

Proposed Health Equity Response to COVID-19

OCPIM COVID-19 Virtual Open Forum



Department
of Health

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Using Disease Convergence to Facilitate Multi-Sectorial Approaches to Advance Health Equity.

- Visualize where different health disparities simultaneously exist at their worst levels in the same census geographies (***Convergence Analysis***).
- Connect disparate health outcomes (Convergence) to overall opportunity(***Opportunity Index***).
- Understand convergence and overall opportunity with health opportunity (***Health Opportunity Index***).
- Relate this information to COVID-19 response and recovery activities.

Place Matters

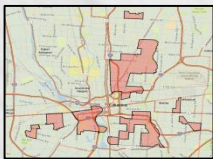
Convergence Analysis helps visualize where different health disparities simultaneously exist at their worst levels.

Convergence Analysis

This technique functions to harmonize data by identifying where can we find at least four (4) or more of these health outcomes at their highest levels.

Columbus, Ohio. Selected Health Conditions/Outcomes by Census Tract at the Highest (Worst) Levels.

Asthma



Lead



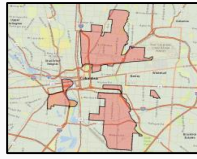
Mental Health



Heart Disease



Diabetes



High BP



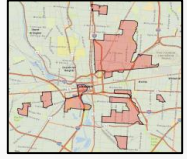
Cancer



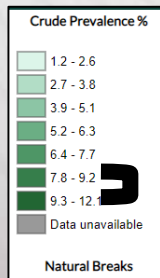
Prematurity



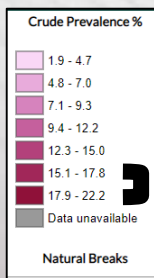
Stroke



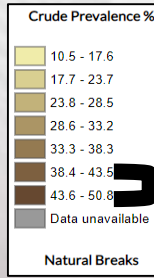
Heart Disease



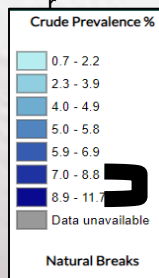
Diabetes



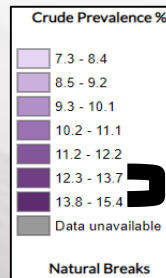
High Blood Pressure



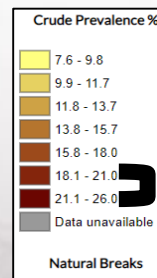
Cancer



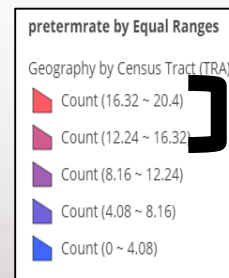
Asthma



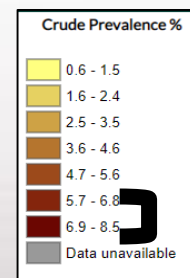
Poor Mental Health



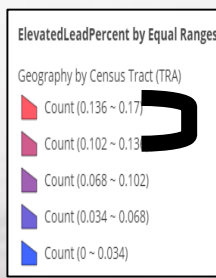
Preterm Birth



Stroke



Elevated Lead

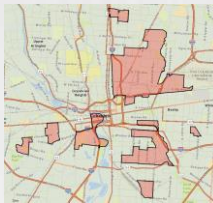


Performing the Convergence Analysis. Using relational database technology to determine which health outcomes simultaneously occur in the same census tract.

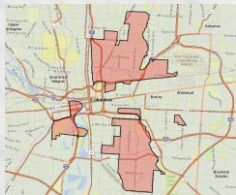
Heart Disease



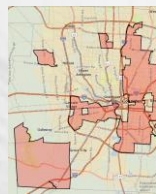
Stroke



Diabetes



High BP



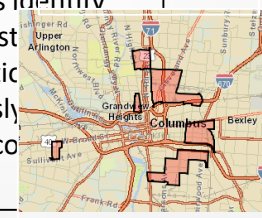
Prematurity



Mental Health



Elevated Lead



Census Tract FIPS Code	Count	Analysis Area Name
39049005000	1	ASTHMACOL2016Converge
	1	CoronaryCOL2016Converge
	5	
	7	
39049005300	1	FranklinPretermConvergence
	1	HBPCOL2016Converge
0.53%	2	

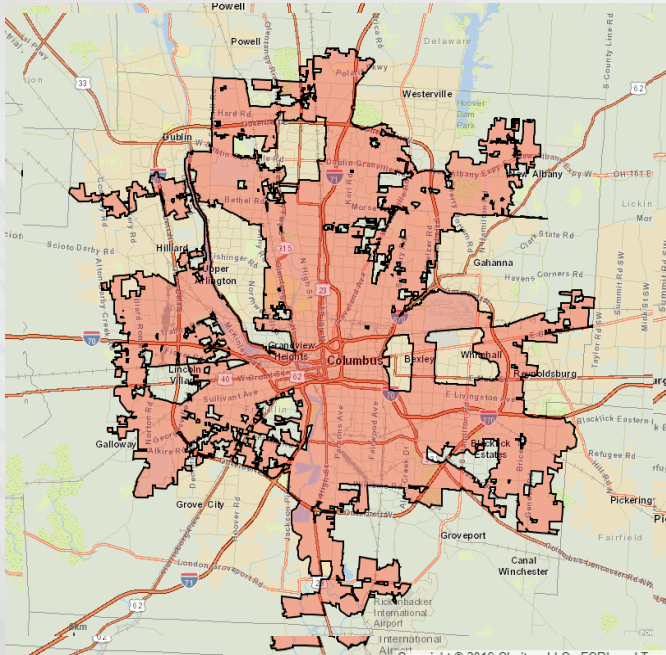
Use relational database to perform the convergence analysis

A query helps identify where at least one health condition simultaneously occurs at the worst levels of a census tract.

Using GIS technology and market research demographic data to identify census tracts with more than four (4) health conditions simultaneously at the worst levels (convergence) in Columbus, Ohio.

Columbus City

Columbus City (Convergence)



- 37 Census Tracts
- 114,835 Population
- 54% Black (29% in Columbus)
- 36% White (60% in Columbus)
- 2% Asian
- 0.45% Native Amer/AN
- 0.17% Native Hawaiian/PI
- 3% Some Other Race
- 5% Two or More Races

- 6% Hispanic/Latino

- 0.02% Armed Forces
- 48% Employed
- 7.5% Unemployed (4.70 % in Columbus)-BEFORE COVID-19

Early Health Equity Analysis for COVID-19

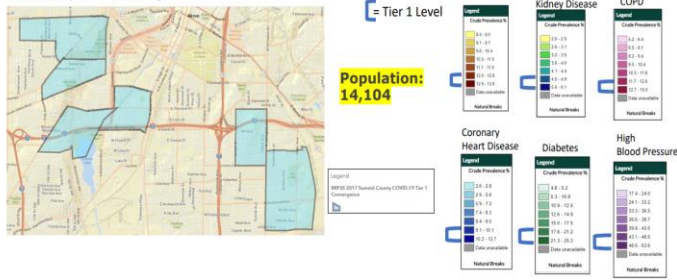
- High burden across different health outcomes.
- Consistent racial disparity
- Unemployment

Akron

Census Tracts in Akron, Ohio which contribute to the Tier 1 Convergence Model for Ohio.

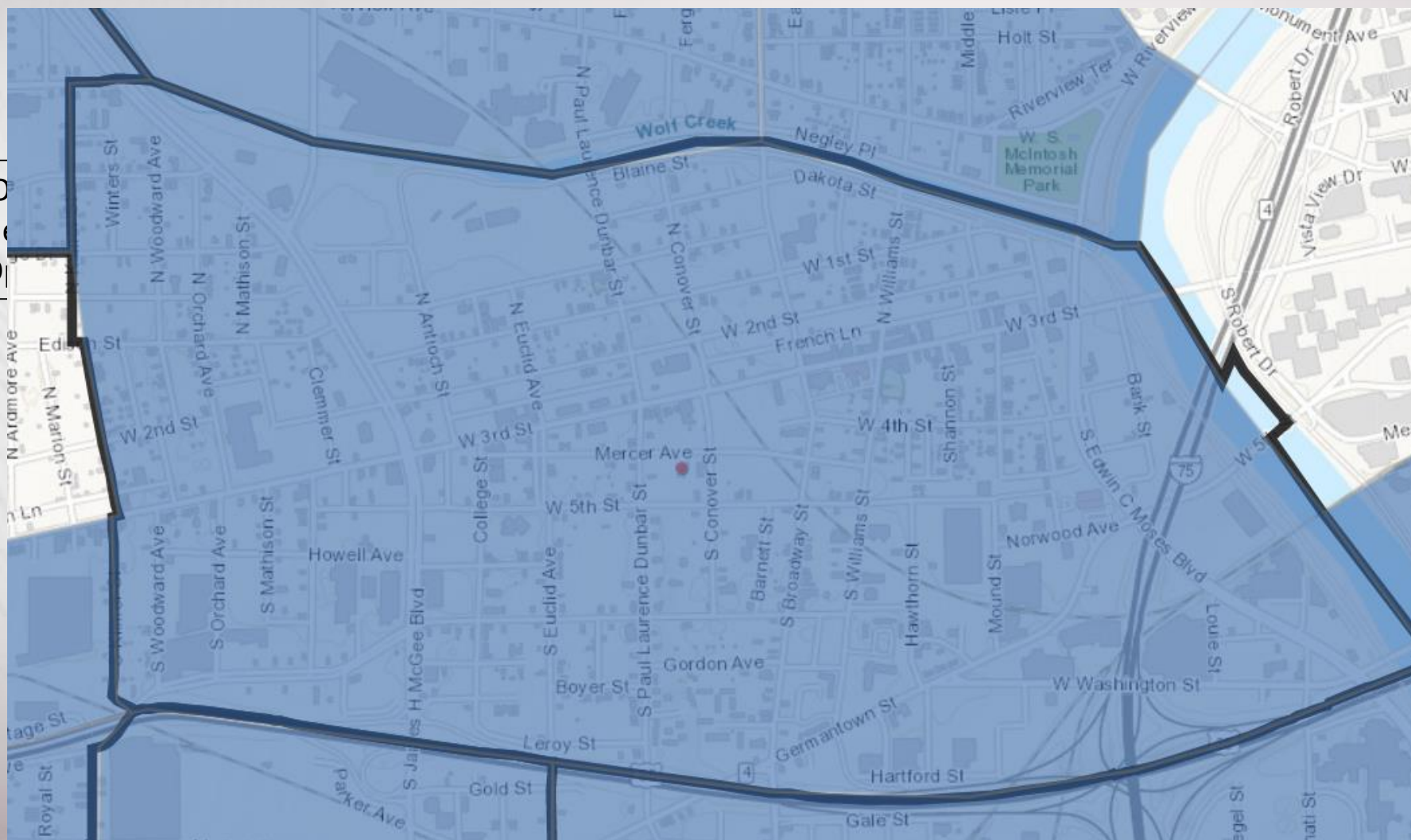
Akron, Ohio. CDC 2017 BRFS 500 City Project Data for Selected Health Outcomes. Asthma crude percent 12.0% to 13.0%, Kidney Disease 4.5% to 6.1%, COPD 11.7% TO 15.5%, Coronary Heart Disease 9.1 % to 12.7%, Diabetes 17.6% to 25.3% and High Blood Pressure 43.1% to 53.6%) by Census Tract. The census tracts reflected in the map below have all of these health outcomes occurring simultaneously at the specified highest (worst) levels.

Summit County, Ohio. Tier 1 Convergence



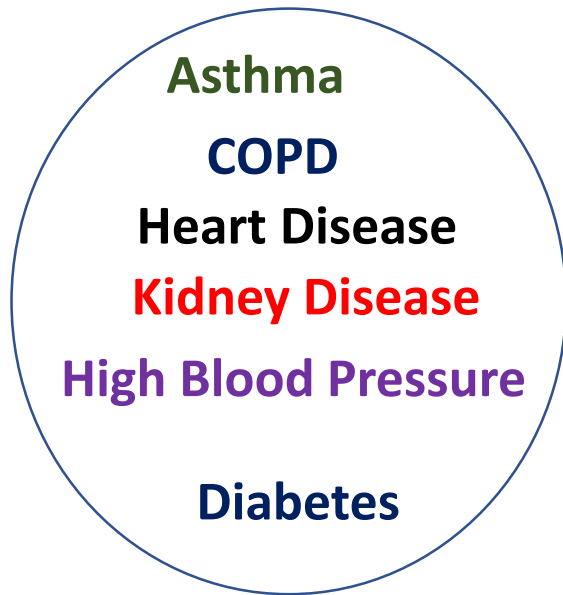
Connecting Specific Social Determinants with Health Outcomes in Neighborhoods

Census Tract 39113165100



When Health Disparities Turn into Health Inequities

Census Tracts of Selected Ohio Cities. COVID-19 Risk Factors at the Highest (Worst Levels).



Akron



Black 68%
White 23%
2+ Races 5%
Latino 3%
Pop. 13,387

Cincinnati



Black 87%
White 9%
2+ Races 3%
Latino 2%
Pop. 22,324

Columbus



Black 77%
White 16%
2+ Races 5%
Latino 3%
Pop. 44,299

Toledo



Black 81%
White 11%
2+ Races 5%
Latino 6%
Pop. 19,370

Canton



Black 47%
White 43%
2+ Races 7%
Latino 3%
Pop. 11,887

Cleveland



Black 96%
White 2%
2+ Races 2%
Latino 2%
Pop. 3,837

Dayton



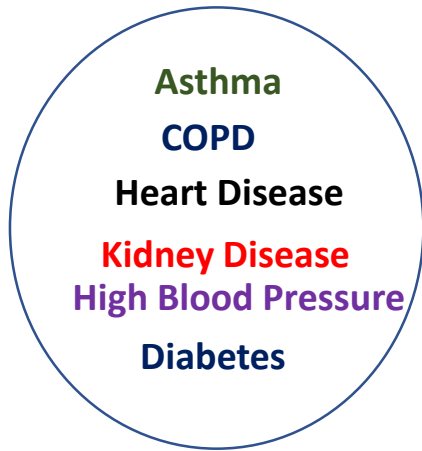
Black 84%
White 10%
2+ Races 4%
Latino 2%
Pop. 12,961

Youngstown



Black 77%
White 16%
2+ Races 5%
Latino 5%
Pop. 4,086

What social determinants drive these health outcomes out of control?



Columbus



- Concentrated Poverty
- Income Inequality
- Food Insecurity
- Segregation

Cincinnati



- Income Inequality
- Concentrated Poverty

Cleveland



- Segregation
- Concentrated Poverty
- Food Insecurity

Akron



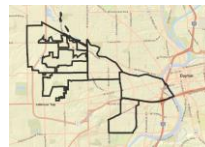
- Income Inequality
- Concentrated Poverty
- Food Insecurity
- Segregation

Canton



- Concentrated Poverty
- Food Insecurity

Dayton



- Segregation
- Concentrated Poverty

Toledo



- Income Inequality
- Concentrated Poverty

Youngstown



- Income Inequality
- Concentrated Poverty
- Food Insecurity

Making Different Data Sets Work for You

The following slide will demonstrate how to combine different data to solve challenging public health problems.

Using GIS technology to combine different spatial analysis to understand how opportunity structures influence health.

Combine All Four

This is the map that is generated by combining all four analysis.

Kirwan Institut

Legend

Opportunity Index

Very High

High

Moderate

Low

Very Low

Undefined

Legend

Ohio HOI Spatially Joined with Opportunity Index

Relationship

↖ CompOIn

↗ Composite Index

High - High

High - Low

Low - High

Low - Low

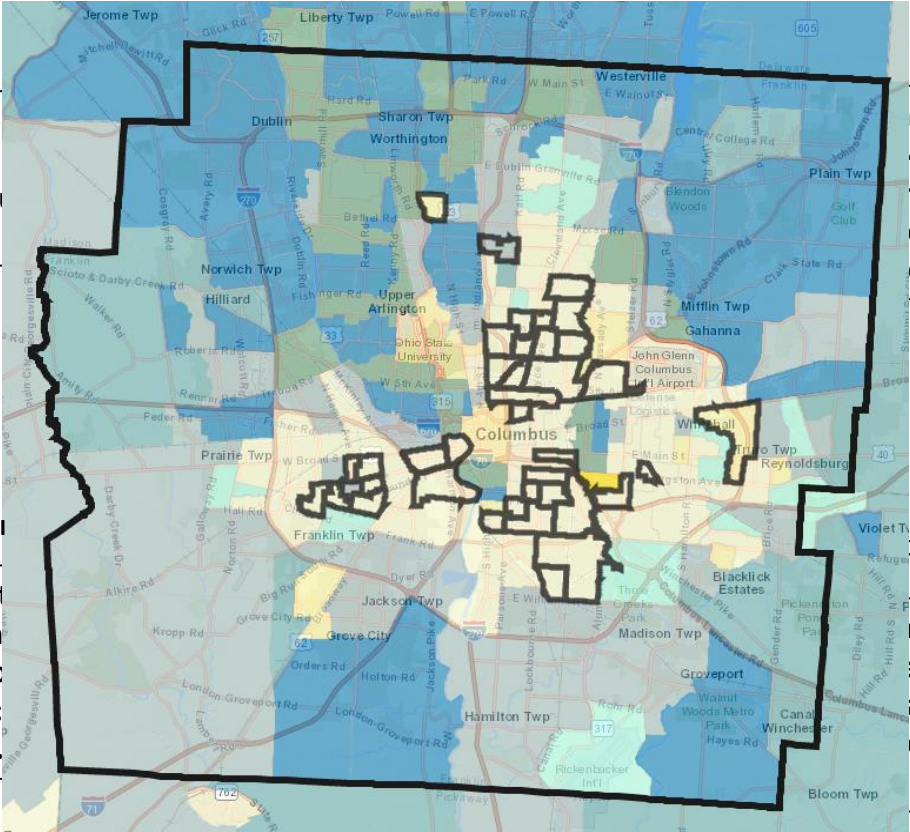
Disparate Convergence Analysis

CDC's Social Vulnerability Index (SVI) - 2014 overall SVI, census tract level

Low

Health Opportunity

Health Oppo



ta helps identify 4 or more health ne exist at their levels in orhoods.

helps the e of neighborhoods ssfully endure or human-made

Let's walk through, step by step, what you just observed by combining all three data-sets.

Franklin County, Ohio. Visualizing the Relationship Between the Health Opportunity Index (HOI), Comprehensive Opportunity Index (COI) and Disparate Convergence Analysis (DCA) by Census Tract and CDC Social Vulnerability Index.

Legend

Ohio HOI Spatially Joined with Opportunity Index

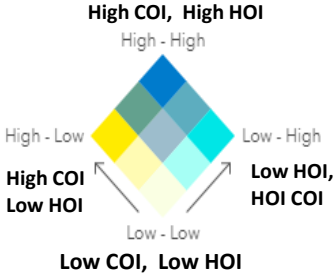
Relationship

↖

CompOIn(COI)

↗

Composite Index(HOI)



Disparate Convergence Analysis



CDC's Social Vulnerability Index (SVI) - 2014 overall SVI, census tract level



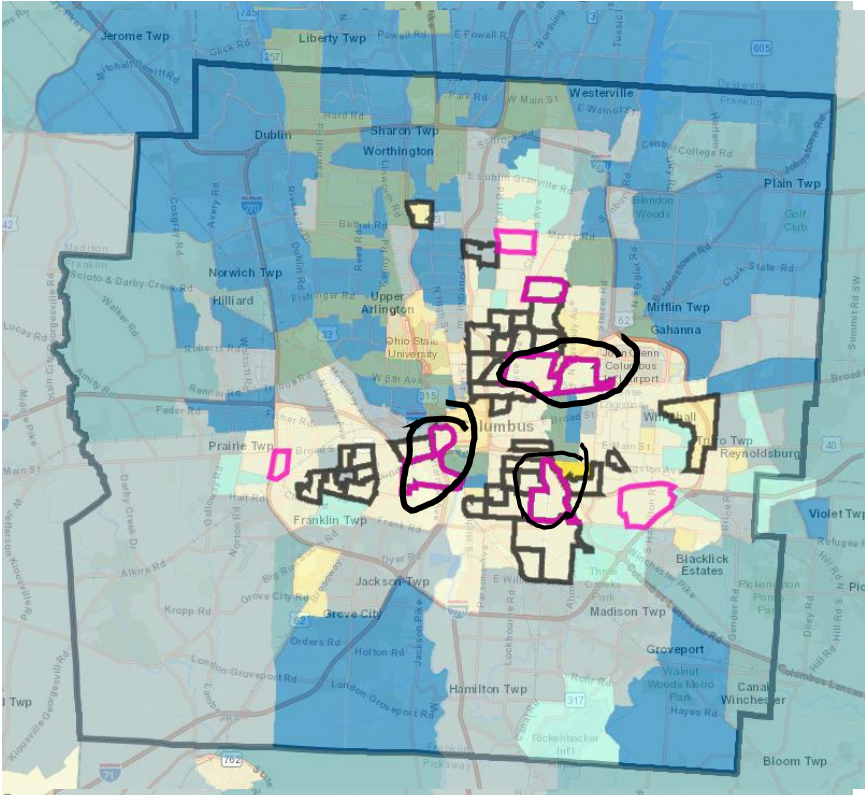
Reflecting neighborhoods with high health opportunity and high health opportunity.

Next, identify neighborhoods with high opportunity and low health opportunity.

Next, reflect neighborhoods with low opportunity and low health opportunity.

Next, identify neighborhoods with more than four extremely poor health outcomes, simultaneously, at their worst levels (Disparate Convergence Analysis).

Next, identify neighborhoods with a high CDC Social Vulnerability Index
(between 0.955 to 1).
~~Next, identify were all for~~
conditions are simultaneously challenging.



Again, What is the connection to COVID-19?

Introduction

- On April 3, 2020 the ODH Office of Health Equity (OHE) learned of a new data-set from Deloitte Consulting, LLP containing risk information for COVID-19 at the household level. This data could augment existing convergence analysis studies from the OHE to inform the statewide COVID-19 response.
- The OHE quickly assembled a group of Ohio-based health equity and data science experts (hereafter referred to as the *Ohio Team*). The Ohio Team endeavored to work with Deloitte Consulting to leverage their data to respond to the myriad of COVID-19 needs among vulnerable populations in Ohio.
- The Deloitte team employs a variety of health data-scientists and uses a proprietary data tool, Health 360, which is based on predictive modeling across multiple data sources. Health 360 uses GIS mapping to provide household level insights on the pre-existing COVID-19 health conditions, household composition and social determinants of health.

Ohio Team: Johnnie (Chip) Allen, MPH (Ohio Department of Health), Dr. Deena Chisolm, PhD (Nationwide Children's Hospital), Dr. Andrew Miller, PhD (OSU Kirwan Institute), Dr. Kierra Barnett, PhD (OSU Kirwan Institute), Dr. Juliana Nemeth, PhD (OSU College of Public Health), Angela Dawson, MS, MRC, LPC (Ohio Commission on Minority Health), Dr. Jason Reece, PhD (OSU Knowlton School of Architecture, Kirwan Institute), Tif Huber, MA (Ohio Department of Health), Teresa Valadez, BA (Ohio Department of Health)

Deloitte Consulting: Sean Conlin (Lead Delivery Principal), Dr. Meera Kanhouwa, MD (Managing Director), Keith Cherry (Lead Account Principal), Aptta Bhutto (Project Manager), Teress Votto (Insight Manager, Clinical Operations), Brett Woefel (Analytics SME), Welman Aquino (Healthcare Insight Advisor (Nurse), Helen Han (Data Scientist), Shaleen Raina (Data Engineer).

Questions and Approach

Ohio Team Questions?

Executive Summary

- Which census tracts of interest have the greatest number of households at risk of being unable to safely social distance and/or self-quarantine?
- Where will secondary waves of the COVID-19 epidemic most likely occur (for vulnerable populations)?
- Where should COVID-19 testing be concentrated to assess disease prevalence and enhance COVID-19 treatment and quarantine protocols?
- Which census tracts can be prioritized for community-based COVID-19 testing for families, especially those living in multi-unit dwellings, crowded households and/or with possible limited English proficiency?

Approach

- a. Use a variety of data sources (Health 360, CDC Social Vulnerability Index, Claritas, PolicyMap) to locate vulnerable populations.
- b. Gather insights from the Ohio Team (health equity and data experts) to focus data and insights from the Deloitte Team.
- c. Compile a list of interventions that can mitigate COVID-19 risks among vulnerable populations.
- d. Apply Deloitte's Health 360 household level data to focus/inform local interventions for COVID-19.
- e. Work with local community-based organizations to use the data to implement local solutions.

The two factors that predispose segments of Ohio's population to the burden of COVID-19 disease & death:

1. Populations most vulnerable to death resultant from COVID-19 exposure are those with pre-existing underlying medical conditions.
2. Populations most vulnerable to COVID-19 disease spread are populations that cannot socially distance due to the context in which they live or work.

**Populations with
higher proportion of
residents with underlying
health conditions**



**Populations with
lower proportion of
residents who can
socially distance**



**Populations who will
experience the
burden of COVID-19
disease and death**

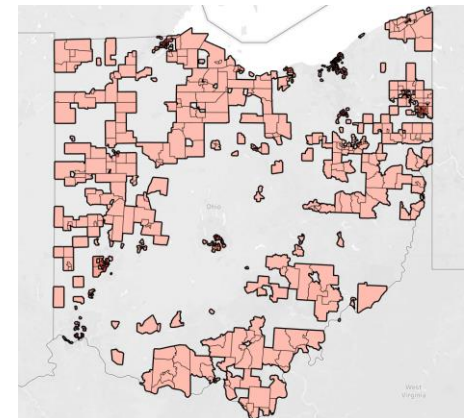
For example,

- Elders
- African & Latino Americans
- Immigrants
- People Living with Disabilities
- The Poor
- Appalachian Ohioans
- Survivors of Interpersonal Violence
- Sexual & Gender Minorities

For example,

- Congregate living residents
- Residents in crowded housing
- Low-wage essential workers, including:
 - workers in the food & PPE supply chains,
 - public transportation and services &
 - those supporting hospitals and care facilities

**Ohio census tracts with populations
most vulnerable for COVID-19.**



- Families of essential workers
- Families without a car
- Residents who are food or housing insecure
- Residents who rely on medication to control underlying health conditions

Vulnerable Populations Health 360 Filter Tool

- Ohioans Over Age 65
- Racial and Ethnic Minorities
- Pregnant Women
- Parents of Extremely Young or Multiple Children
- Appalachian Ohioans
- Ohioans with Disabilities
- Individuals Who Have Immigrated and/or English is a Second Language
- Survivors of Interpersonal Violence
- Individuals Experiencing Short-Term or Persistent Housing Insecurity
- Ohioans living in Congregate Housing
- Sexual and gender minorities
- Individuals Living with Mental/Substance Abuse Disorder
- Economically Challenged Individuals
- Low-Wage Essential Employees
- The Un- and Underinsured

Ability to filter

COVID Com.: (All)

Race Group: (All)

Language: (All)

Income Level Category: (All)

Dwelling Type Category: (All)

Household Square Feet Category: (All)

Age: 18 98

Number Of People: 1 8

Number Of Children: 0 11

Vehicle Count: 0 10

Data Output

Ability to drill down to the household level

Low Income Populations (<\$20k),
Number of Vehicles (=0)



Insights include:

- Demographic profile (race, age, gender)
- Concentration of low-wage essential workers
- COVID-19 co-morbidities
- # of persons living in each HH
- Square footage
- Household Income level

Interventions

- Dissemination of COVID-19 safety kits.
- Targeted COVID-19 testing.
- Hospital surge planning.
- Locate residents in congregate settings at risk for COVID-19.
- Understanding risk for housing insecurity.
- Detect potential locations for secondary waves of the COVID-19 outbreak.

Parting Thoughts

- COVID-19 exploits the existing burden of infant mortality.
- We must use different data to understand the connection and effect of pandemics like COVID-19 on infant mortality.
- You do not have to be a GIS expert to conduct this type of analysis. All you need is a set of questions that need to be answered or decisions that need to be made to get started.
- Whatever data you have, try combining different types of information to break out of your silo.

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