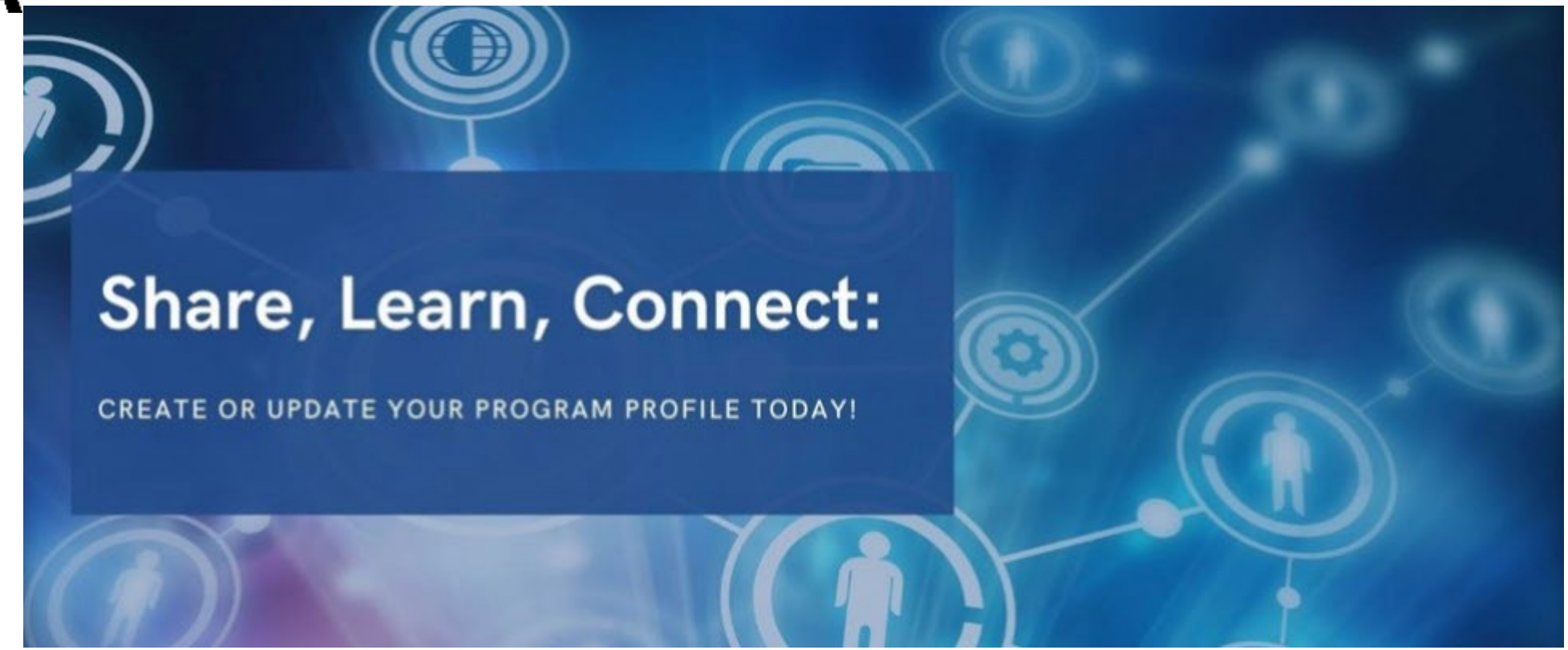
- High-quality asthma **systems break down siloes** to address the IEDOH in asthma.
- Systems require **time, partnership, data and investment** to scale and sustain.
- Assembling community systems to address the IEDOH in asthma is a model **for the social determinants of health (SDOH)**.

IED's System for High Quality Asthma Care



Solutions for the Indoor Environmental Determinants of Health

- **IEDOH solutions for asthma reflect SDOH models** for clinic–community integration, housing-related supports, and health equity priorities in health care.
- **This webinar series spotlights solutions with health care for the IEDOH** to help health care innovation stakeholders advance health equity with in-home environmental asthma care.



Join the Asthma Community Network to access Solutions for the IEDOH at **AsthmaCommunityNetwork.org**

Solutions for the IEDOH in Asthma and Community Health

Population Health Situational Awareness: Getting the Data You Need to Build Equity in Child Asthma Outcomes

ANDREW BECK, M.D., M.P.H.
ASSOCIATE PROFESSOR, UNIVERSITY OF CINCINNATI COLLEGE OF MEDICINE AND ATTENDING PHYSICIAN, CINCINNATI CHILDREN'S HOSPITAL MEDICAL CENTER

Population Health Situational Awareness: Getting the Data You Need to Achieve Equity in Child Asthma Outcomes

Andrew F. Beck, MD MPH

Solutions for addressing indoor environmental determinants of health

December 13, 2022

Andrew.Beck1@cchmc.org or @afbeckMD

Cincinnati Children's
changing the outcome together

Objectives

- Consider how and why certain patients and populations are disproportionately burdened by asthma morbidity
- Employ situational awareness to inform collective action
- Discuss intervention strategies aimed at improving asthma outcomes for children and communities (across a city)

Cincinnati Children's
changing the outcome together

A child I met during my training

What is population health?

"The health outcomes of a group of individuals, including the distribution of such outcomes within the group."

Kindig & Stoddart (2003)

Population health research is "the study of the conditions that shape distributions of health within and across populations, and of the mechanisms through which these conditions manifest as the health of individuals."

Keyes & Galea (2016)

What Is Population Health?

David Kindig, MD, PhD, and Greg Stoddart, PhD

Population health is a relatively new term that has not yet been precisely defined. Is it a concept of health or a field of study of health determinants?

We propose that the definition be "the health outcomes of a group of individuals, including the distribution of such outcomes within the group," and we argue that the field of population health includes health outcomes, patterns of health determinants, and policies and interventions that link these two.

We present a rationale for this definition and note its differentiation from public health, health promotion, and social epidemiology. We invite critiques and discussion that may lead to some consensus on this emerging concept. (*Am J Public Health.* 2003;93: 380–383)

ALTHOUGH THE TERM "population health" has been much more commonly used in Canada than in the United States, a precise definition has not been agreed upon even in Canada, where the concept it denotes has gained some prominence. Probably the most influential contribution to the development of the population health approach is Evans, Barer, and Marmor's *Why Are Some People Healthy and Others Not? The Determinants of Health of Populations,*[1] which grew out of the work of the Population Health Program of the Canadian Institute for Advanced Research. No concise definition of the term appears in this volume, although its authors state the concept's "linking thread [to be] the common focus on trying to understand the determinants of health of populations."[1(p29)]

The idea that population health is a field of study or a research approach focused on determinants seems to have evolved from this work. Early discussions at the Canadian Institute for Advanced Research also considered the definition and measurement of health and the processes of health policymaking, but the dominant emphasis evolved to the determinants themselves, particularly the nonmedical determinants. John Frank, the scientific director of the recently created Canadian Institute of Population and Public Health, has similarly called population health "a newer research strategy for understanding the health of populations."[2] T.K. Young's recent book *Population Health* also tends in this direction; he states that in Canada and the United Kingdom in the 1990s, the term has taken on the connotation of a "conceptual framework for thinking about why some populations are healthier than others as well as the policy development, research agenda, and resource allocation that flow from this framework."[3(p4)]

However, Young also indicates that in the past, the term has been used as a "less cumbersome substitute for the health of populations," which is of course its literal meaning. Evans and Stoddart, while supporting an emphasis on "understanding of the determinants of population health," have also stated, however, that "different concepts [of health] are neither right or wrong, they simply have different purposes and applications. . . . [W]hatever the level of definition of health being employed, however, it is important to distinguish this from the question of the determinants of that definition of health."[1(p28)] The Health Promotion and Programs Branch of Health Canada has recently stated that "the overall goal of a population health approach is to maintain and improve the health of the entire population and to reduce inequalities in health between population groups."[4(p1)] They indicate that one guiding principle of a population health approach is "an increased focus on health outcomes (as opposed to inputs, processes, and products) and on determining the degree of change that can actually be attributed to our work."[(p11)]

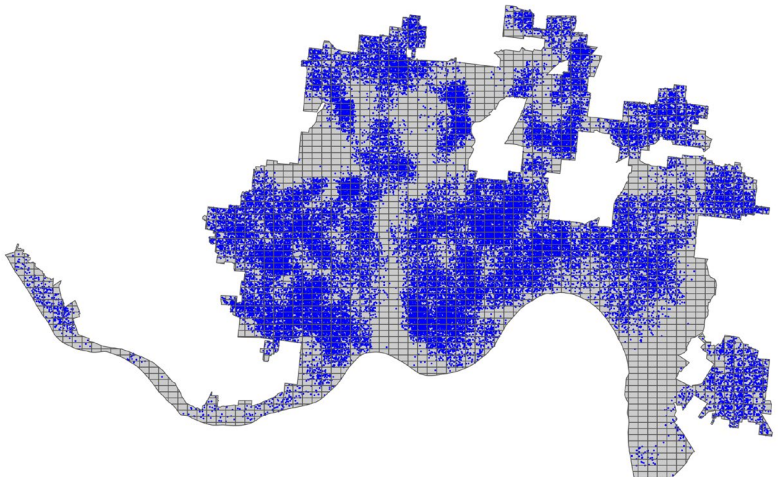
Dunn and Hayes, quoting the definition of the Canadian Federal/Provincial/Territorial Advisory Committee on Population Health, write that "population health refers to the health of a population as measured by health status indicators and as influenced by social, economic, and physical environments, personal health practices, individual capacity and coping skills, human biology, early childhood development, and health services. As an approach, population health focuses on interrelated conditions and factors that influence the health of populations over the life course, identifies systematic variations in their patterns of occurrence, and applies the resulting knowledge to develop and implement policies and actions to improve the health and well being of those populations."[5(p57)] Kindig has suggested a similarly broad definition: population health is "the aggregate health outcome of health adjusted life expectancy (quantity and quality) of a group of individuals, in an economic framework that balances the relative marginal returns from the multiple determinants of health."[6(p47)] This definition proposes a specific unit of measure of population health and also includes consideration of the relative cost-effectiveness of resource allocation to multiple determinants.

Recently, even in the United States, the term is being more widely used, but often without clarification of its meaning and definition. While this development might be seen as a useful movement in a new and positive direction, increased use without

Pursuing population health – key questions

Why are certain children more likely to face preventable morbidity (and mortality)?

Why are certain communities more likely to face preventable morbidity (and mortality)?



How can we use shared situational awareness to move, with urgency, toward action?

Situational awareness is "the **perception** of environmental elements and events with respect to time or space, the **comprehension** of their meaning, and the **projection** of their future status." It is a tool for population health action, for asking / answering critical questions.

- ✓**Perception** identifies key data and contextual elements.
- ✓**Comprehension** employs analytics to consider meaning, significance of data / context.
- ✓**Projection** thinks ahead, forecasting what might be coming.

Endsley (1995)
Hartley (2020)

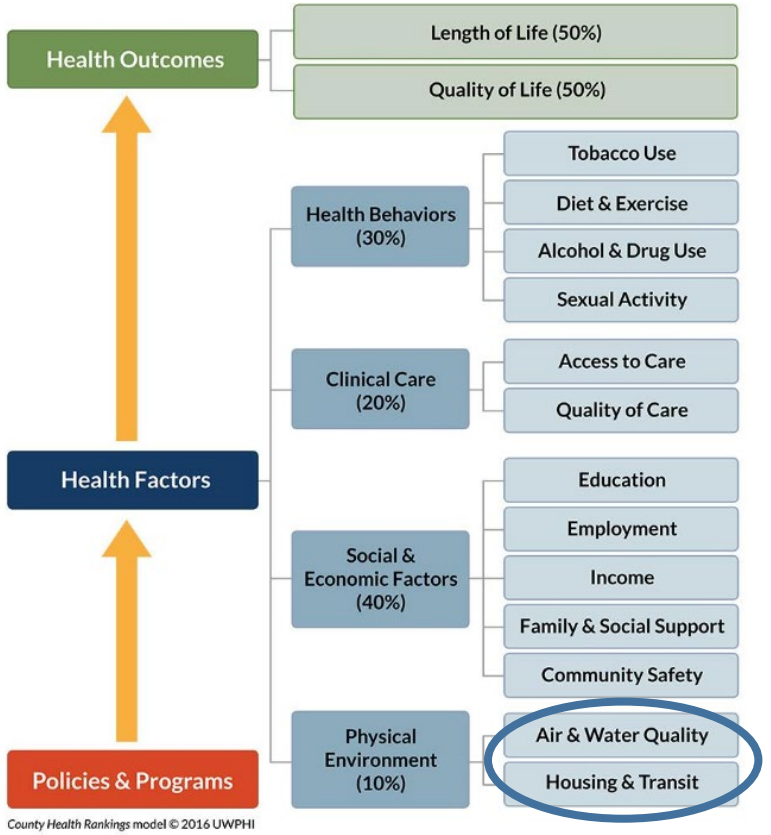
Cincinnati Children's
changing the outcome together

Why are certain children more likely to face preventable morbidity (and mortality)?

Cincinnati Children's
changing the outcome together

Factors that “determine” health outcomes

1. Medical care is insufficient for ensuring better health outcomes
2. Social conditions, policies, programs associated with health outcomes
3. New payment models prompting interest in addressing socioeconomic, environmental factors
4. Frameworks for integrating social and medical care emerging
5. Prompting experimentation at multiple levels

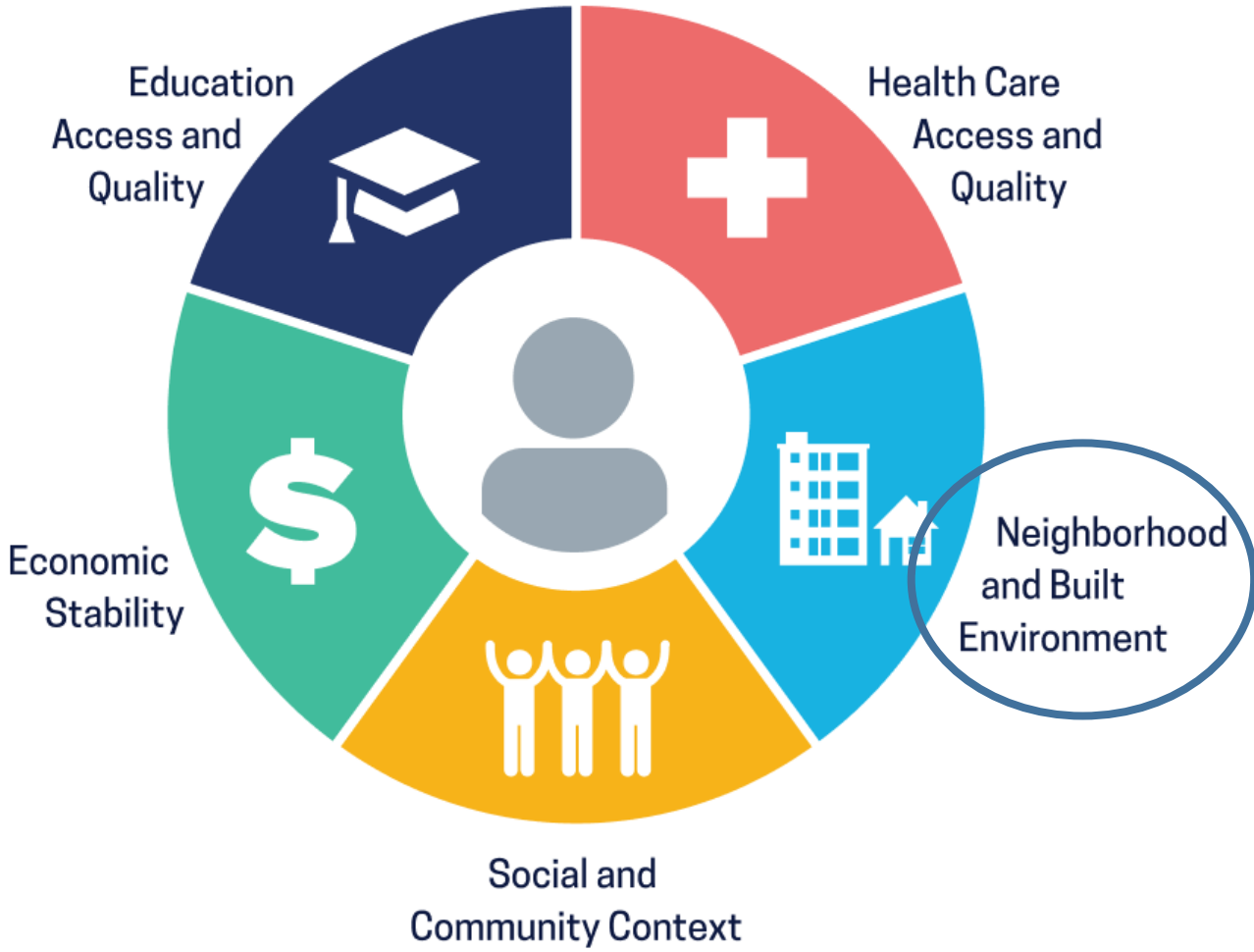


Cincinnati Children's
changing the outcome together

https://nam.edu/social-determinants-of-health-101-for-health-care-five-plus-five/

Social determinants of health (SDH)

"**Conditions** in which people are born, grow, work, live, and age, and the wider set of **forces and systems** shaping the conditions of daily life. These forces and systems include economic policies and systems, development agendas, social norms, social policies and political systems."



http://www.who.int/social_determinants/en/
https://health.gov/healthypeople/objectives-and-data/social-determinants-health

Health equity

"Everyone has a **fair and just opportunity** to be as healthy as possible. This requires **removing obstacles** to health such as poverty, discrimination, and their consequences, including powerlessness and lack of access to good jobs with fair pay, quality education and **housing, safe environments**, and health care."

https://www.rwjf.org/en/library/research/2017/05/what-is-health-equity-.html
https://www.rwjf.org/en/blog/2022/11/we-used-your-insights-to-update-our-graphic-on-equity.html

Inside the homes of too many of Cincinnati's youth

Cincinnati Children's™
changing the outcome together

Individual-level

Social Risk Factors & Social Needs

Social risk factors are specific individual-level adverse social conditions (i.e., adverse material and psychosocial circumstances) that are associated with poor health. Behavioral risk factors are not social risk factors. Social needs are the social risk factors that individuals (e.g., patients, clients, beneficiaries) identify and prioritize. Example: Food insecurity

Community-level

Social Determinants of Health

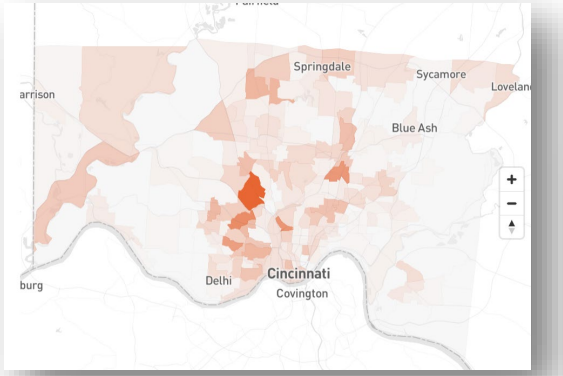
Underlying community-wide social, economic, and physical conditions in which people are born, grow, live, work, and age. These conditions shape the distribution, chronicity, and severity of individual social risk factors and social needs. Example: Food desert

Societal-level

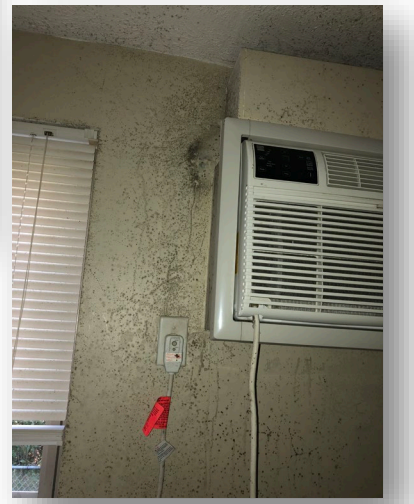
Structural Determinants of Health Equity:

The societal norms; macroeconomic, social & health policies; and the structural mechanisms that shape social hierarchy and gradients (e.g., power, racism, sexism, class, and exclusion), and, in turn, the distribution, quality, and chronicity of social determinants of health and social needs. Example: Supermarket redlining, structural racism

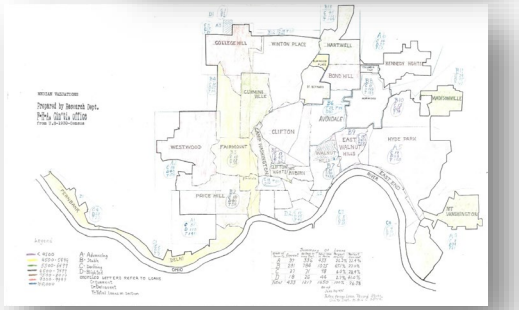
Source: HealthBegins. Upstream Communications Toolkit



Housing stability (evictions)



Housing conditions



Legacy of redlining

https://2hdp0l1trjr524kvdq3mg5sa-wpengine.netdna-ssl.com/wp-content/uploads/2022/02/HealthBegins-Upstream-Communications-Toolkit-Feb-2022.pdf
https://evictionlab.org/eviction-tracking/cincinnati-oh/

Cincinnati Children's™
changing the outcome together

Asking the right question – screening

- National Academy of Medicine (NAM) now recommends:
  - Standardized collection of race/ethnicity, tobacco, alcohol, **residential address**
  - Data on educational attainment, financial strain, stress, depression, physical activity, social isolation, intimate partner violence, neighborhood median household income
  - Integration of SDH data with electronic health record (EHR)
- American Academy of Pediatrics (AAP) encourages screening to "facilitate prevention services" and "improve the health of **all** children"

Adler & Stead (2015)
AAP Policy Statement (2016)

Cincinnati Children's
changing the outcome together

	Are you under threat of eviction for reasons other than not paying rent?	Yes / No
	Are you currently having any housing problems (roaches, rodents, mold, lead, etc.) that your landlord is not helping you with?	Yes / No
	Within the past 12 months did you/your family worry whether your food would run out before you got money or SNAP/food stamps to buy more?	Yes / No
	Within the past 12 months, did the food you/your family bought not last and you didn't have money to buy more?	Yes / No
	Over the past 2 weeks, how often have you been bothered by any of the following problems: • Feeling down, depressed, or hopeless? (Please circle which) — Not at all / Several Days / More than half the days / Nearly everyday • Little interest of pleasure in doing things? (Please circle which) — Not at all / Several Days / More than half the days / Nearly everyday	
	Have you been denied for food stamps, medical insurance, childcare vouchers, SSI, or other benefits and feel this is incorrect?	Yes / No
	Has anything bad, sad, or scary happened to you or your child since your last clinic visit? (Please circle which)	Yes / No
?	Is there anything else we can help you with today? _____ _____	Yes / No
	Are any of your needs urgent? For example: I don't have food tonight, I don't have a place to sleep tonight, I don't have a way to get home today	Yes / No
	If you answered YES to any of the questions above, would you like to receive assistance with this today?	Yes / No / Phone Call

Kenyon (2007)
Beck (2012)
Chung (2016)

Perception – Social histories with empathy and purpose

Domain/Area	Examples of Questions
Income	
General	Do you ever have trouble making ends meet?
Food income	Do you ever have a time when you don't have enough food? Do you have WIC? Food stamps?
Housing	
Housing	Is your housing ever a problem for you?
Utilities	Do you ever have trouble paying your electric/heat/telephone bill?
Education	
Appropriate education placement	How is your child doing in school? Is he/she getting the help to learn what he/she needs?
Early childhood program	Is your child in Head Start, preschool, or other early childhood enrichment?
Legal status	
Immigration	Do you have questions about your immigration status? Do you need help accessing benefits or services for your family?
Literacy	
Child literacy	Do you read to your child every night?
Parent literacy	How happy are you with how you read?
Personal safety	
Domestic violence	Have you ever taken out a restraining order? Do you feel safe in your relationship?
General safety	Do you feel safe in your home? In your neighborhood?

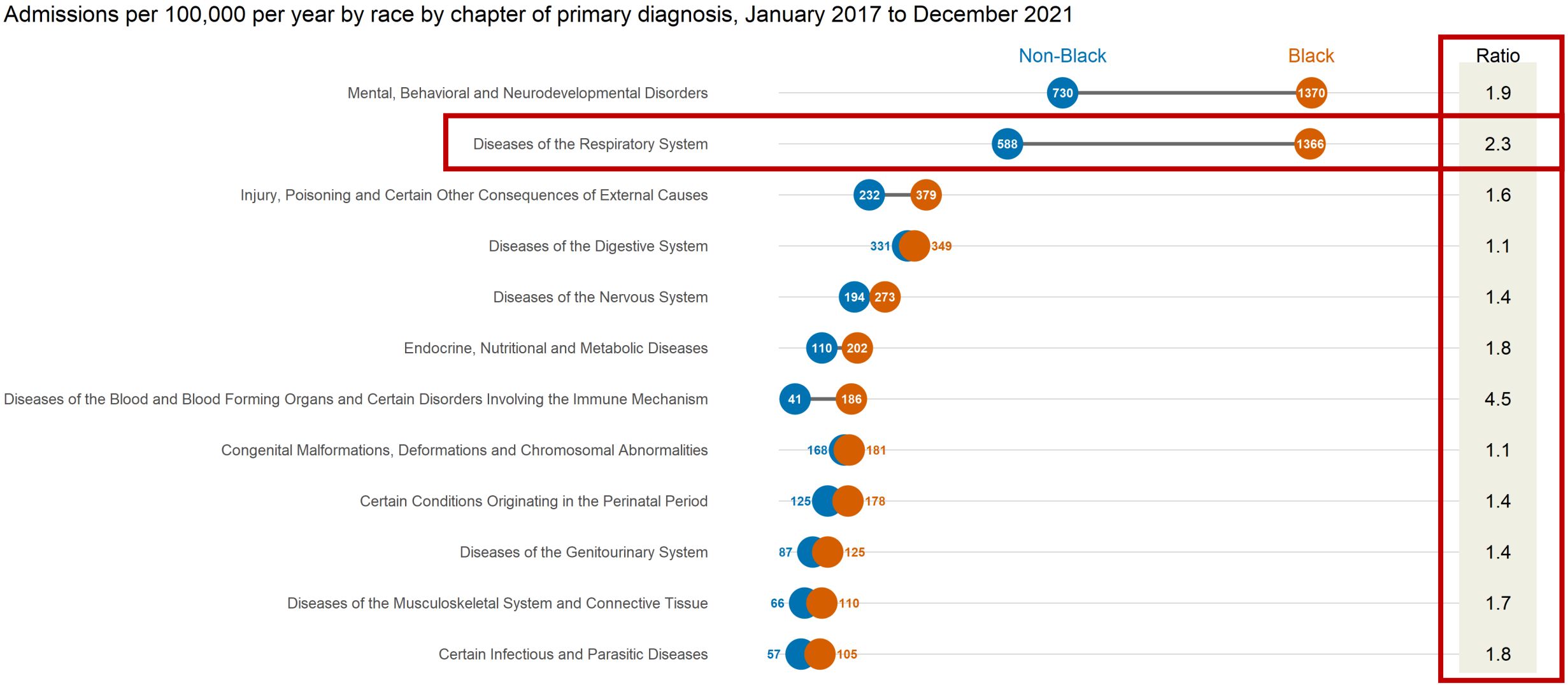
WIC indicates Supplemental Nutrition Program for Women, Infants, and Children.

Perceiving inequitable systems

- **1 in 6 US children live in poverty**
  - Children are poorest age group in the US
  - Federal poverty level for a family of 4 is $27,750 – half income needed for basic financial security
- Disproportionate % of poor children are children of color
- **Child Tax Credit** played a substantial (temporary?) role in lifting children out of poverty

https://www.census.gov/library/stories/2022/10/poverty-rate-varies-by-age-groups.html
https://www.census.gov/library/stories/2022/09/record-drop-in-child-poverty.html

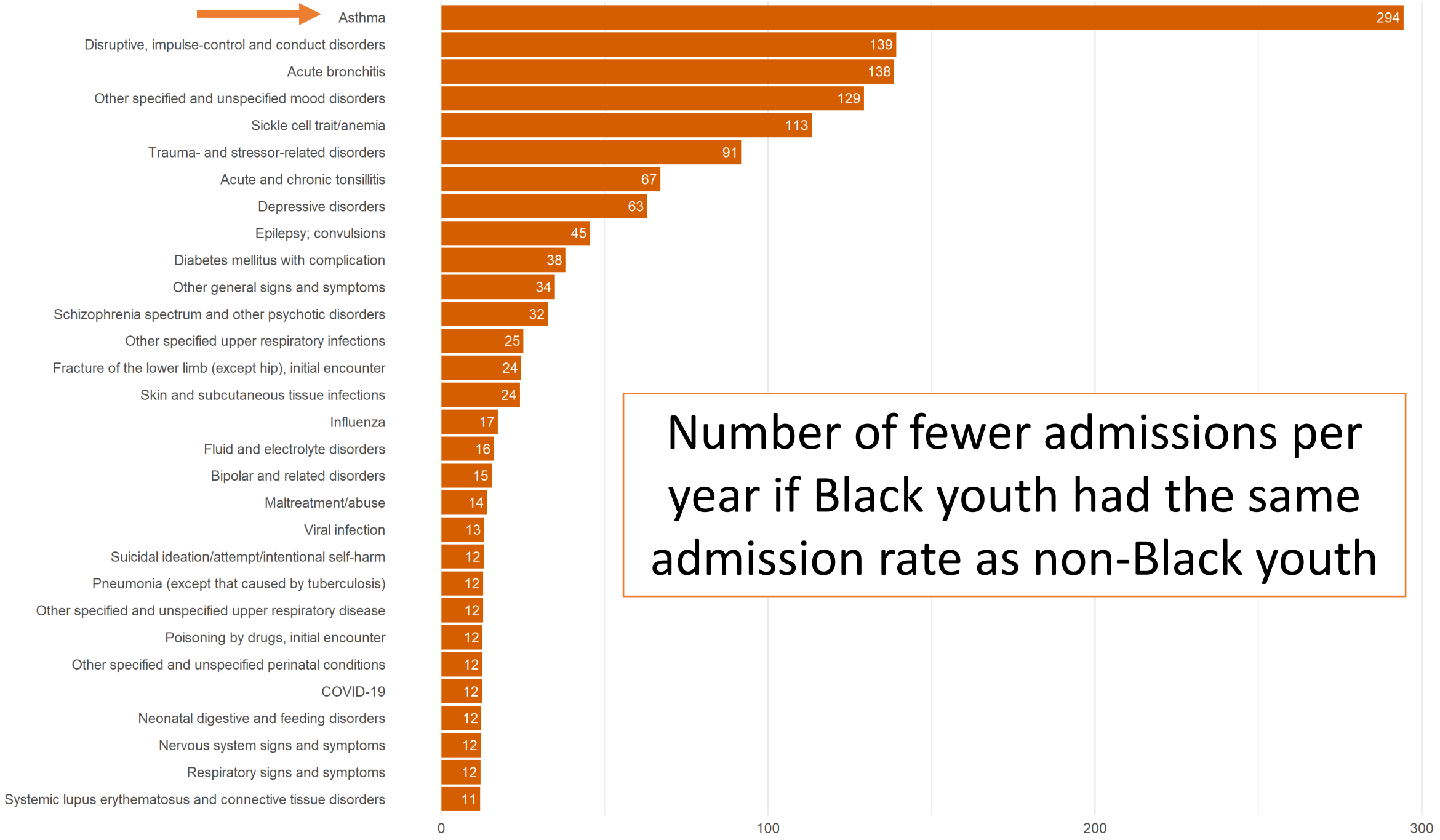
Cincinnati Children's™
changing the outcome together



Comprehension: racial inequities in hospitalizations across conditions

Cincinnati Children's
changing the outcome together

Beck (2018)

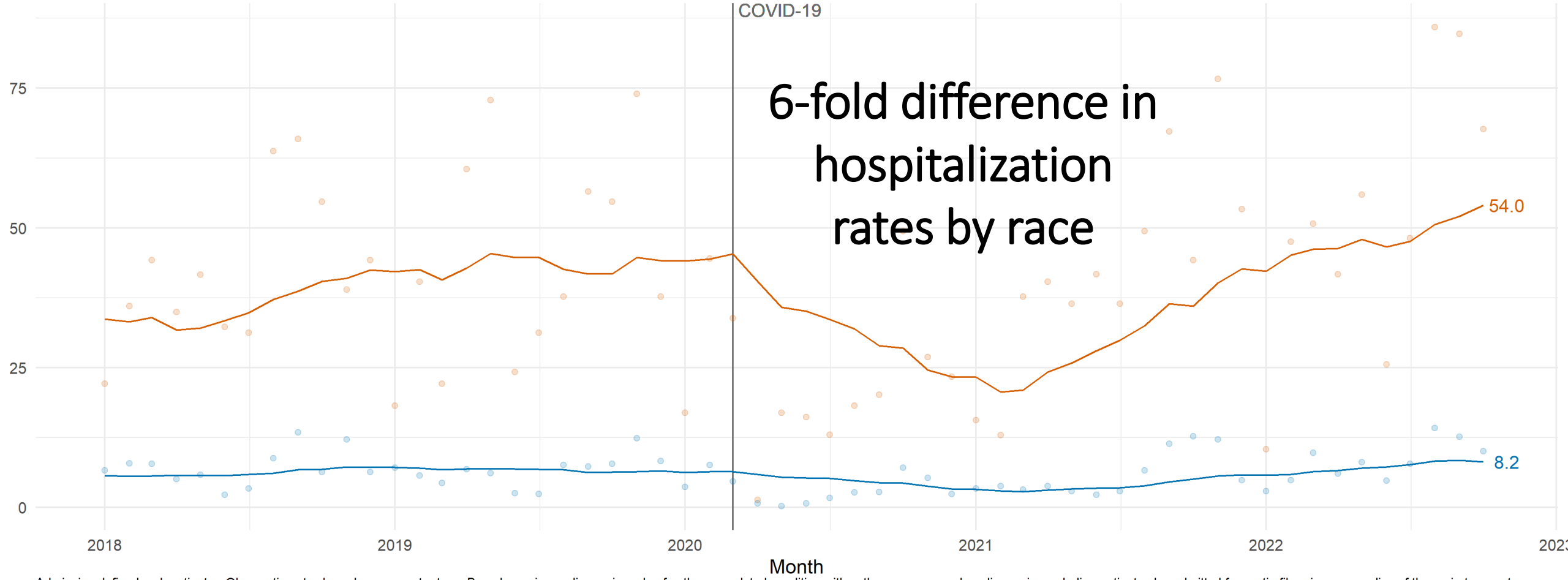


Top 30 conditions with excess admissions by primary diagnosis for 2017-2021

Asthma admissions per 100,000 population from SW Ohio, 12 month moving average

Patients identifying as only Black or African American and All other patients

Desired direction ↓



6-fold difference in hospitalization rates by race

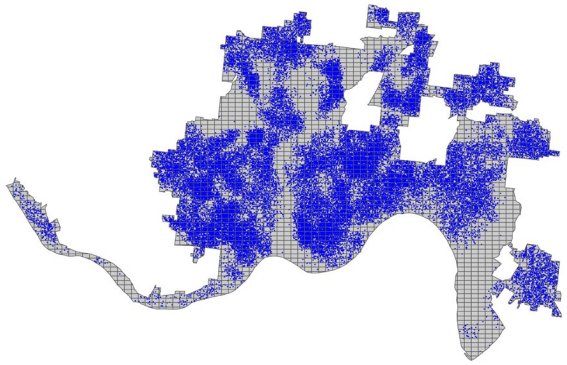
Admission defined as Inpatient or Observation stay based on encounter type. Based on primary diagnosis code of asthma or related condition with asthma as a secondary diagnosis, excluding patients also admitted for cystic fibrosis or anomalies of the repiratory system. Monthly admissions adjusted to 30 day month. County of residence defined as county of geocoded address. Southwestern Ohio includes the following counties: Adams, Brown, Butler, Clermont, Clinton, Hamilton, Highland, and Warren. Race determined by mapping of self-reported values in Epic.

Projection: racial inequities in hospitalizations, measured over time

Cincinnati Children's
changing the outcome together

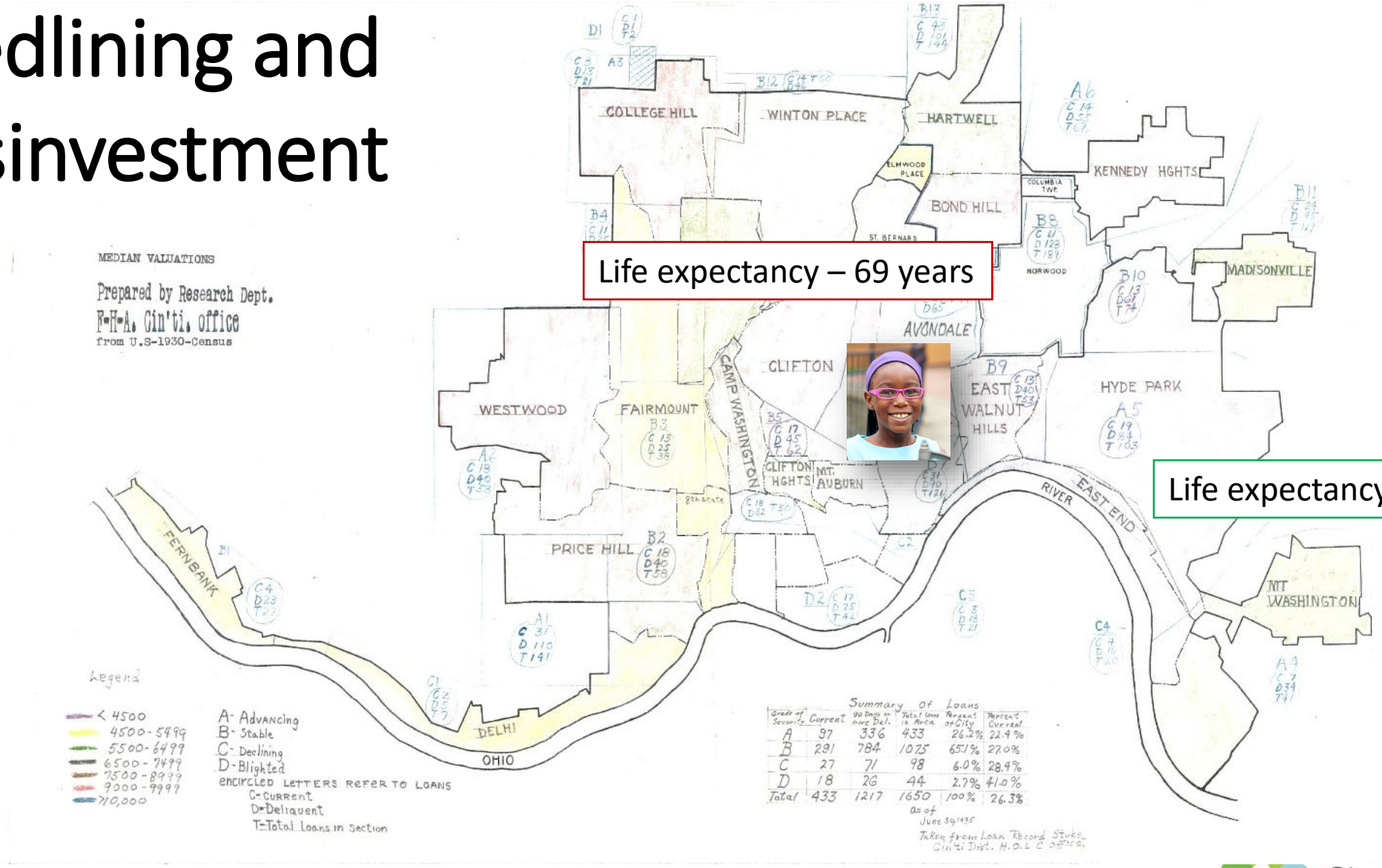
S. Taylor & J. Michael

Why are certain communities more likely to face preventable morbidity (and mortality)?



Cincinnati Children's
changing the outcome together

Redlining and disinvestment



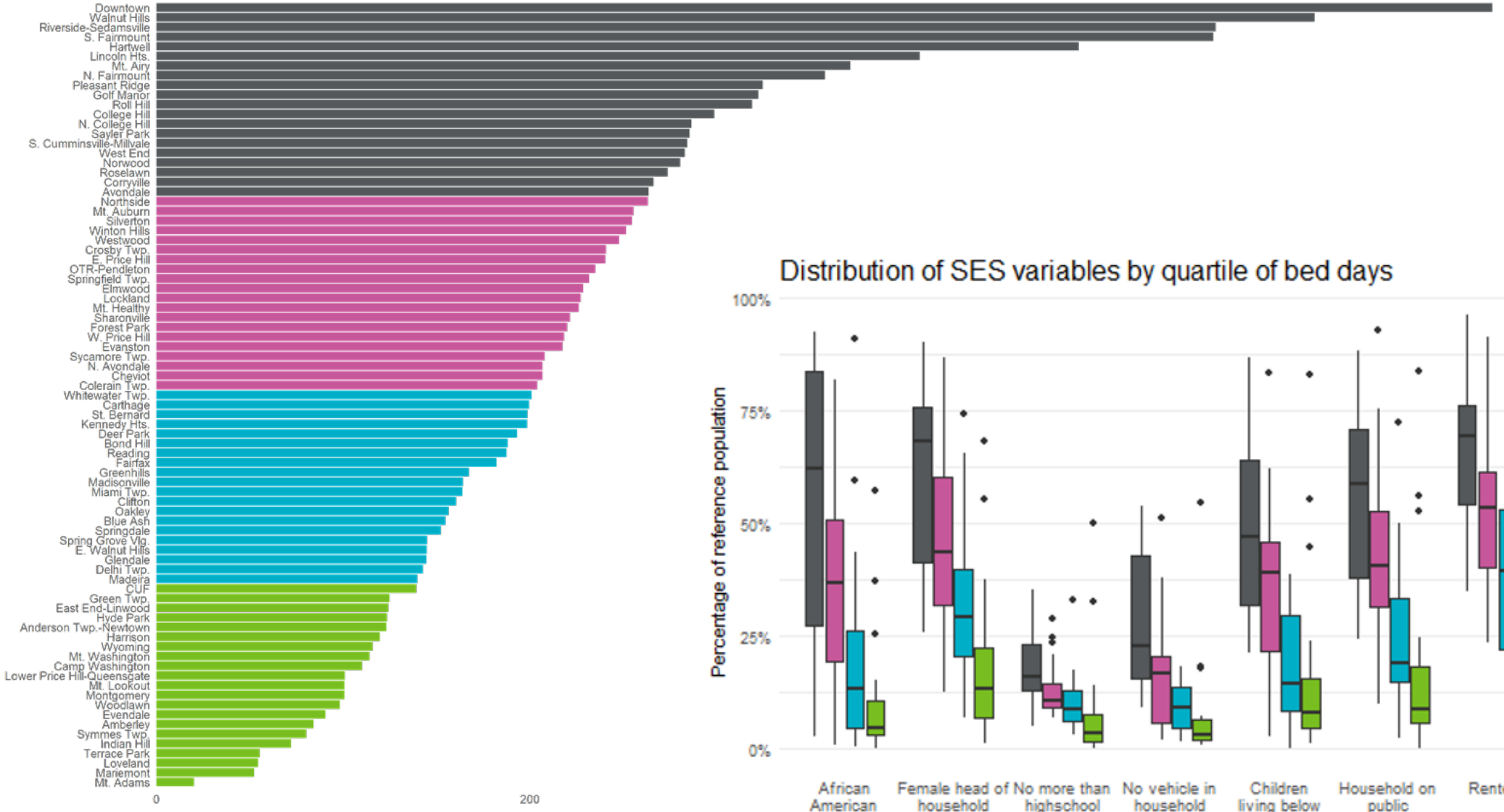
Life expectancy – 69 years

Life expectancy – 84 years

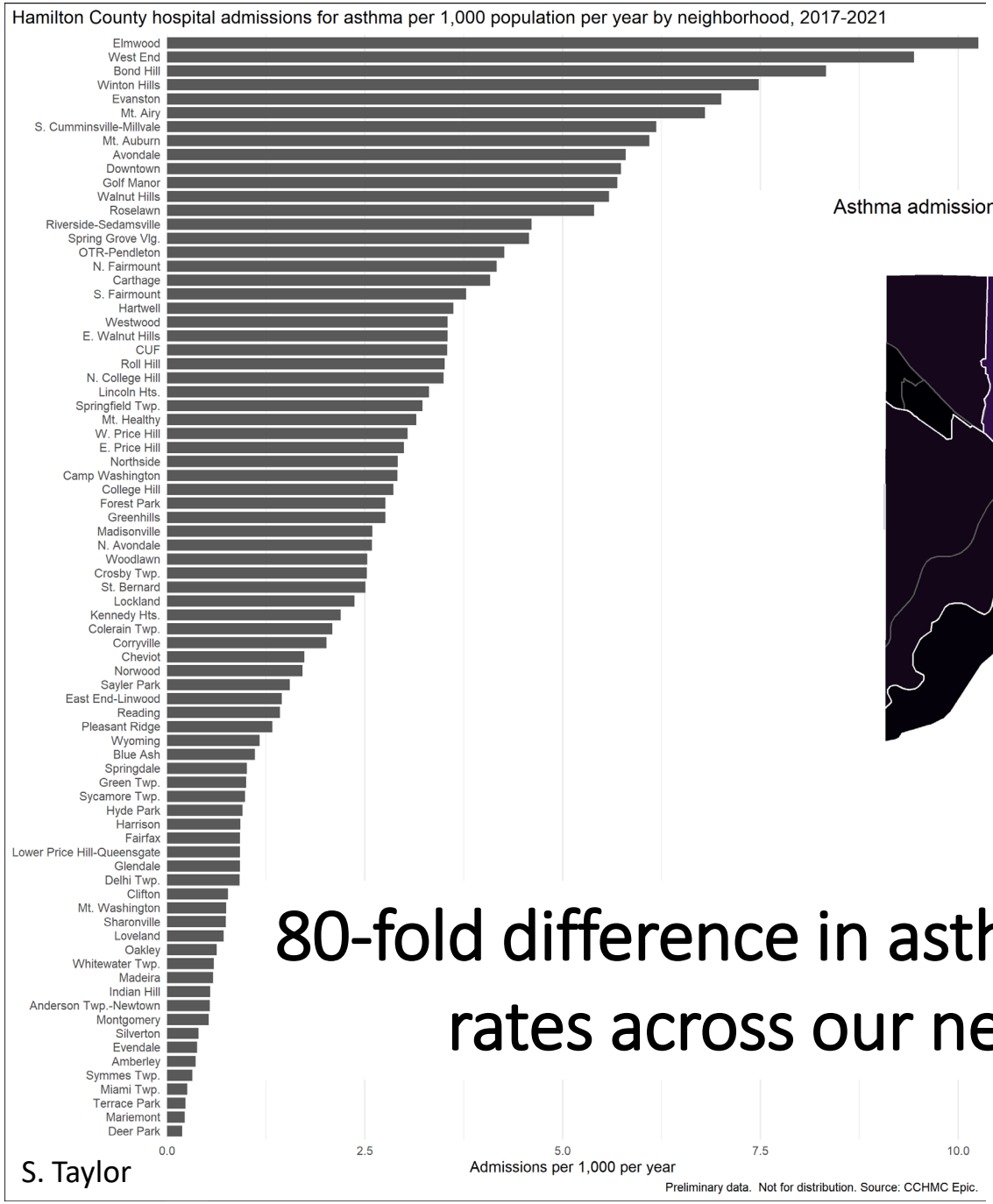
https://dsl.richmond.edu/panorama/redlining/#loc=5/39.1/-94.58

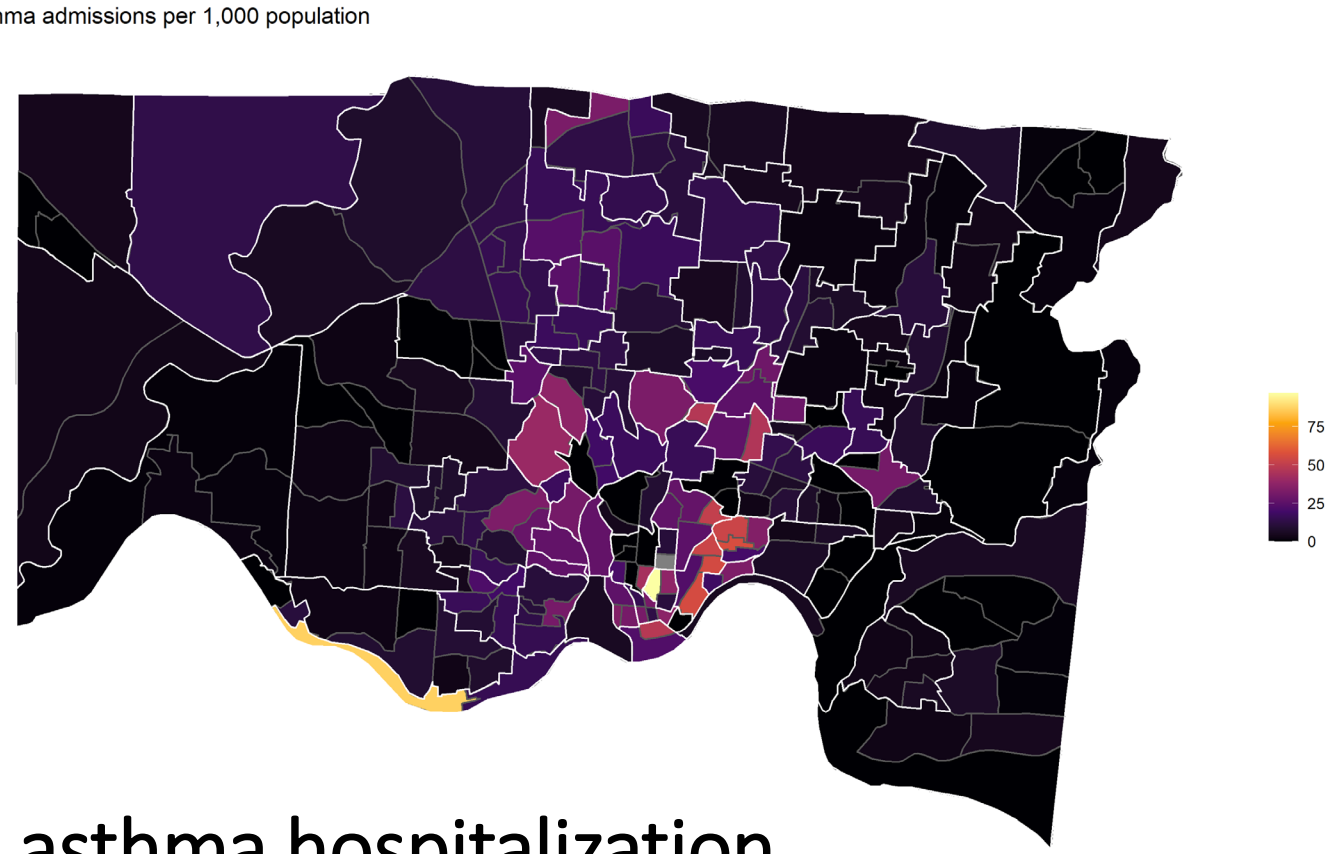
Cincinnati Children's
changing the outcome together

Neighborhood all-cause inpatient bed-day rate per 1,000 children per year (FY2015-2019)



S. Taylor & K. Rich

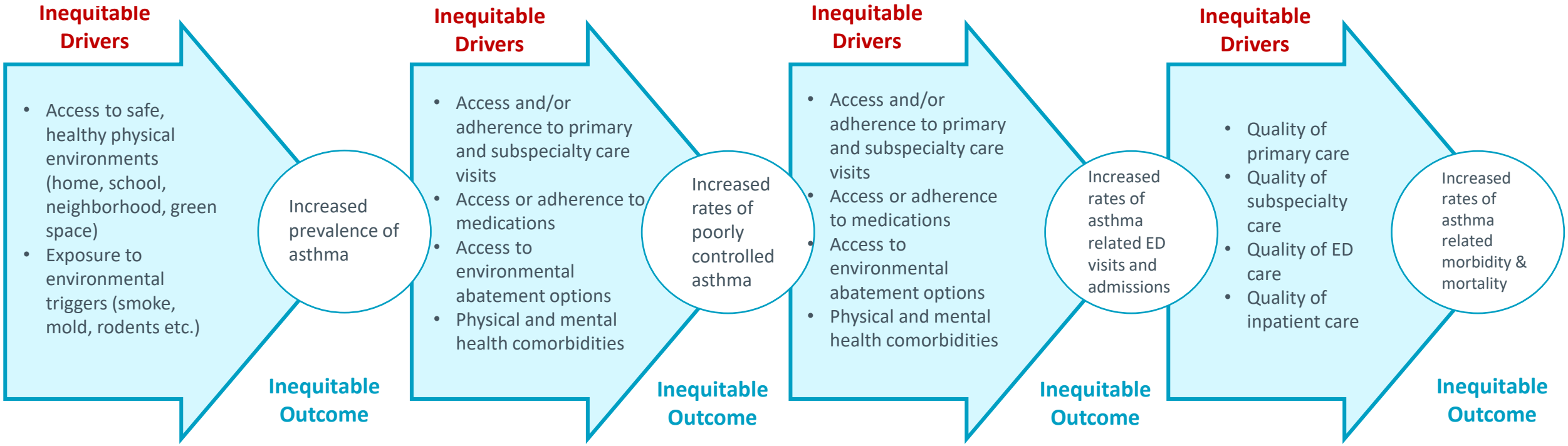




80-fold difference in asthma hospitalization rates across our neighborhoods

S. Taylor

Cincinnati Children's™
changing the outcome together



Structural Factors
- Racial wealth gap
- Concentrated poverty
- Housing discrimination and insecurity
- Neighborhood violence
- Education inequities (variation in school district resources)

Environmental Factors
- Residential segregation
- Environmental racism
- Poor housing quality

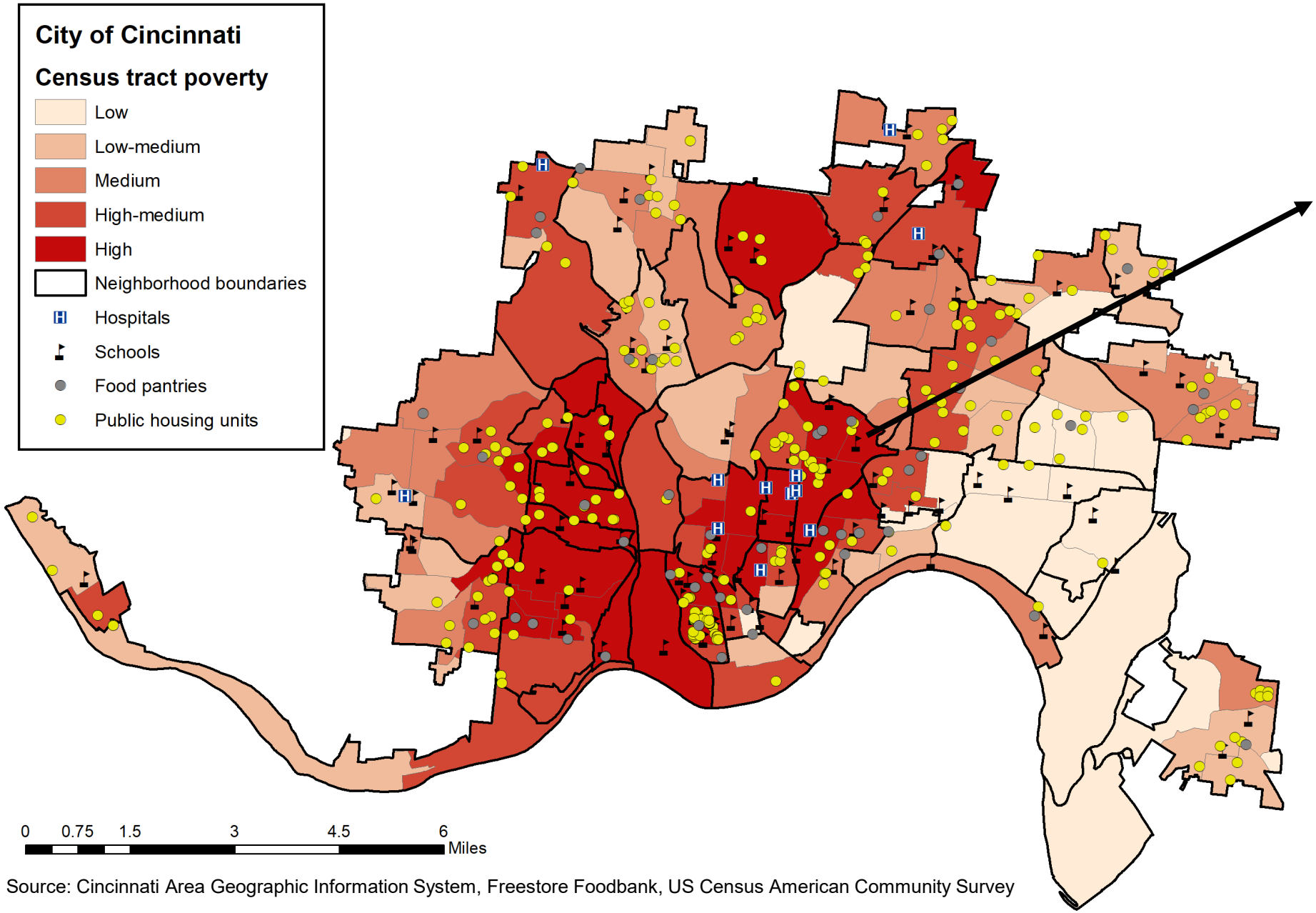
Proximal Factors
- Institutional racism in healthcare systems
- Insurance status variation
- Weathering effects of racism (e.g., chronic stress)
- Inadequate data collection, analysis, monitoring and sharing

"Anti-Black **structural racism** drives health inequities… through a **cascade** of factors and has manifestations warranting dedicated analysis and response."

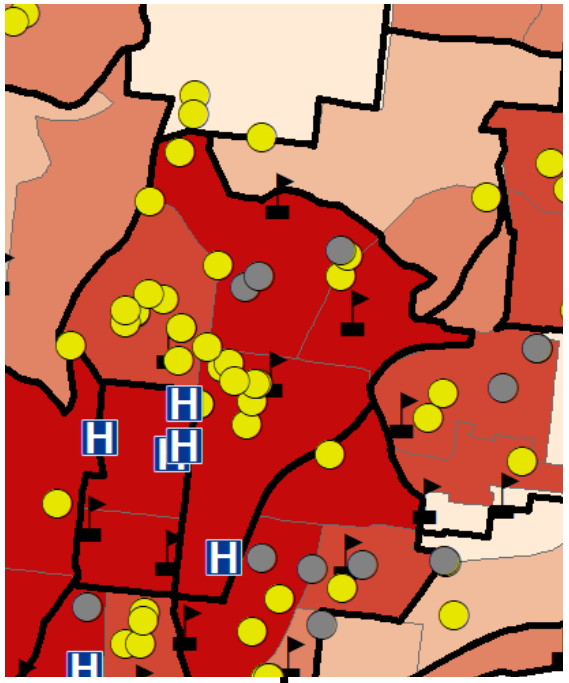
Cincinnati Children's
changing the outcome together

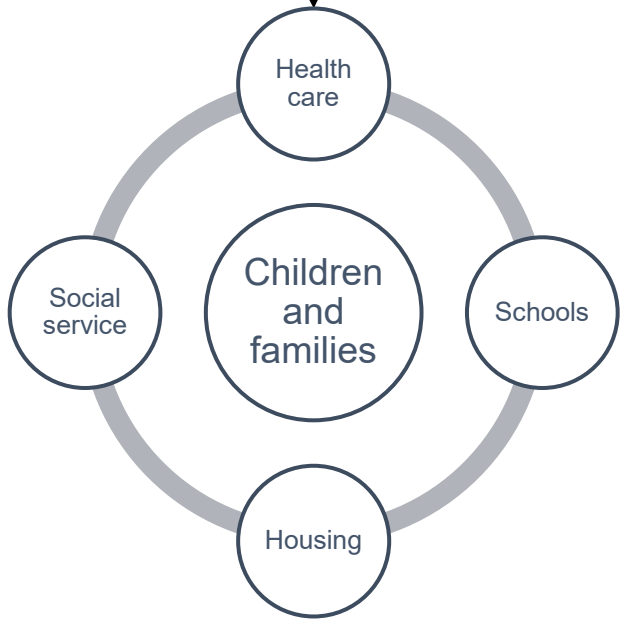
https://www1.nyc.gov/assets/doh/downloads/pdf/covid/black-hospitalizations-omicron-wave.pdf

Cross-sector health system – from city, to community, to household (and child)



Source: Cincinnati Area Geographic Information System, Freestore Foodbank, US Census American Community Survey





Social risks/needs

- Parents overwhelmed and stressed, “fog”
- Parents with limited social support

- School enrollment is challenging
- Older sibling performing poorly in school

- Children overdue for well care
- Transportation barriers (one car, unreliable bus)

- Family is living in poor housing with previous lead and mold exposure and an unresponsive landlord

- Hours are rigid
- Run out of food when SNAP benefits lapse before end of month

Social Determinants of Health

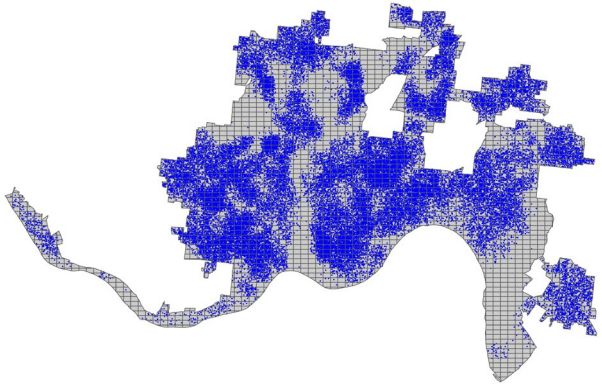
Opportunity to thrive

System of Assets

Cincinnati Children's
changing the outcome together

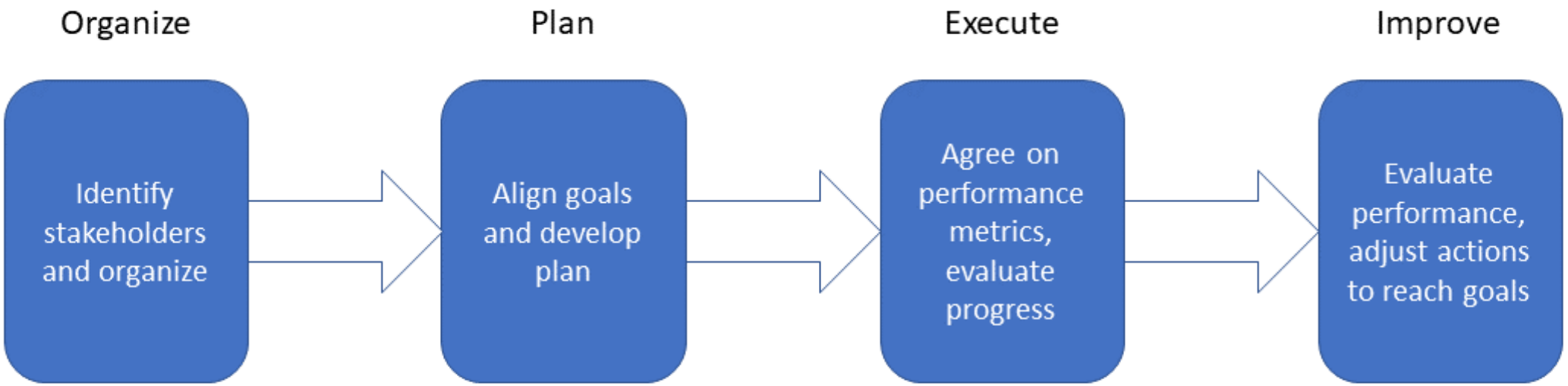
A. Henize

How can we use shared situational awareness to move, with urgency, toward action?



Cincinnati Children's
changing the outcome together

Situational awareness & learning health systems



https://www.springerprofessional.de/en/multi-sector-situational-awareness-in-the-covid-19-pandemic-the-/19551082

Cincinnati Children's™
changing the outcome together

What are learning health systems (LHS)?

https://www.ahrq.gov/learning-health-systems/about.html

Core practices for pursuit of equity via LHS

1. **Establish principle**. Position equity as an essential focus.
2. **Measure for equity**. Track data that matter to drive and sustain success.
3. **Lead from lived experience**. Ensure people with lived experience are leading the work.
4. **Co-produce**. Design, create, learn, act, and sustain together.
5. **Redistribute power**. Reallocate power and leadership across the system.
6. **Practice a growth mindset**. Cultivate an environment and expectation for growth.
7. **Engage beyond the healthcare system**. Catalyze change across systems that produce health.

Cincinnati Children's™
changing the outcome together

Parsons (2021)

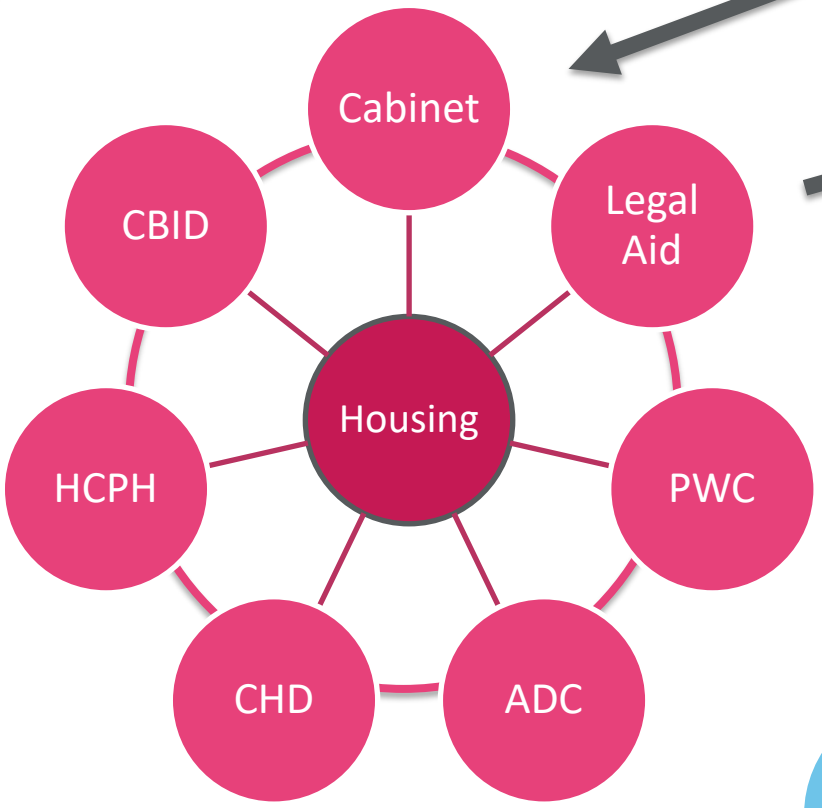
Building an Asthma LHS

- Work to collaboratively define population and set goals, measures, theory
- Facilitate organization, sharing of information and resources
- Situational awareness (data, dashboards) to build will, shared purpose
- Integrate research, practice, improvement

Cincinnati Children's
changing the outcome together

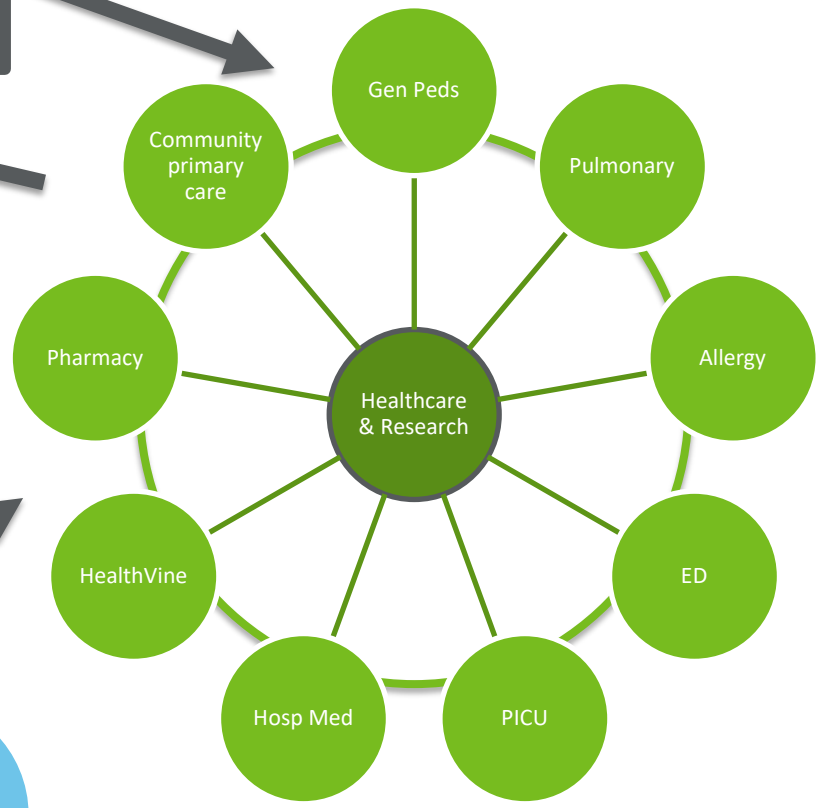
A. Beck, M. Seid, K. McDowell, & N. Unaka

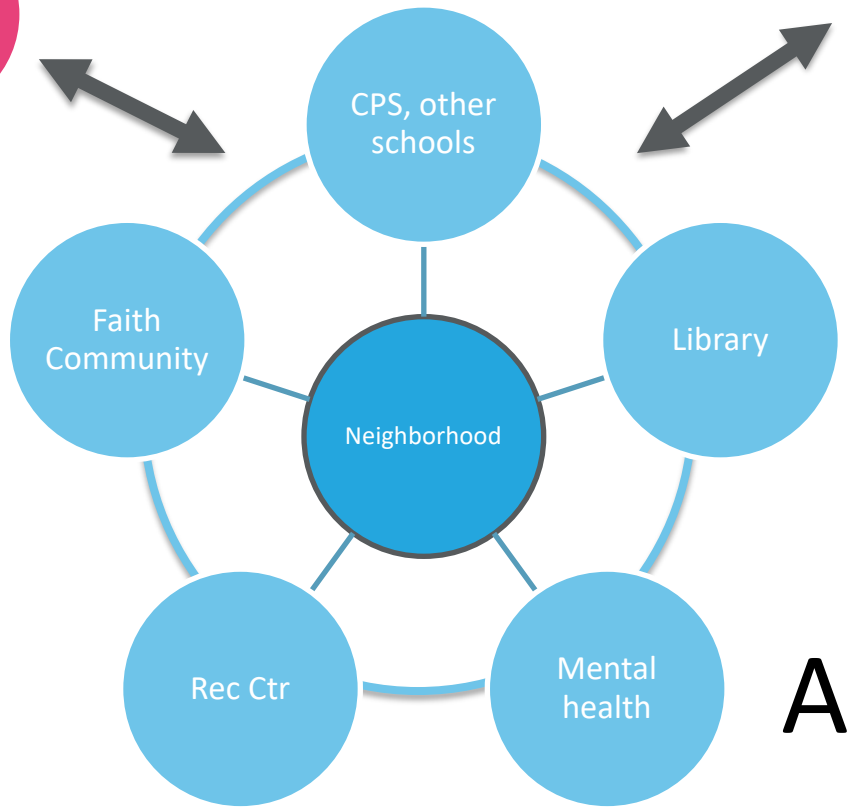
ALHS Network Steering Committee
Multidisciplinary improvement teams
Research collaborations



Neighborhoods

Families





Hyp: Shared ***situational awareness*** and network organizing (making it easier to connect and work together) will get the right resources to the right person (and populations) at the right time.

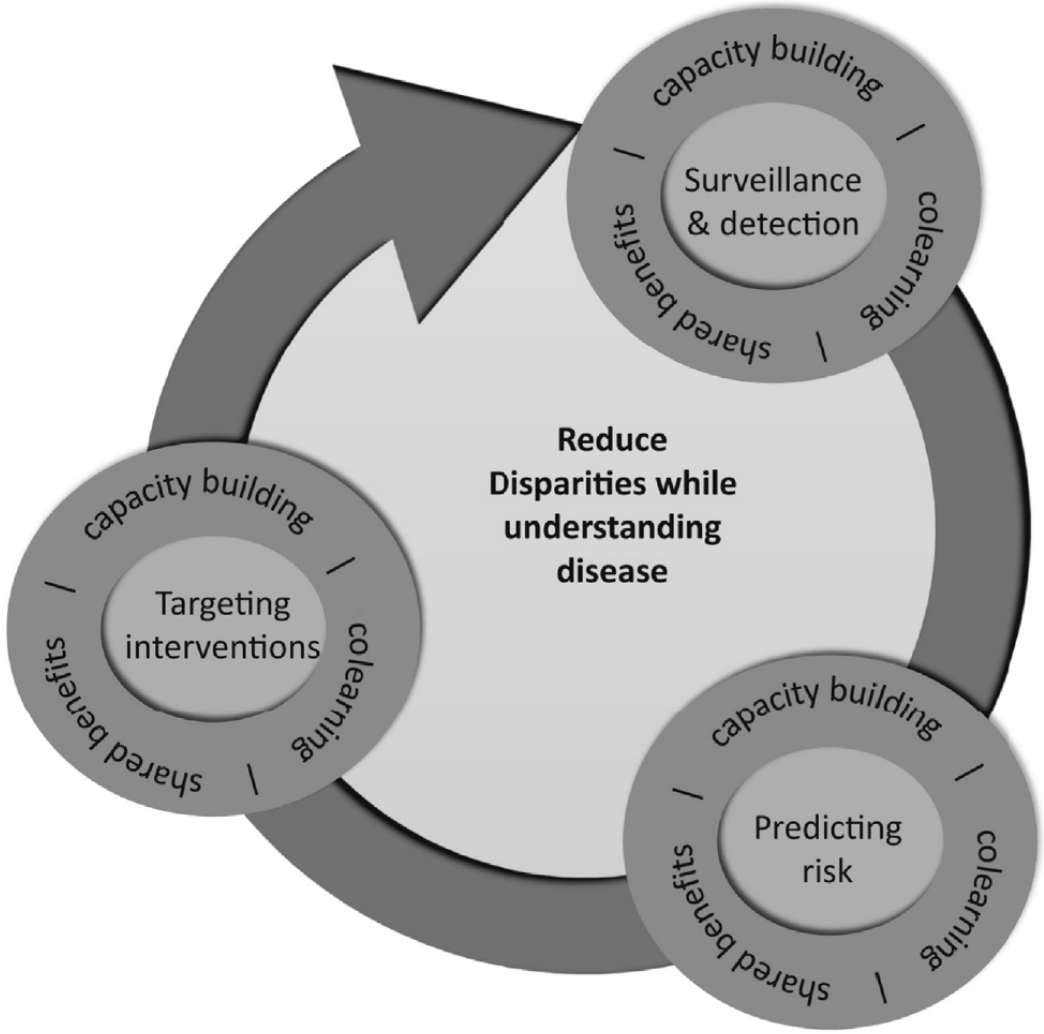
ALHS

Cincinnati Children's™
changing the outcome together

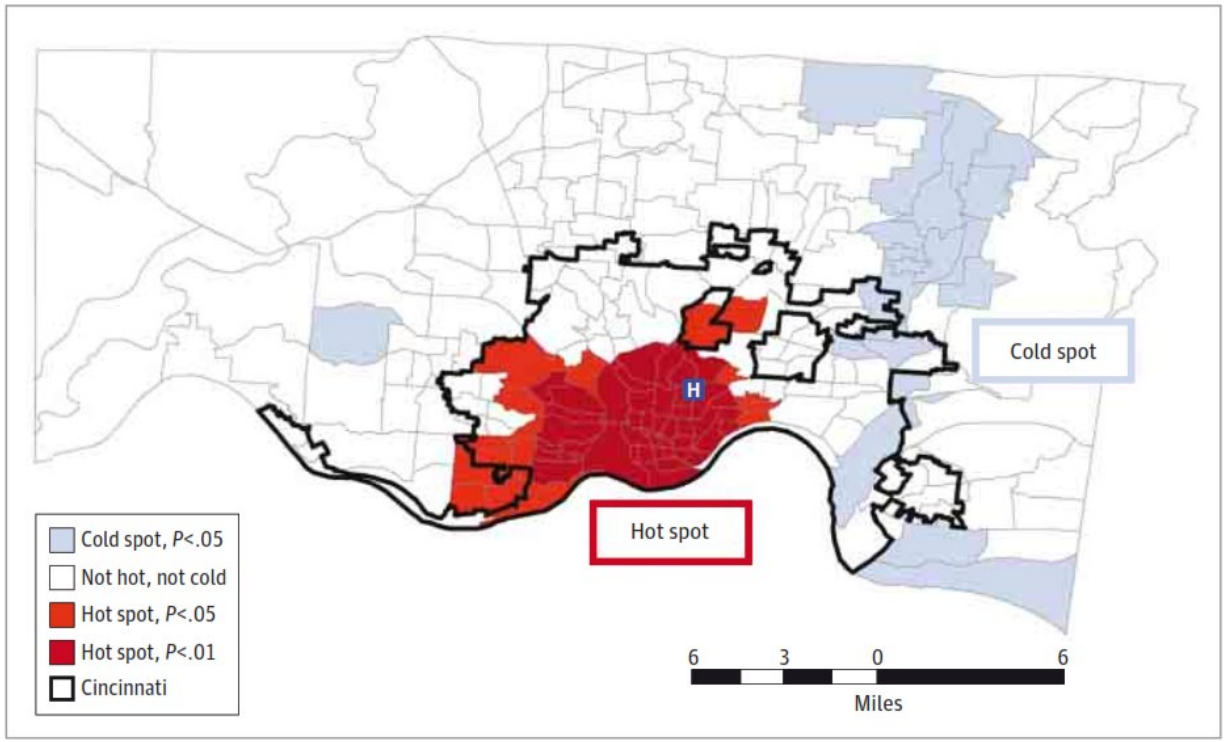
Adding precision to population health

Getting the right resources to the right person (population) at the right time

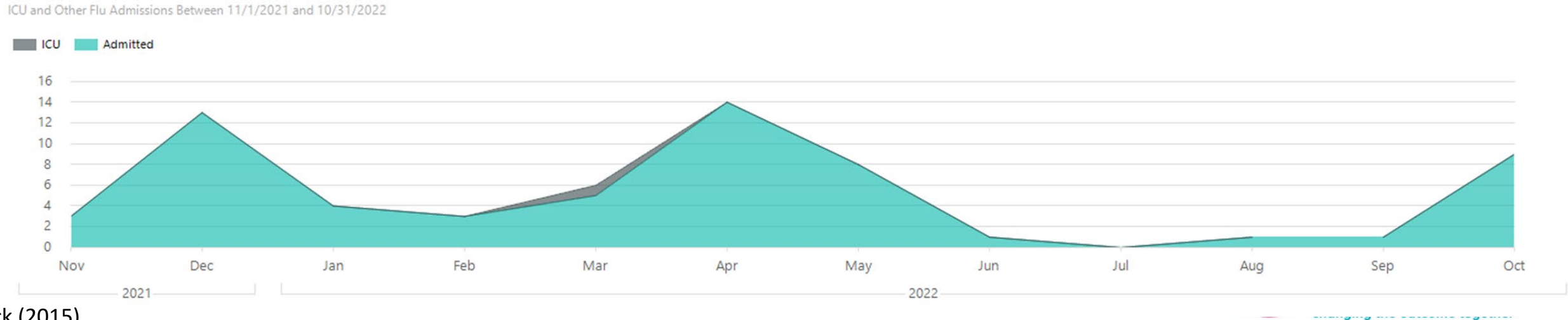
- **Surveillance & Detection**: Measurement infrastructure for surveillance and detection (overall, distribution)
  - EHR, Medicaid, geospatial datasets
- **Predicting risk**: Transformative analytic capabilities to predict risk, characterize gaps, and inform action
- **Targeting interventions**: Co-design to achieve better, more equitable outcomes



Kuo (2019)



Perception, comprehension, and projection of potential asthma triggers (e.g., viral infections)



Beck (2015)
J. Bruce

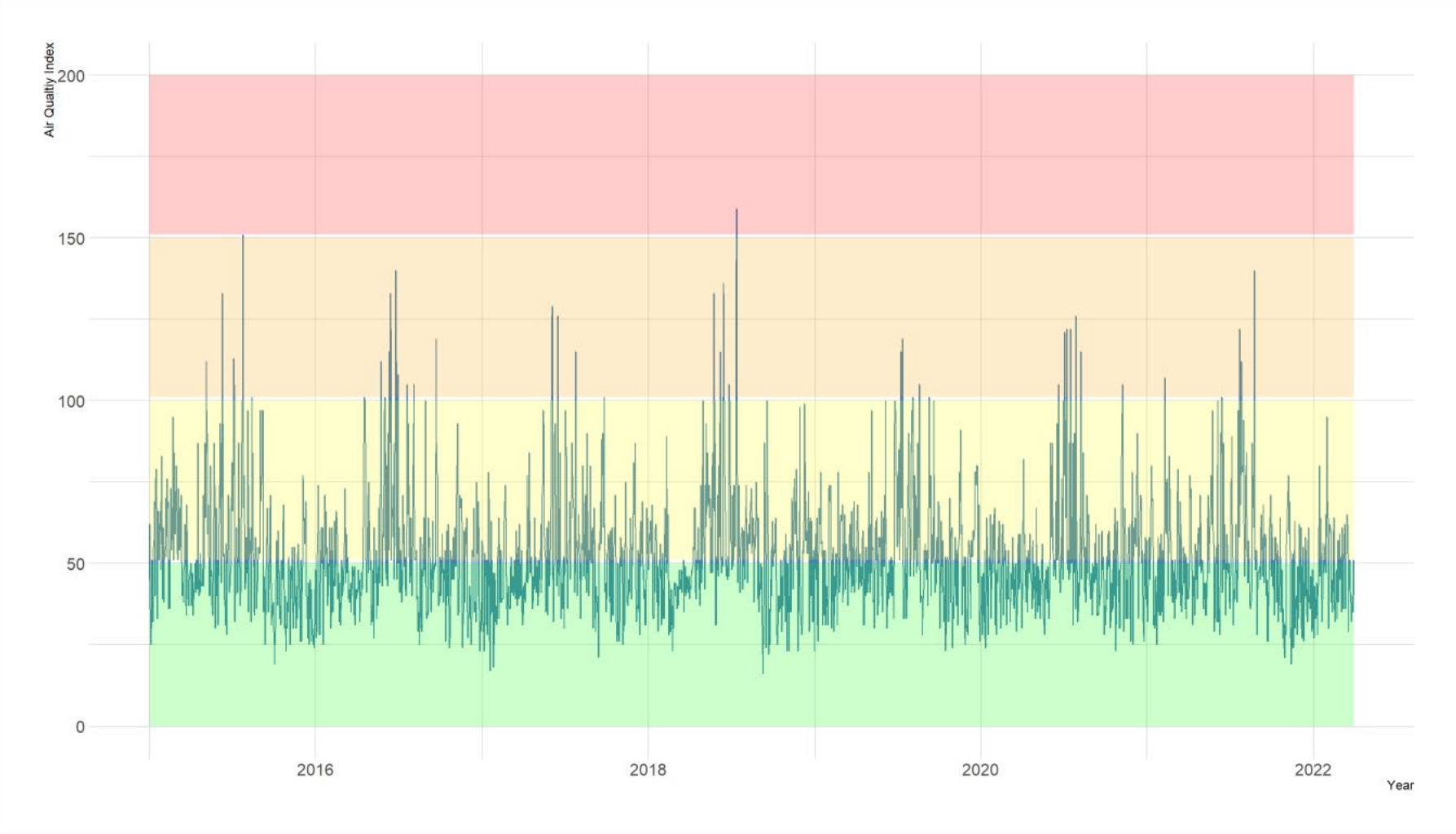
RISEUP Dashboard | Census Tract-Level Data in Hamilton County, Ohio | Historical Air Quality Index (AQI) Data in Hamilton County, Ohio

The plot provides daily air quality index (AQI) from 01-01-2015 to 03-31-2022 for Hamilton county, Ohio.

AQI has six categories as shown below:

AQI	Category
0 to 50	Good
51 to 100	Moderate
101 to 150	Unhealthy for Sensitive Groups
151 to 200	Unhealthy
201 to 300	Very Unhealthy
301 to 500	Hazardous

The current air quality in Cincinnati area can be found on AirNow



Perception, comprehension, and projection of potential asthma triggers (e.g., outdoor air quality)

Cincinnati Children's
changing the outcome together

E. Rasnick, Q. Duan, C. Brokamp

RISEUP Dashboard | Census Tract-Level Data in Hamilton County, Ohio | Historical Air Quality Index (AQI) Data in Hamilton County, Ohio

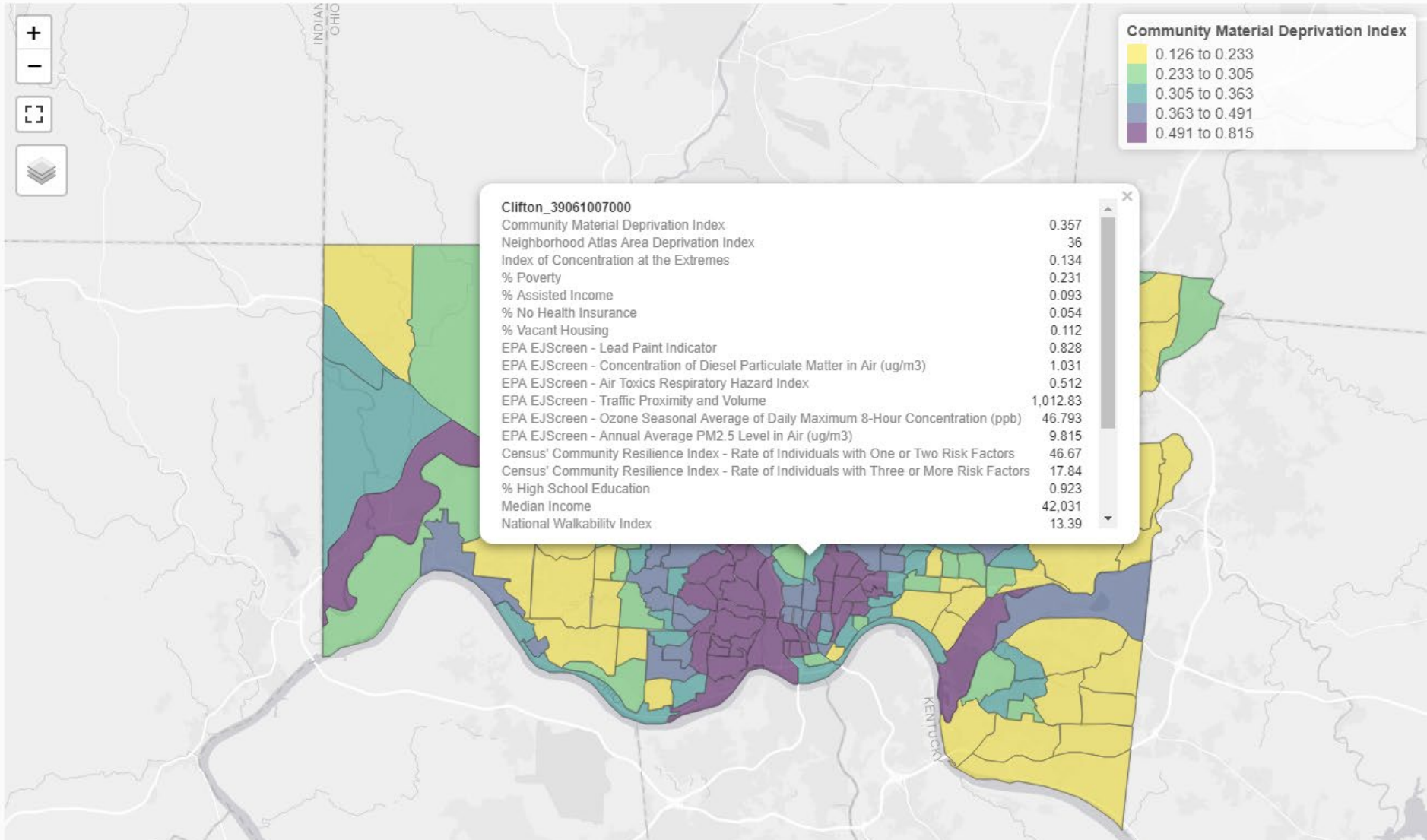
This map displays census tract-level data in Hamilton County.

Using the menu on the left-hand side of the map, you can toggle variables on/off.

Clicking on a census tract displays all variables for that census tract.

Variables Include:

- Community Material Deprivation Index
- Neighborhood Atlas Area Deprivation Index
- American Community Survey Sociodeomgraphic Variables
  - Fraction Assisted Income
  - Fraction High School Education
  - Median Income
  - Fraction No Health Insurance
  - Fraction Poverty
  - Fraction Vacant Housing
- National Walkability Index
- Nancy Krieger's Index of Concentrated Extremes (ICE)
- EPA EJScreen
  - Lead Paint Indicator
  - Concentration of Diesel Particulate Matter in Air (ug/m3)
  - Air Toxics Respiratory Hazard Index
  - Traffic Proximity and Volume
  - Ozone Seasonal Average of Daily Maximum 8-Hour Concentration (ppb)
  - Annual Average PM2.5 Level in Air (ug/m3)
- Child Opportunity Index
  - Overall
  - Education Domain
  - Health and Environment Domain
  - Social and Economic Domain
- Census' Community Resilience Index
  - Rate of Individuals with One or Two Risk Factors
  - Rate of Individuals with Three or More Risk Factors
- Mental Health Professional Shortage Areas
- Primary Care Professional Shortage Areas



Perception, comprehension, and projection of potential asthma triggers (e.g., range of exposures)

City of Cincinnati

JGM BWG

An Ordinance No. 8 - 2020

ESTABLISHING a City of Cincinnati Children and Families Cabinet, whose purpose is to advise the Mayor and Council about policy initiatives and to measure and monitor data on the improvement of safety, housing, health, cultural and societal exposure, and career opportunities for children and families in Cincinnati.

WHEREAS, nearly forty-three percent of Cincinnati children live in poverty, and far too many of our families are suffering from the effects of poverty; and

WHEREAS, local governments have taken significant steps to better support children and families through strategic partnerships, investments, and leadership; and

WHEREAS, many City of Cincinnati government departments directly affect the lives of children and families, including the provision of safe drinking water from Greater Cincinnati Water Works, the assurance of safe housing from the Department of Buildings and Inspections, and enriching social interactions provided and encouraged through the Department of Recreation and Parks Department; and

WHEREAS, the City is fortunate to have knowledgeable and talented non-government partners who make huge impacts on the lives of children and families, from experts at medical institutions and social service organizations to philanthropic foundations; and

WHEREAS, the creation of a City of Cincinnati Children and Families Cabinet will assist the Mayor and City Council in their review of policies and programs that will make an empirical positive change in the lives of children and families; now, therefore,

BE IT ORDAINED by the Council of the City of Cincinnati, State of Ohio:

Section 1. That the Mayor and City Council hereby establish the City of Cincinnati Children and Families Cabinet ("Cabinet"), as further described herein, whose purpose is to advise the Mayor and Council about policy initiatives and to measure and monitor data on the improvement of safety, housing, health, cultural and societal exposure, and career opportunities for children and families. The Cabinet will also strive to improve communication between the City government and community stakeholders so that services to children and families are improved.

Perception, comprehension, and projection of potential asthma triggers (e.g., indoor air quality)

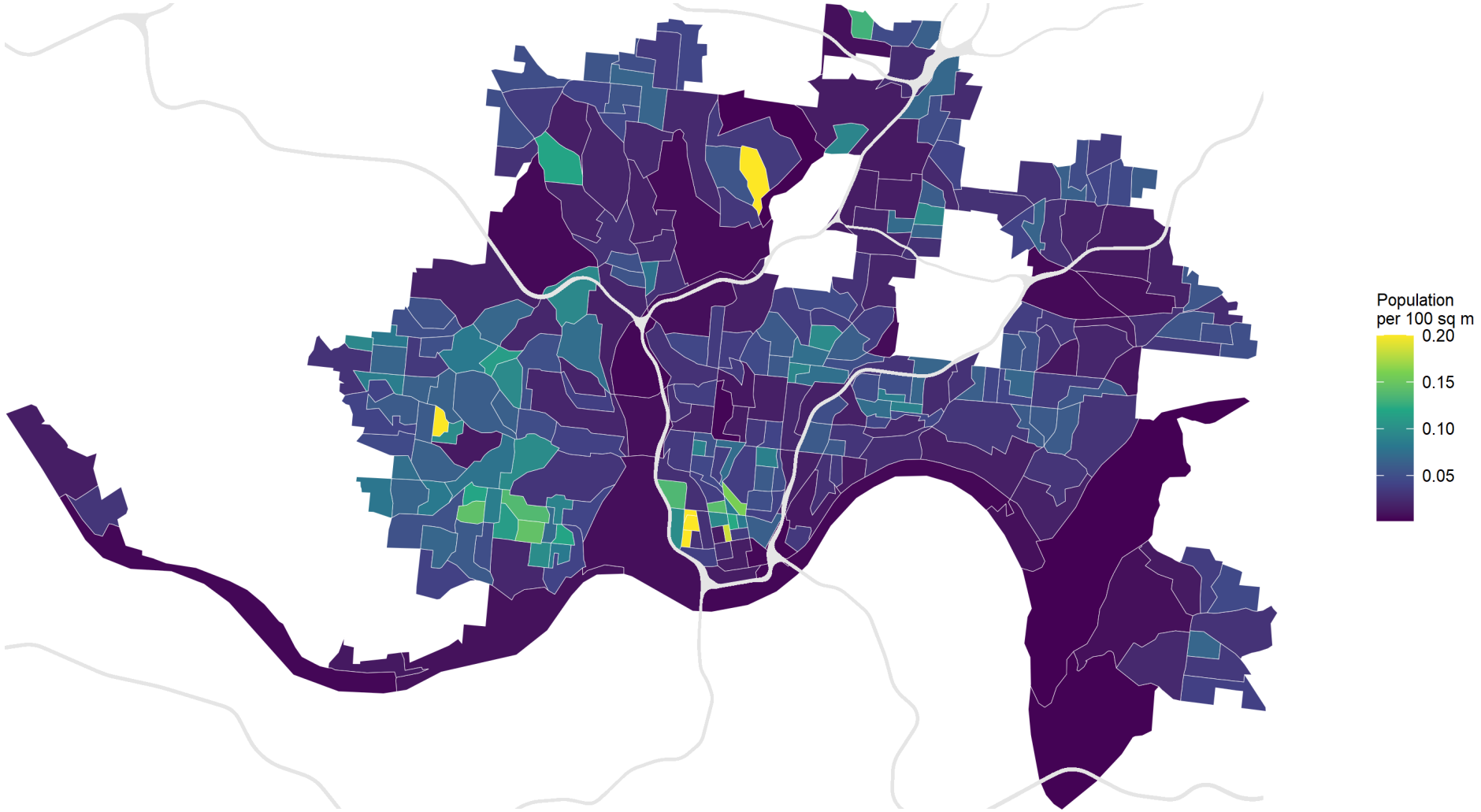
Cincinnati Creating Cabinet To Combat Issues Affecting Children And Families

91.7 WVXU | By Tana Weingartner
Published January 6, 2021 at 6:14 PM EST

Cincinnati Children's
changing the outcome together

Where do children live?

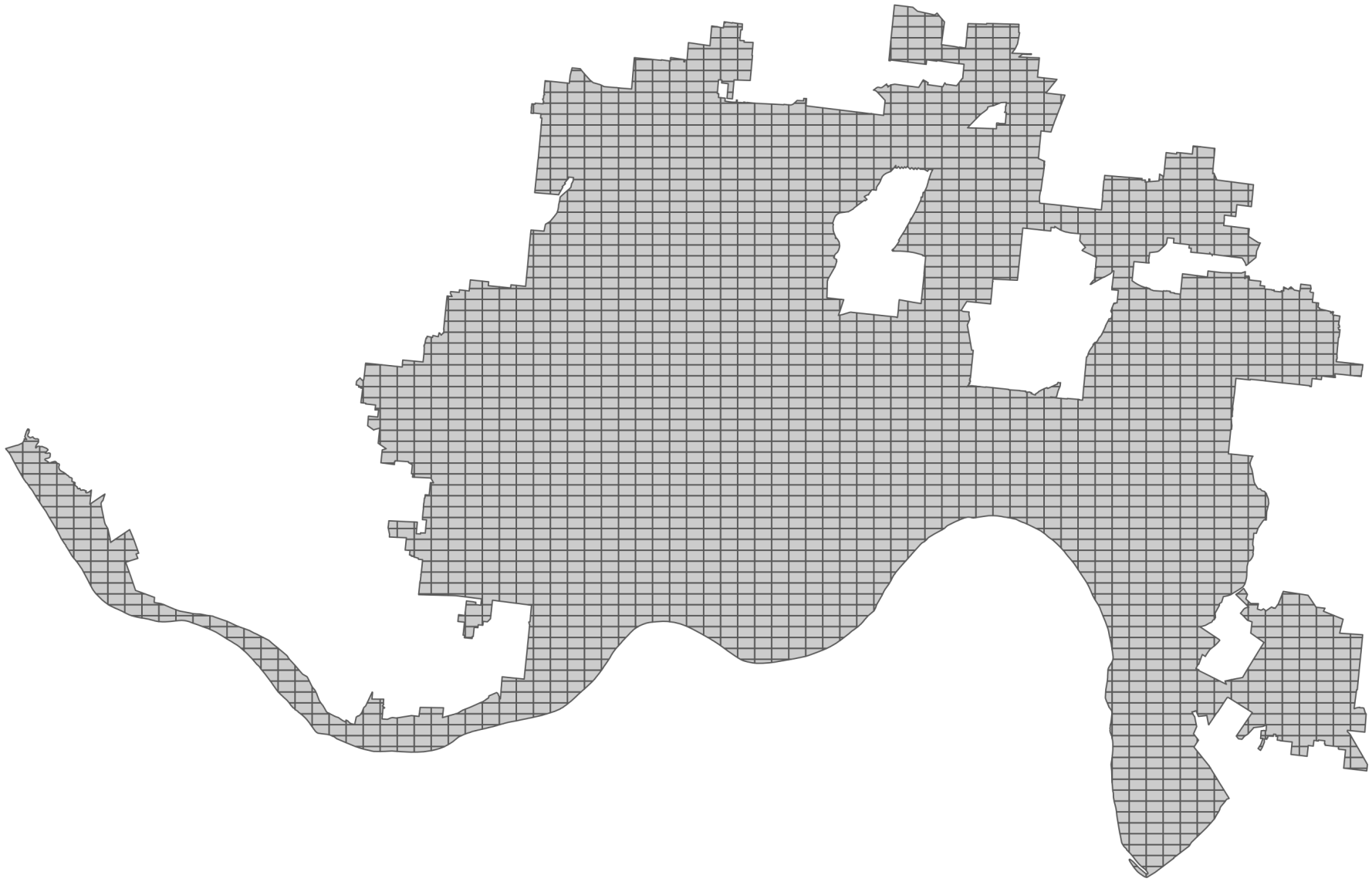
Population under 18 by Census Block Group, approximately 66,000 kids



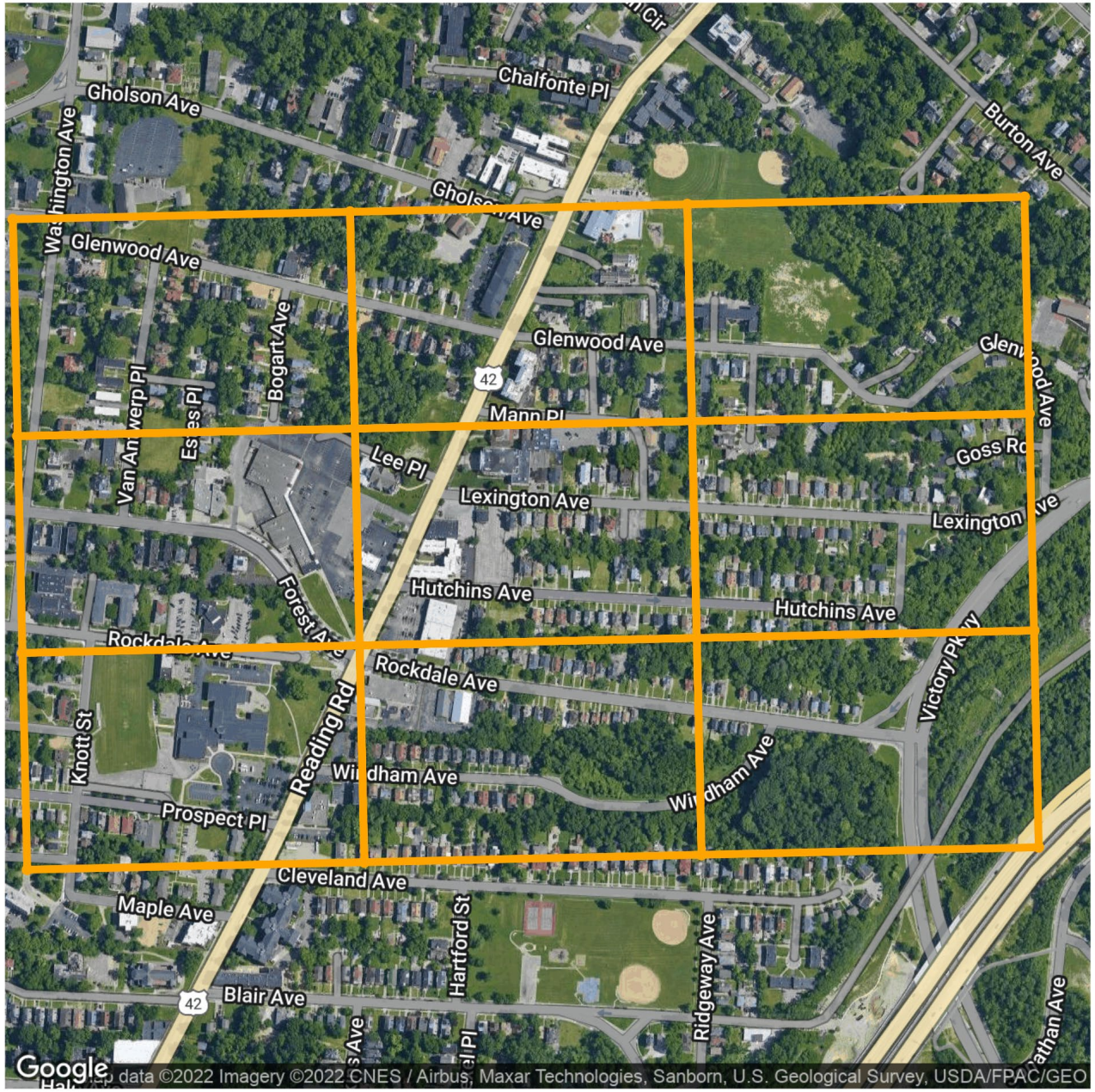
Source: Decennial Census Redistricting Data (PL 94-171). Under 18 population is the difference between total population and the population 18 and over.

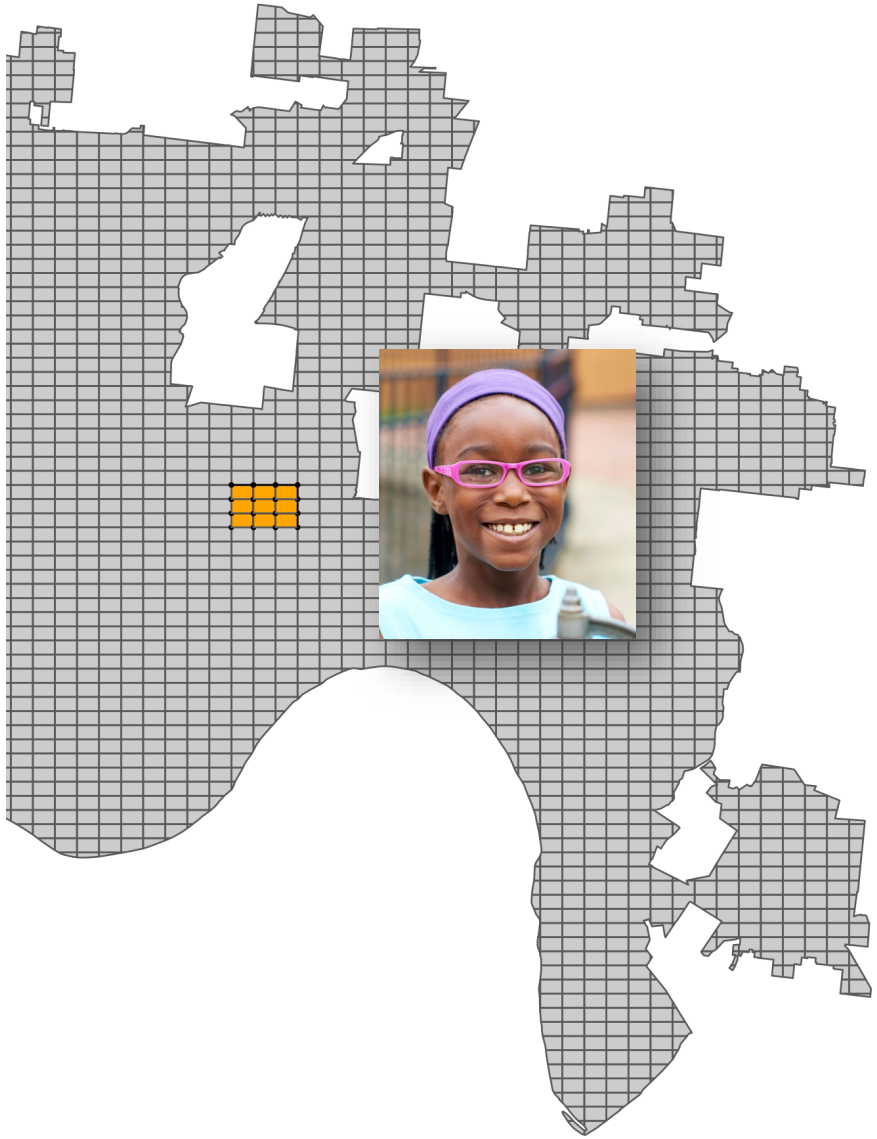
S. Taylor, J. Michael, C. Brokamp

Grid over the city



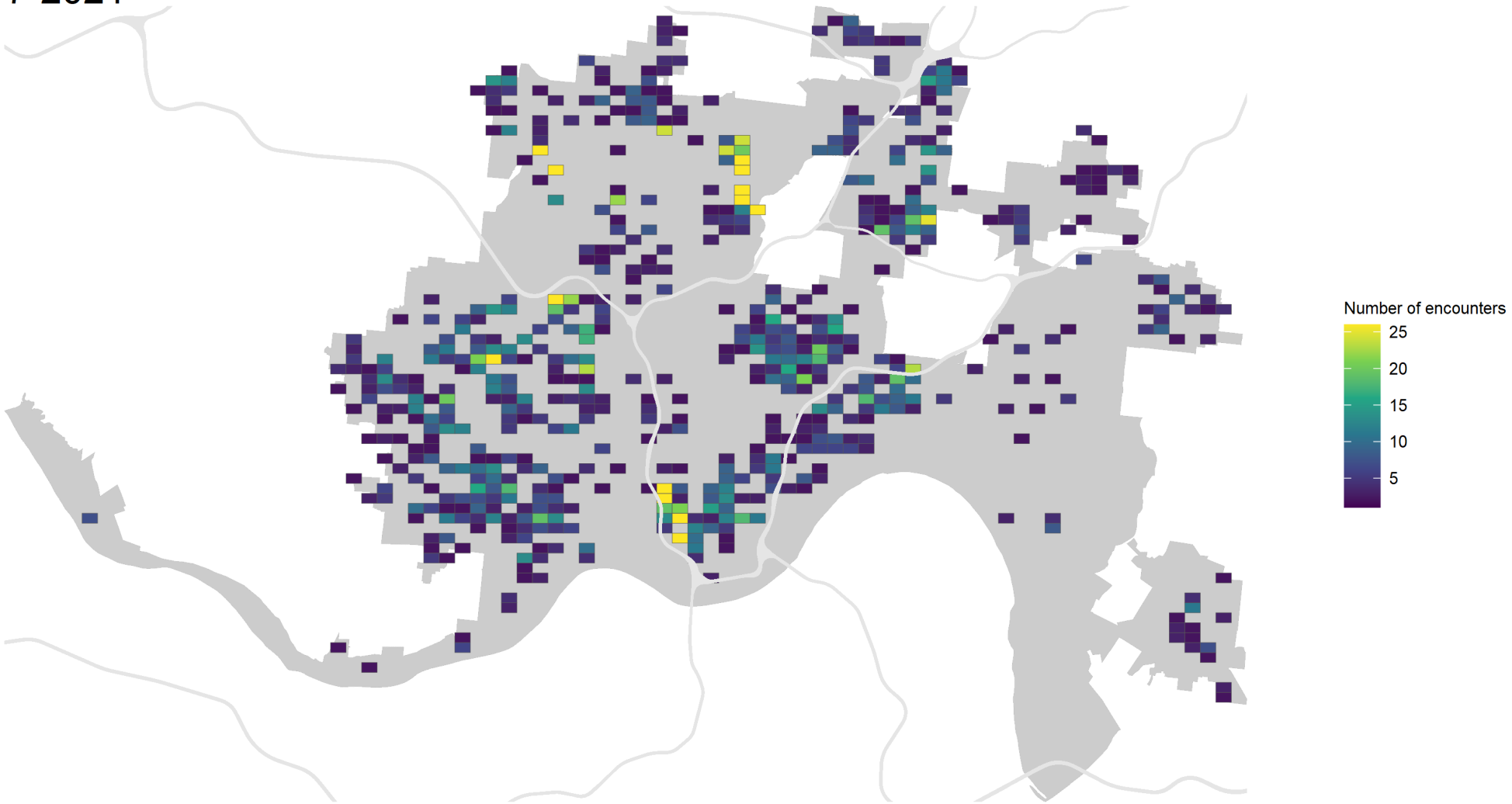
An example of the grid: Avondale





Asthma admissions/ED visits by grid (by city blocks)

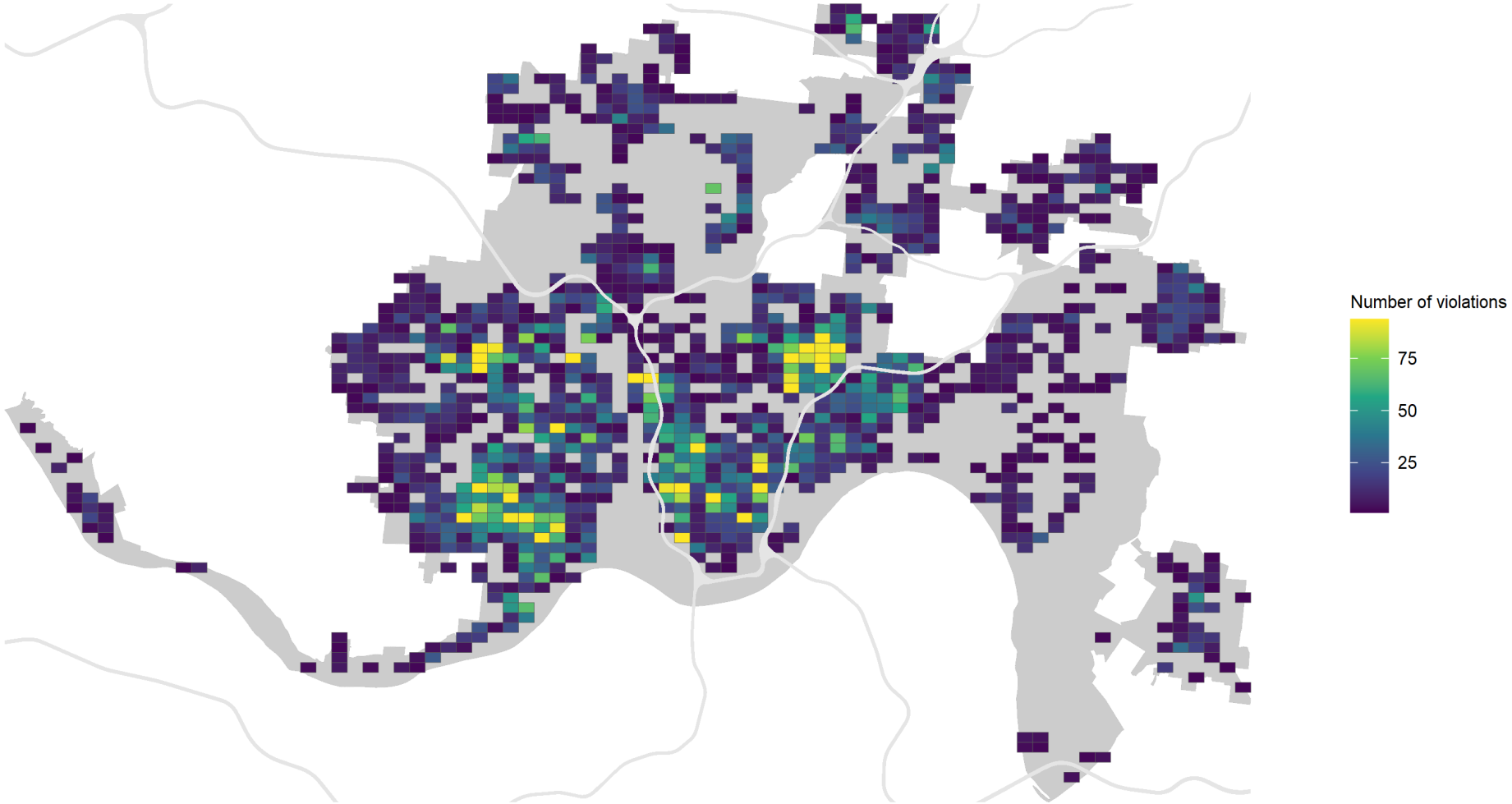
Admissions and emergency department visits for asthma at CCHMC facilities, 2017-2021



Source: CCHMC EHR, 2017-2021, address at time of discharge. Areas with at least 2 asthma visits, shading is top coded so that bright yellow represents top 2% of remaining grid squares

Housing code violations by grid (city blocks)

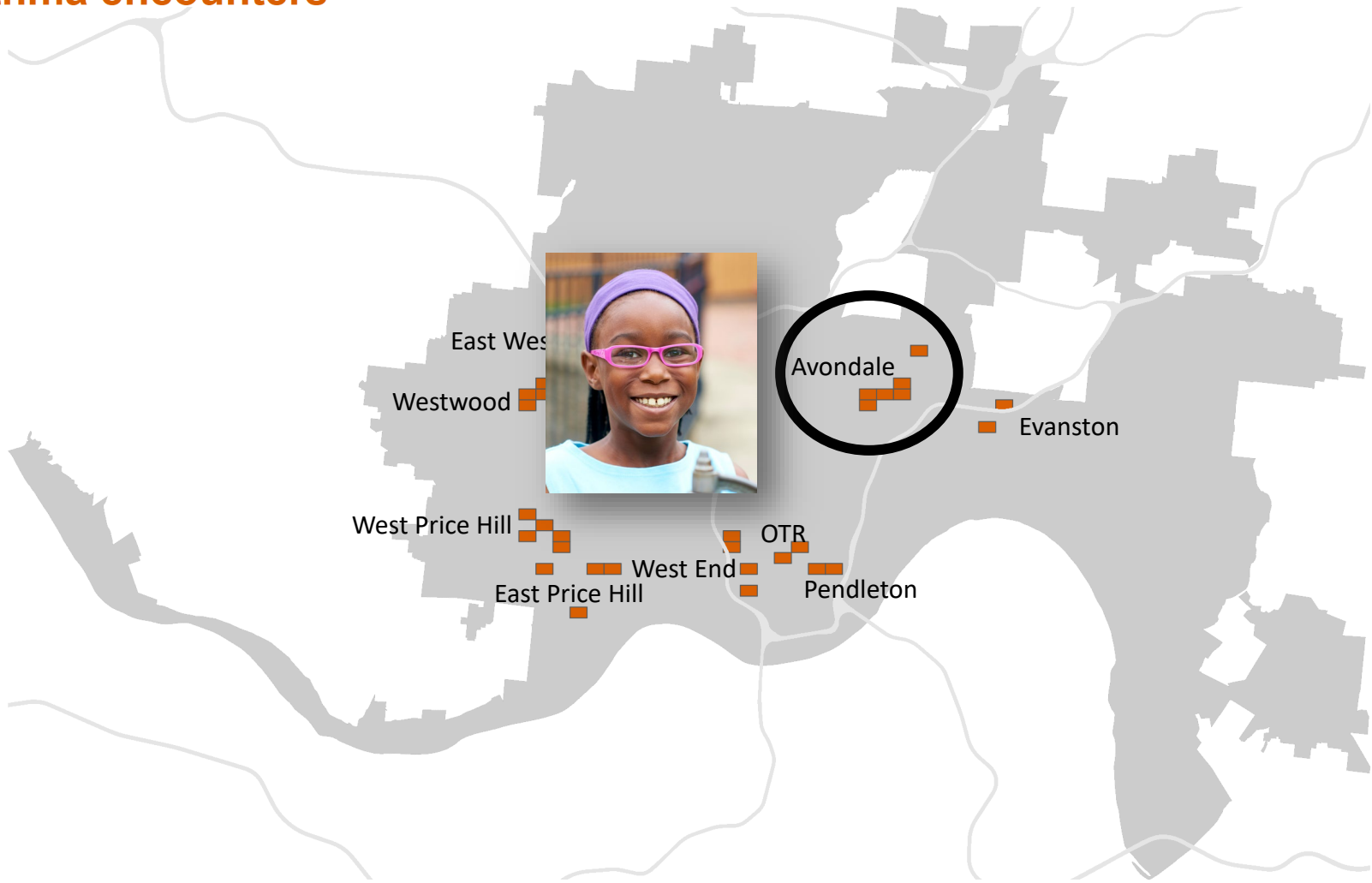
Department of Buildings and Inspections code enforcements and Cincinnati Health Department health code violations related to triggers for asthma



Source: Cincinnati Health Department and Cincinnati Department of Buildings and Inspections, 2017-2021. Areas with at least 2 enforcments or violations shown. Shading is top coded, bright yellow represents top 2% of remaining grid squares

Grids elevated in both categories (asthma + housing)

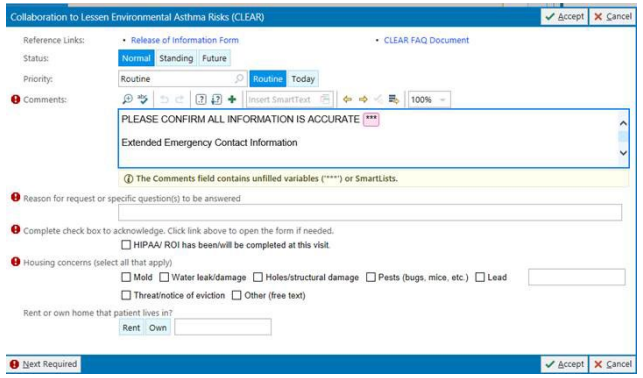
Areas that are in the **top 5% of building and health code violations and asthma encounters**



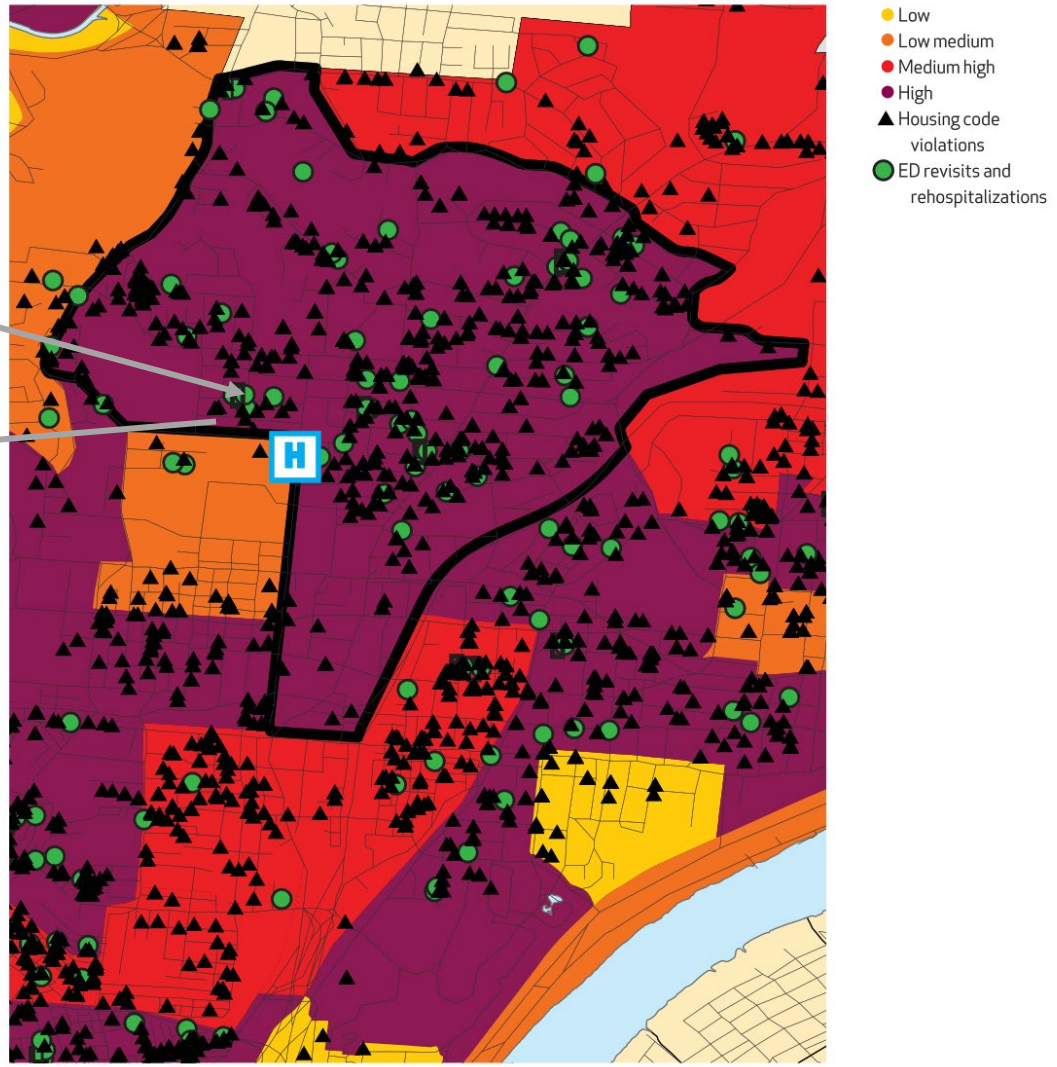
Data from 2017-2021. Point locations were placed on to an 80 by 80 grid and ranked by the various measures.

Moving to intervention

Health service environment	Physical environment	Economic environment	Psychosocial environment
GEOMARKERS			
Distance to pharmacy Live within "pharmacy desert" Pharmacy quality metric Distance to primary care Live within undeserved area Vehicle availability Public transport availability	Housing code violations Vacancy rate Renter rate Home value Crowding/population density Exposure to pollution	Poverty rate Household income Home ownership Car ownership Educational attainment	Crime rate Mental health access
INTERVENTIONS			
Medication delivery Care coordination Community health worker Home nurse visitation Medicaid rides Telemedicine	Housing inspection Legal advocacy Air conditioning or filtration Development of affordable housing	Financial services Medicaid rides Legal advocacy Public benefit procurement Community health worker Community agency referrals	Community health worker Community agency referrals Resilience training Community partnerships



EHR referrals for community action



Beck (2017)

Clinical-community partnership

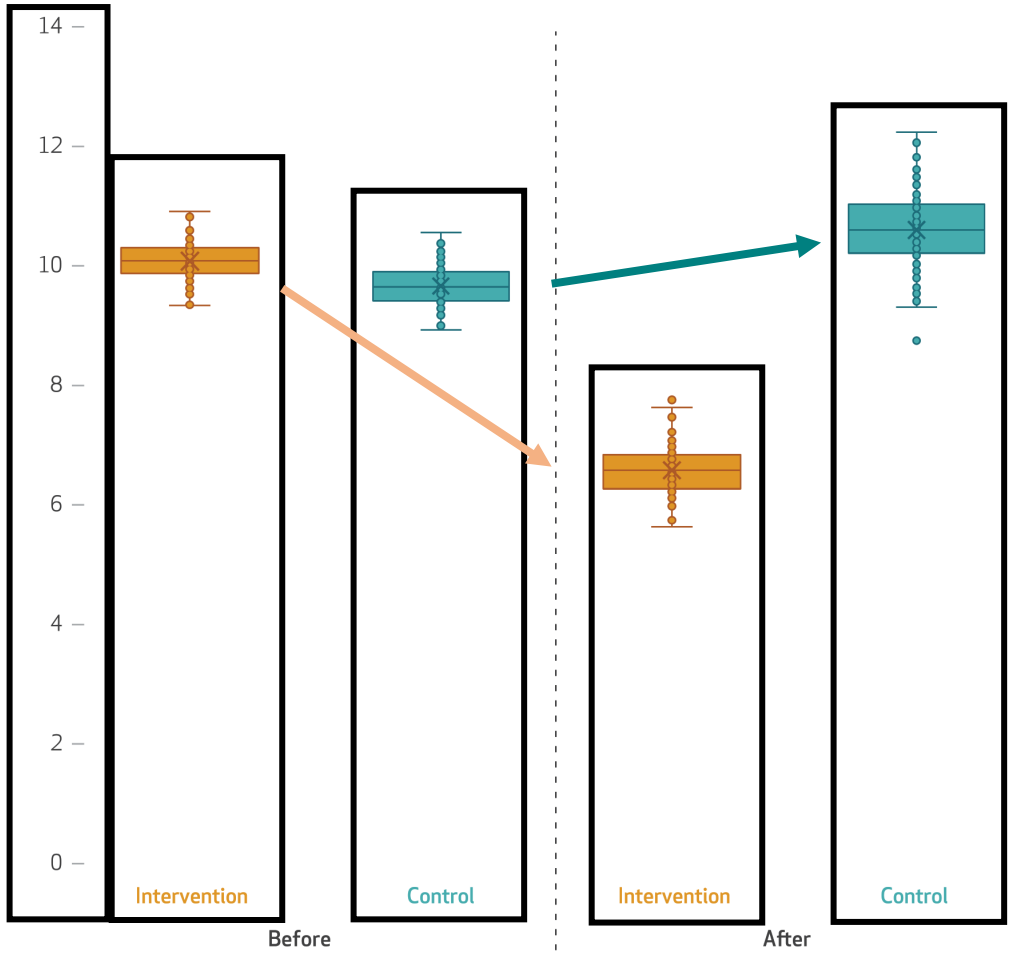
E.g., Cincinnati Child Health Law Partnership (Child HeLP)

- Medical-legal partnerships address health-related social (and legal) needs
  - **Housing**, public benefits, education
- Patient- and household-level action
  - 10,000 referrals affecting 25,000 individuals
  - $1M public benefits recovered for families
- Population-level pattern recognition and action

Klein (2013)
Beck (2012)
Beck (2022)

Child HeLP and health outcomes

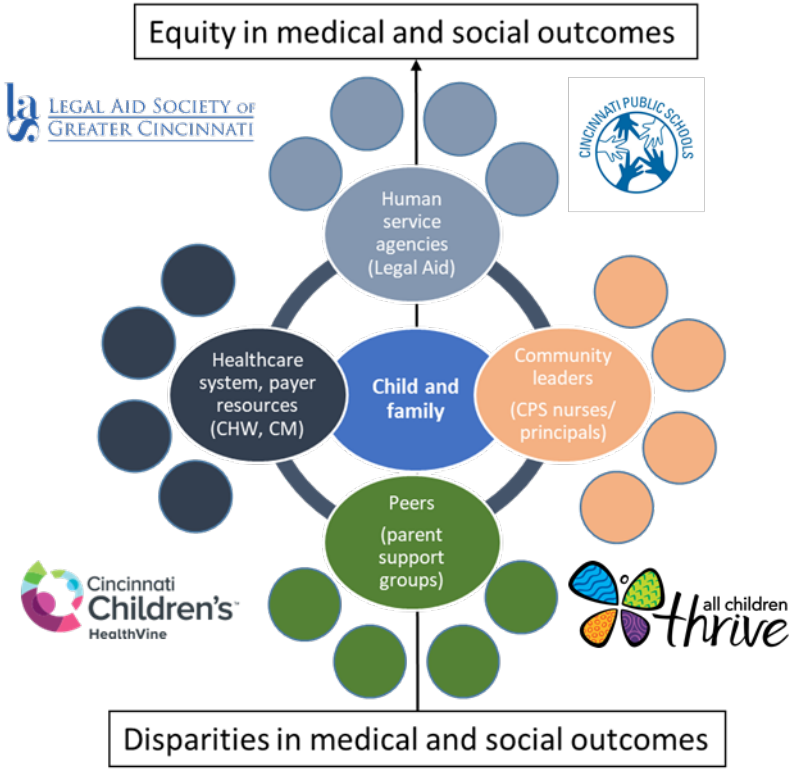
- Research to assess link between referral to medical-legal partnership and hospitalization
- Advanced biostatistical methods to “emulate” 100 randomized trials
  - Matched on age, date of referral (or concurrent visit), prior hospitalizations
  - Adjusted for remaining differences, including on census tract deprivation
- Hospitalization rate in year after referral 38% lower than if not referred



Beck (2022)

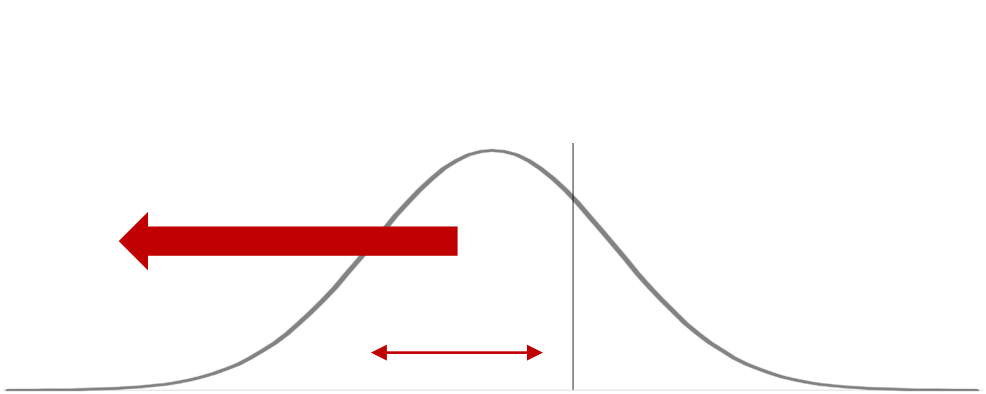
Systems thinking to support scale, spread

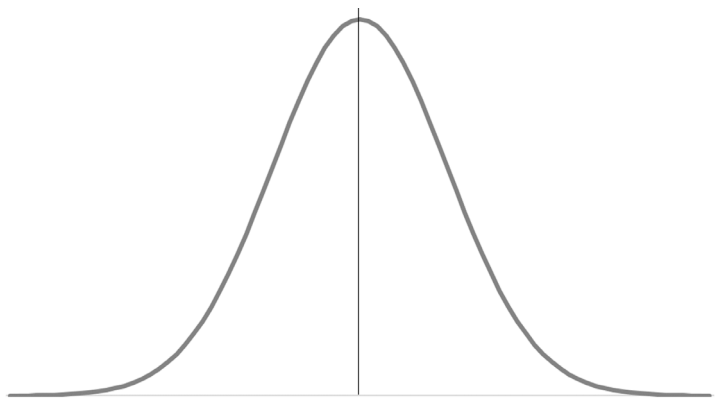
- Reorientation of **systems of care**, connections between stakeholders
  - Common measures, objectives, methods build shared purpose
  - Co-design interventions
  - Rapid, iterative prototypes adapted to situation, context
  - Evaluate overall (+ distribution of) health
- "Virtuous" cycle of investment and reinvestment to build both **capability** and **capacity**
- Outcome-focused **Culture of Equity**

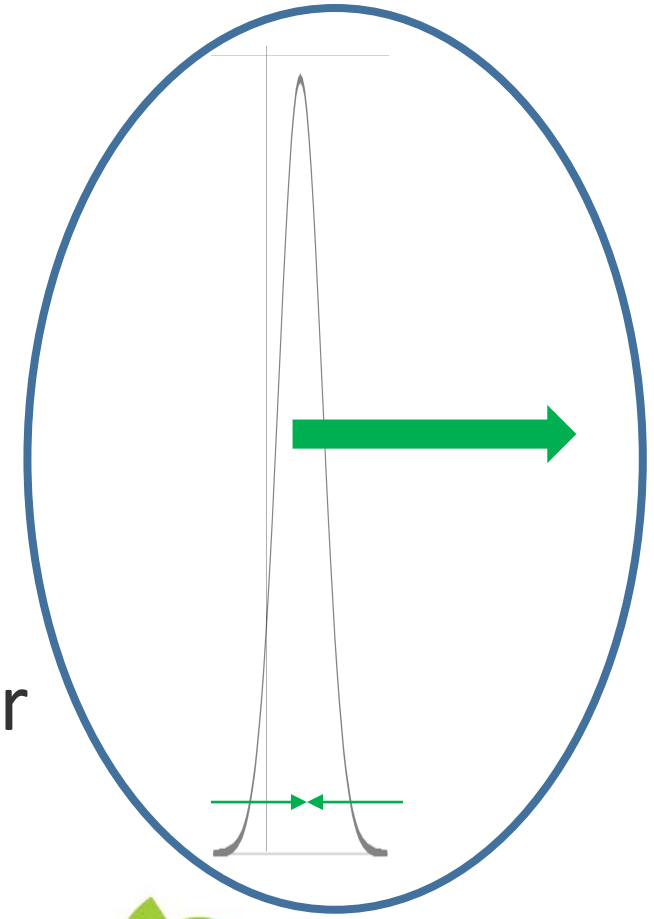


Cincinnati Children's
changing the outcome together

Collectively choosing population health equity







"'Solidarity' would mean that individuals in the US legitimately and properly can depend on each other for helping to secure the basic circumstances of healthy lives." – **Don Berwick**

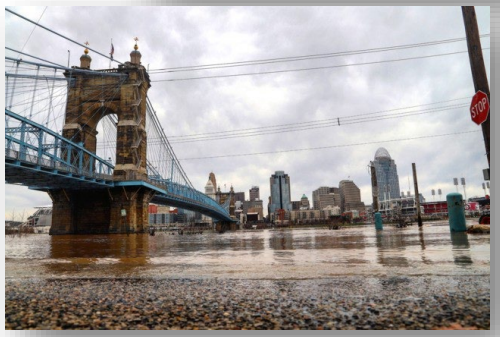
Cincinnati Children's
changing the outcome together

Rose (2001)
Berwick (2020)


Returning to that
child I met during
my training

Conclusions

- If neighborhoods can cause children to die, so too can they help children to thrive
- Pursuit of health equity requires us to identify, confront, and abolish the generational, systemic effects of racism
- Population health situational awareness allows us to perceive, comprehend, project and to **move upstream** more quickly
- **Every day must challenge us to think of one more thing we can do to advance better, more equitable outcomes for children**



Cincinnati Children's
changing the outcome together

Acknowledgements

- Cincinnati Children's Department of Pediatrics
- Fisher Child Health Equity Center
- HealthVine (https://healthvine.cincinnatichildrens.org/)
- Health Equity Network
- Cincinnati Child Health-Law Partnership (https://www.cincinnatichildrens.org/service/c/child-help)
- All Children Thrive Learning Network (https://actcincy.org/)
- Cincinnati's Children & Families Cabinet
- Cincinnati Health Department Environmental Health (https://www.cincinnati-oh.gov/health/)
- Legal Aid Society of Greater Cincinnati (https://lascinti.org/)
- People Working Cooperatively (http://www.pwchomerepairs.org/)
- Agency for Healthcare Research & Quality (RISEUP R01)
- Cincinnati Children's Research Foundation (funding for Asthma Learning Health System)

And so many more!!

Cincinnati Children's™
changing the outcome together


Thank you!
Andrew.Beck1@cchmc.org or @afbeckMD

Solutions for the IEDOH in Asthma and Community Health

Population Health Situational Awareness: Getting the Data You Need to Build Equity in Child Asthma Outcomes

LISA CROSBY, D.N.P., APRN, CNP, ADVANCED PRACTICE PROVIDER, CLINICAL DIRECTOR FOR PRIMARY CARE, SCHOOL-BASED HEALTH CENTERS AND OUTPATIENT MEDICAL/SURGICAL SUBSPECIALTIES, CINCINNATI CHILDREN'S HOSPITAL MEDICAL CENTER

MARYSE AMIN, PH.D., M.S., ASSISTANT HEALTH COMMISSIONER & DIVISION DIRECTOR, COMMUNITY HEALTH & ENVIRONMENTAL HEALTH SERVICES, CINCINNATI HEALTH DEPARTMENT

PATRICK RYAN, PH.D., M.S., PROFESSOR, DEPARTMENT OF PEDIATRICS AND DEPARTMENT OF ENVIRONMENTAL HEALTH, UNIVERSITY OF CINCINNATI COLLEGE OF MEDICINE

Polling Question 2

Do you know much about using data and analytics to reveal where indoor environmental factors may be contributing to community asthma burden?

1. Yes, I know about population data and analytics to focus on community-level environmental asthma burden.
2. No, I am not familiar (yet) with terms like population-level data and analytics in asthma care.
3. I know a little and want to learn more.
4. I do not want to use data and analytics in my indoor environments and asthma work.

Where Can I Learn More?

- Join the Asthma Community Network at www.asthmacommunitynetwork.org.

In Closing: Requests and Offers