



# Applying publicly available data to address complex social issues

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**JENNIFER A. POOLER, MPP**

# Introduction

- Background & Problem
- Strategy
- Data & Methods
- Visualizing the Data
- Benefits & Challenges

# Background

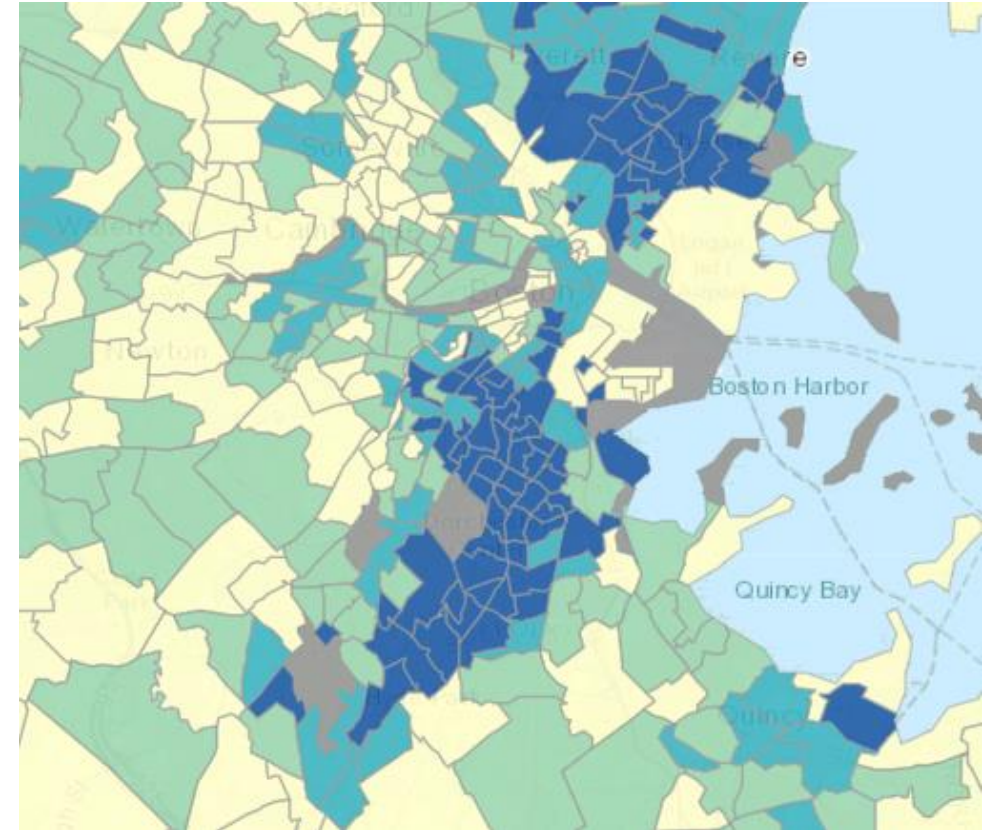
- Access to nutritious food is a key social determinant of health
- Many factors contribute to limited food access:
  - Socio-economic factors – Can individuals/families afford to buy healthy food?
  - Community factors – Do community members live in proximity to stores that offer nutritious foods (e.g., supermarkets, farmers markets)? Can community members get to those stores?
  - Other contextual factors – Can individuals/families prepare healthy meals?

# Problem

- COVID-19 created new challenges in food access
  - Increasing unemployment
  - School / summer food program site closures
  - Stay-at-home orders and closure of public transportation
  - Older adults and those at high risk may be reluctant to visit grocery stores
- How do we ensure the people who need food, receive it?
  - How can we inform the multitude of organizations, policies, and programs that seek to alleviate hunger?

# Driving Strategy

- Using publicly available data, we aim to create a Food Access Index to identify census tracts at highest risk of having limited food access
  - What community and individual-level factors contribute to limited food access?
  - What data are available to distinguish food access risk between communities?



Centers for Disease Control and Prevention/ Agency for Toxic Substances and Disease Registry/ Geospatial Research, Analysis, and Services Program. Social Vulnerability Index

# Data

- U.S. Census Bureau's American Community Survey (ACS)
- U.S. Department of Agriculture's Food Access Research Atlas
- Urban Institute – low-income job loss (based on U.S. Bureau of Labor Statistics Current Employment Statistics and ACS)
- U.S. Department of Education, National Center for Education Statistics, Common Core of Data

# Methods

- Consultation with experts in food insecurity and organizations involved in charitable and community food services
  - Identification of indicators influencing food access
- Acquisition of publicly available data address those indicators
- Variable reduction – eliminate redundancy, focus on factors that distinguish between communities
- Calculate the index
- Visualize the data

# Visualizing the Data



The Food Access Index will allow users to **easily identify communities** at heightened risk of limited food access.



The Food Access Index will **rank census tracts** based on their relative risk for limited food access, providing community-based organizations, policy makers, and planners with a tool to target resources to specific communities.



The Food Access Index will be presented as an **interactive data visualization** using Tableau software.



The Food Access Index will be hosted on IMPAQ's website and accessible to the public. As data source updates are released and made **publicly available**, IMPAQ plans to update the tool.

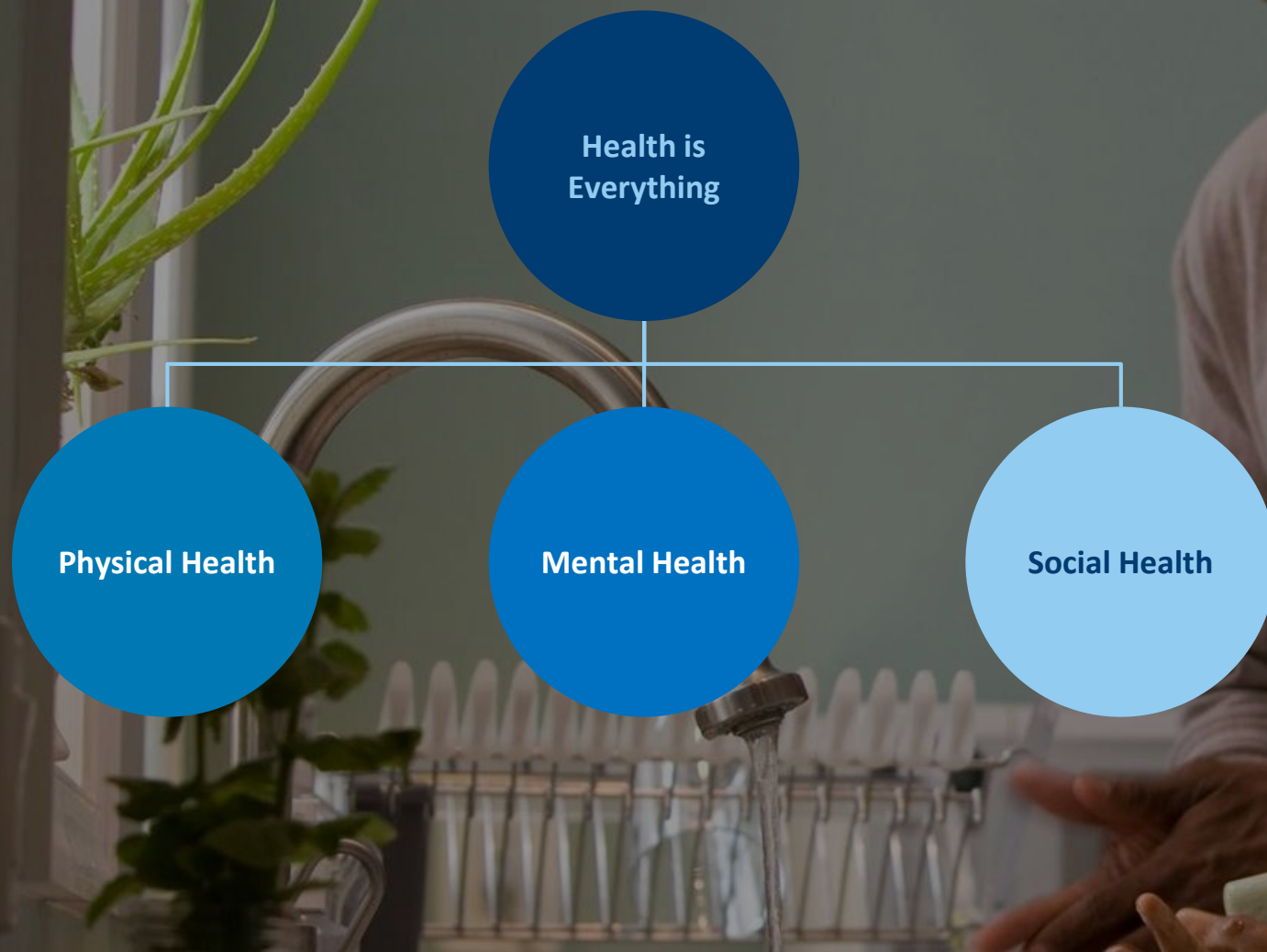


# Benefits & Challenges

- Benefits of relying on publicly available data?
  - Cost-effective
  - Often comparable across years and geographies
  - Useful for covering large geographic areas
- Challenges of relying solely on publicly available data?
  - Proxies – often what you find is “close, but not quite” what you’re looking for
  - If focusing on smaller geographic areas, public data may not be granular enough

**Elisa Wong, National Program Lead, Social Health**  
**Kaiser Permanente National Community Health**

At Kaiser Permanente, social health is equally important as physical and mental health



# Using data to identify risk and connect individuals to resources



KAISER PERMANENTE

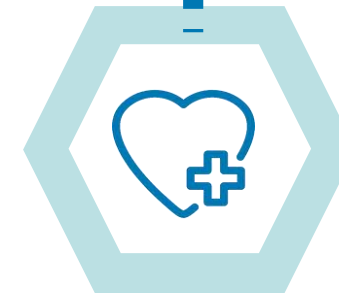
## Identification

Social needs identified by KP staff, providers, patients, caregivers, or community partners



## Information

Thrive Local provides information on community resources and tracks referrals with community partners

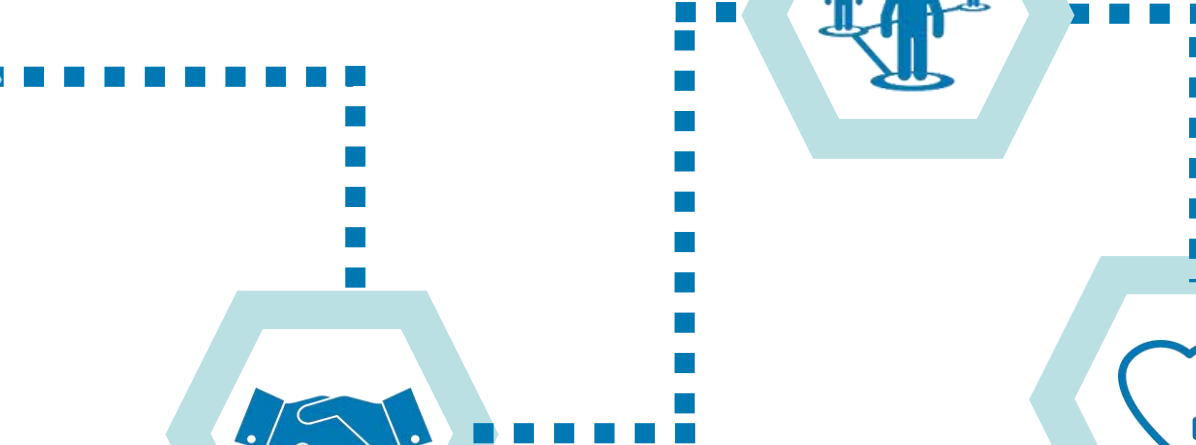


## Optimization

Information from the Thrive Local network is used by Kaiser Permanente and community partners to better understand social needs, identify community wide social care gaps, and improve community conditions for health

## Connection via Thrive Local

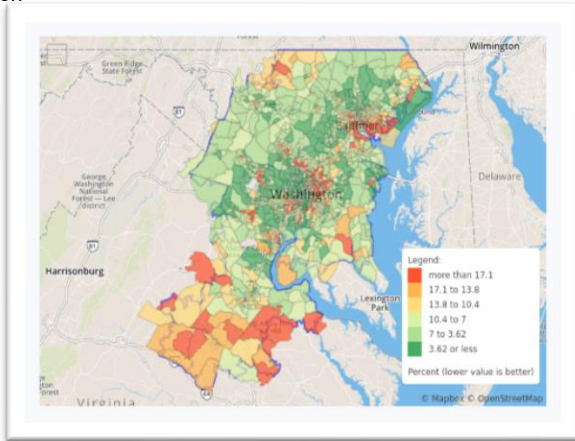
Using the Thrive Local network, health or social service providers can locate the appropriate community, government, or health care systems resources to meet social needs



## KP's Community Health Needs Assessment (CHNA):

- Aggregation and comparison of 120 indicators of health across KP regions & service areas

Adults with no high school diploma, Mid-Atlantic States region



## Community engagement through focus groups, town halls, key informant interviews & surveys:

- Defined scope and severity of needs
- Provided insights into health factors and racial/ethnic and geographic disparities
- Surfaced issues that are difficult to understand with quantitative data
- Identified barriers and community resources

## KP's enterprise Community Health priorities

- Medicaid
- Charity Care
- Food security
- Housing for health
- Economic opportunity
- Environmental stewardship
- Healthy school environments
- Local policies for wellness

*Thrive Local data will also inform future investment and partnership priorities*



## *Food for Life*

### Data

- 1 of top 3 CHNA priorities across all KP communities
- 30% of KP members experience food insecurity\*
- Food insecurity can lead to higher healthcare utilization<sup>1</sup>
- Under-enrollment in federal nutrition programs
  - SNAP enrollment at 72% among those eligible in California
  - WIC enrollment at 40% in Colorado

### Policy Efforts

- Supporting policies that **remove barriers to enrollment and participation** in food stamps and other nutrition programs, e.g.
- Waiving in-person appointments
  - Extending eligibility and certification periods
  - Allowing for online purchase of foods



## *Housing for Health*

- 1 of top 3 CHNA priorities across all KP communities
- 16% of members experience housing instability\*
- Decreased healthcare utilization associated with solutions such as permanent supportive housing<sup>2</sup>

- Highlight need for **expanded federal support for affordable housing**
- Promote **inclusionary zoning policies** to require lower-income housing in new market-rate developments
- Convene health sector stakeholders to catalyze affordable housing projects and **prevent displacement of existing residents**
- Supported a \$4 billion California housing bond in 2018 to create new affordable housing and **provide low-interest housing loans to veterans**

\*preliminary results from 2020 KP member survey

<sup>1</sup>Berkowitz et al (2019), Association between receipt of a medically tailored meal program and health care use, JAMA Intern Med, 179 (6) (2019), pp. 786-793, <https://doi.org/10.1001/jamainternmed.2019.0198>

<sup>2</sup>National Academies of Sciences, Engineering, and Medicine. Permanent Supportive Housing: Evaluating the Evidence for Improving Health Outcomes Among People Experiencing Chronic Homelessness The National Academies Press, Washington, DC (2018), <https://doi.org/10.17226/25133>





# Linking Neighborhood + Individual Health with EHR Data

Nrupen Bhavsar, PhD

Duke University School of Medicine



# Neighborhoods Linked to Health



## Environment

Physical & Social



Behavior



## Proximal Clinical Factors



Cardiovascular  
Disease





# Defining the Health of Neighborhoods



National Initiatives



Local Initiatives

# What is Gentrification?

Alligator Shoe Store (Harlem, NYC)



Whole Foods





# What is Gentrification?

Alligator Shoe Store (Harlem, NYC)



Gentrification

Increase neighborhood wealth/resources due to influx of healthier, wealthier, younger people

Physical displacement/ decreased social cohesion of long-term residents

↑ Health  
↓ Health



Whole Foods



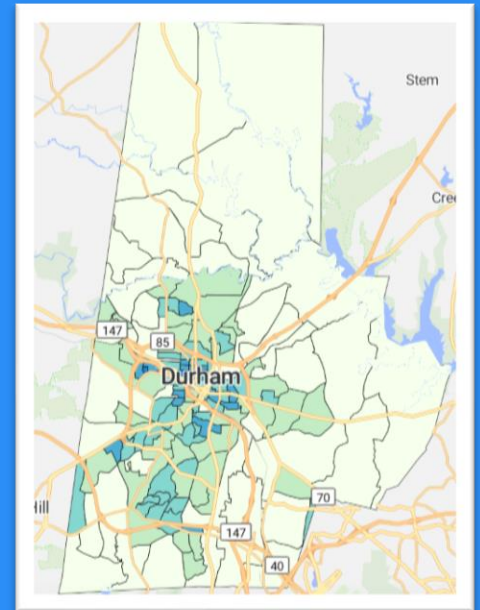
# How to Define Gentrification Using Data

## PLOS ONE

### Defining gentrification for epidemiologic research: A systematic review

Nrupen A. Bhavsar<sup>1\*</sup>, Manish Kumar<sup>2</sup>, Laura Richman<sup>3</sup>

- Multiple definitions with common nSES variables
  1. Median income
  2. Median rent price
  3. % of population that is professional
  4. % living below poverty level
- Neighborhoods must be eligible to be gentrified
- Gentrification (in our study from 2008 – 2016)
  - + change in income, rent \$, and professional population
  - - change in poverty level



# Data Linkage

## Figure 4: Data linkage using FIPS codes

Source: U.S. Census Bureau

|       | Level   | Total Population | Black (%) | Household Income (Median) |
|-------|---|------------------|-----------|---------------------------|
| 01011 | Block Group 1, Census Tract 1.01, Durham County, North Carolina | 1369             | 34        | 38446                     |
| 01012 | Block Group 2, Census Tract 1.01, Durham County, North Carolina | 1705             | 56        | 45455                     |
| 01021 | Block Group 1, Census Tract 1.02, Durham County, North Carolina | 2900             | 38        | 29483                     |
| 01022 | Block Group 2, Census Tract 1.02, Durham County, North Carolina | 1620             | 19        | 51740                     |
| 02001 | Block Group 1, Census Tract 2, Durham County, North Carolina    | 1320             | 36        | 30329                     |

Data source: EPA

| FIPS | PM2.5 Concentration |
|------|---------------------|
|------|---------------------|

Data source: Durham City/County

| FIPS | Number of Parks |
|------|-----------------|
|------|-----------------|

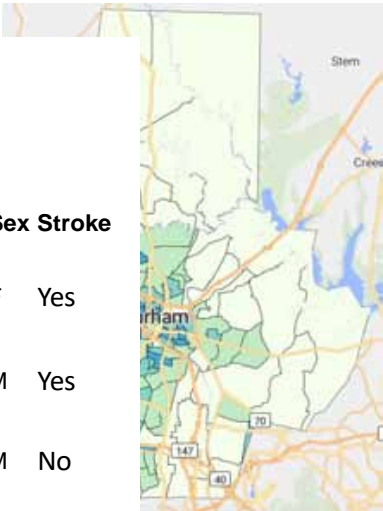
Data source: EHR Data

| Patient ID | FIPS | Age | Race | Sex | Stroke |
|------------|------|-----|------|-----|--------|
|------------|------|-----|------|-----|--------|

|   | Total Population | Black (%) | Household Income (Median) | PM2.5 Concentration | Number of Parks |
|---|------------------|-----------|---------------------------|---------------------|-----------------|
| 1 | 1369             | 34        | 38446                     | 8.8                 | 0               |
| 2 | 1705             | 56        | 45455                     | 8.8                 | 0               |
| 1 | 2900             | 38        | 29483                     | 9                   | 2               |
| 2 | 1620             | 19        | 51740                     | 8.9                 | 1               |
| 1 | 1320             | 36        | 30329                     | 9.2                 | 0               |

B

| Linked SDOH + EHR Dataset |              |     |       |     |                     |                 |        |  |
|---------------------------|--------------|-----|-------|-----|---------------------|-----------------|--------|--|
| Patient ID                | FIPS         | Age | Race  | Sex | PM2.5 Concentration | Number of Parks | Stroke |  |
| 1                         | 370630001011 | 35  | Black | F   | 8.8                 | 0               | Yes    |  |
| 2                         | 370630001012 | 67  | Black | M   | 8.8                 | 0               | Yes    |  |
| 3                         | 370630001021 | 78  | White | M   | 9                   | 2               | No     |  |
| 4                         | 370630001022 | 42  | Asian | F   | 8.9                 | 1               | Yes    |  |
| 5                         | 370630002001 | 80  | White | M   | 9.2                 | 0               | No     |  |





# Data Sources



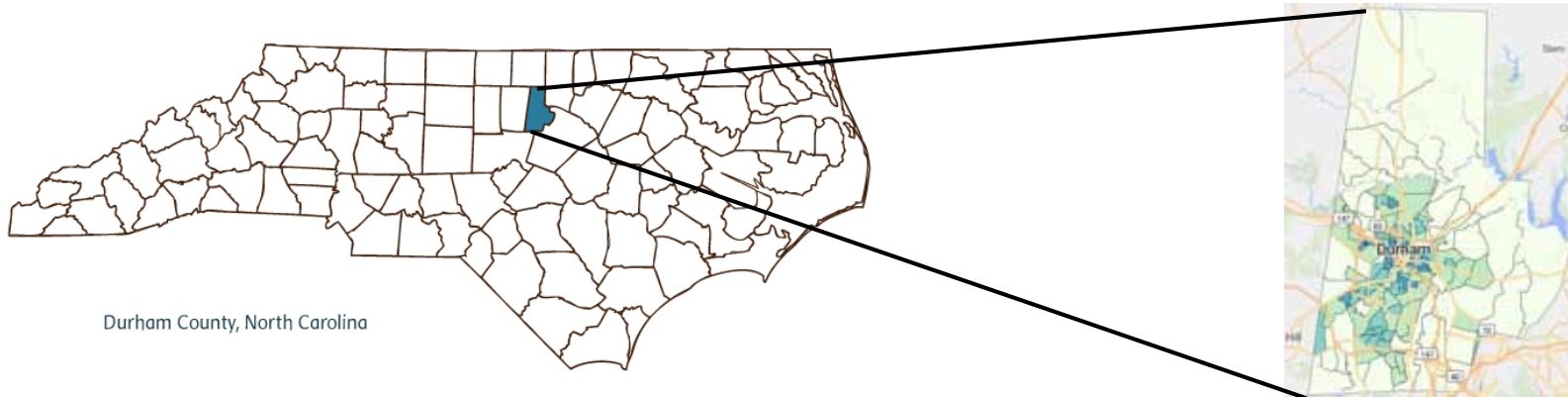
## Duke University Health System

- Duke University Medical Center
- Duke Regional Hospital
- Duke Raleigh Hospital



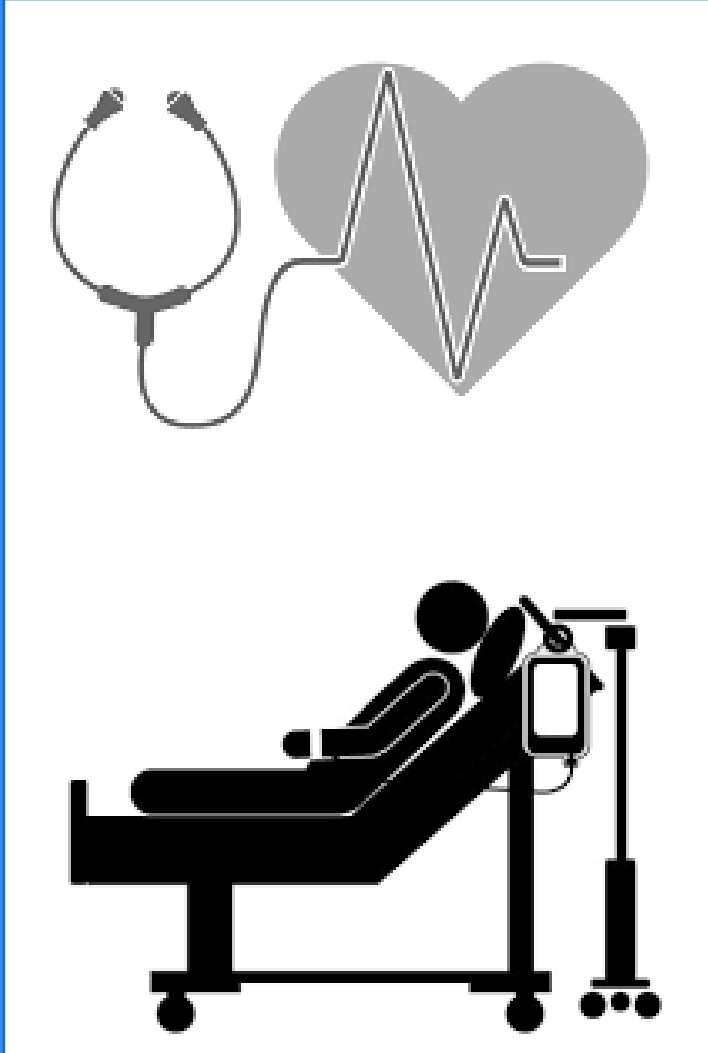
## Lincoln Community Health Center

- Un-insured
- Under-insured
- Undocumented



Durham County, North Carolina

# Health Outcomes



- **Proximal health indicators:**

- Diabetes
- Hypertension
- Obesity

- **CVD hospitalization:**

- Myocardial infarction
- Stroke

- **Healthcare utilization:**

- Emergency department
- Inpatient
- Outpatient

# Results: What We Learned

Diabetes

Hypertension

Cardiovascular Disease →

Healthcare utilization →



Proximal health indicators differ by gentrification status

Healthcare utilization not differ by gentrification status



# Benefits/Challenges of EHR Data

- Benefits

- Cheaper and faster to access
- Broad data elements

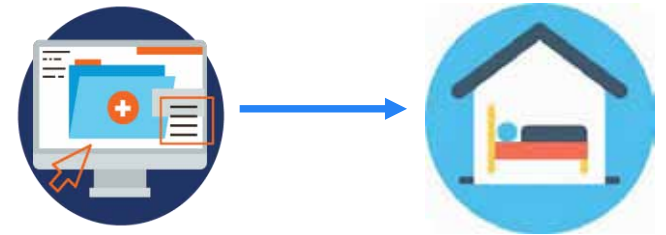
- Challenges

- Dependent on patient interaction for outcomes
- Residents move and receive care outside of health system
- Data curation requires an interdisciplinary team
  - Informaticists
  - Epidemiologists
  - Statisticians
  - Clinicians
  - Community members



# Engaging the Community

- Durham Compass – website that allows community members to visualize SDOH and summary health data
- Identify populations in need and provide interventions
  - EHR to identify patients experiencing homelessness and provide medical respite (Biederman DJ et al., 2019)
- Active participation
  - Focus groups to identify most pressing SDOH
  - Community member participation in grants/projects



# Acknowledgements

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# DISCUSSION

# Caroline Schaefer Back- Up Slides

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### 3M Clinical Risk Group and Severity

| 3M CRG core health status groups (1-9)                                | Base 3M CRGs<br>(Total = 330) | Description/Example of<br>base 3M CRG  | Severity<br>levels | Number of 3M CRGs<br>(Total = 1,408) |
|---|-------------------------------|--|--------------------|--------------------------------------|
| 9 - Catastrophic condition status                                     | 10                            | History of major organ transplant  | 4                  | 40                                   |
| 8 - Dominant and metastatic malignancies                              | 30                            | Colon malignancy - under active treatment  | 4                  | 120                                  |
| 7 - Dominant chronic disease in<br>3 or more organ systems (triplets) | 28                            | Diabetes mellitus, congestive heart failure (CHF) and chronic obstructive pulmonary disease (COPD) | 6                  | 168                                  |
| 6 - Significant chronic disease in<br>multiple organ systems (pairs)  | 78                            | Diabetes mellitus and CHF  | 6                  | 468                                  |
| 5 - Single dominant or moderate<br>chronic disease                    | 125                           | Diabetes mellitus  | 4                  | 500                                  |
| 4 - Minor chronic disease in multiple<br>organ systems                | 1                             | Migraine and benign prostatic hyperplasia (BPH)  | 4                  | 4                                    |
| 3 - Single minor chronic disease                                      | 50                            | Migraine   | 2                  | 100                                  |
| 2 - History of significant acute disease                              | 6                             | Chest pains  | None               | 6                                    |
| 1 - Healthy/Non-Users   | 2                             | Healthy (no chronic health problems)   | None               | 2                                    |

## Conceptual Matrix: Under age 19

| Health Outcomes (20%)                 |                                      |        |   |
|---------------------------------------|--------------------------------------|--------|---|
| Focus Area                            | Measure                              | Weight | Source  |
| Healthcare status                     | Child Mortality Rate                 | 20%    | CDC WONDER mortality data   |
|                                       | Infant Mortality Rate                | 20%    | The Compressed Mortality File (CMF)                                   |
|                                       | Percent of uninsured children        | 25%    | Small Area Health Insurance Estimates                                 |
|                                       | Low birthweight                      | 35%    | National Center for Health Statistics – Natality files                |
| Health Behaviors (15%)                |                                      |        |   |
| Focus Area                            | Measure                              | Weight | Source  |
| Health Focus                          | Food environment index               | 35%    | USDA Food Environment Atlas, Map the Meal Gap                         |
|                                       | Access to exercise opportunities     | 15%    | Business Analyst, Delorme map data, ESRI, & U.S. Census Files         |
| Sexual activity                       | Sexually transmitted infections      | 25%    | National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention |
|                                       | Teen births                          | 25%    | National Center for Health Statistics – Natality files                |
| Access (15%)                          |                                      |        |   |
| Focus Area                            | Measure                              | Weight | Source  |
| Access to care                        | Primary care physicians              | 45%    | Area Health Resource File/American Medical Association                |
|                                       | Mental health providers              | 55%    | CMS, National Provider Identification file                            |
| Social and Economic Environment (30%) |                                      |        |   |
| Focus Area                            | Measure                              | Weight | Source  |
| Education                             | High school graduation               | 10%    | State-specific sources & EDFacts                                      |
| Employment                            | Unemployment                         | 25%    | Bureau of Labor Statistics  |
| Home Environment                      | Children in poverty                  | 10%    | Small Area Income and Poverty Estimates                               |
|                                       | Food Insecurity                      | 10%    | Feeding America Data Map  |
|                                       | Children in single-parent households | 15%    | American Community Survey   |
| Community safety                      | Violent crime                        | 5%     | Uniform Crime Reporting – FBI   |
|                                       | Injury deaths                        | 15%    | CDC WONDER mortality data   |
|                                       | Disconnected youth                   | 10%    | US census data and Measure of America.org                             |
| Physical Environment (20%)            |                                      |        |   |
| Focus Area                            | Measure                              | Weight | Source  |
| Air and water quality                 | Air pollution - particulate matter   | 20%    | Environmental Public Health Tracking Network                          |
|                                       | Drinking water violations            | 10%    | Safe Drinking Water Information System                                |
| Housing                               | Severe housing problems              | 30%    | Comprehensive Housing Affordability Strategy (CHAS) data              |
|                                       | Food Desert                          | 40%    | United States Department of Agriculture<br>Economic Research Service  |

## Conceptual Matrix: 65 Plus

| Health Outcomes (35%)                 |   |        |  |
|---------------------------------------|---|--------|--|
| Focus Area                            | Measure   | Weight | Source   |
| Health Outcomes                       | Life Expectancy                                 | 15%    | National Center for Health Statistics – Mortality files              |
|                                       | Perceived Poor or fair health                   | 30%    | Behavioral Risk Factor Surveillance System                           |
|                                       | Perceived Poor physical health days             | 25%    | Behavioral Risk Factor Surveillance System                           |
|                                       | Perceived Poor mental health days               | 30%    | Behavioral Risk Factor Surveillance System                           |
| Health Behaviors (30%)                |   |        |  |
| Focus Area                            | Measure   | Weight | Source   |
| Tobacco use                           | Adult smoking                                   | 5%     | Behavioral Risk Factor Surveillance System                           |
| Diet and exercise                     | Adult obesity                                   | 15%    | CDC Diabetes Interactive Atlas                                       |
|                                       | Food environment index                          | 35%    | USDA Food Environment Atlas, Map the Meal Gap                        |
|                                       | Physical inactivity                             | 15%    | CDC Diabetes Interactive Atlas                                       |
|                                       | Insufficient Sleep                              | 5%     | Behavioral Risk Factor Surveillance System                           |
| Alcohol and drug use                  | Excessive drinking                              | 20%    | Behavioral Risk Factor Surveillance System                           |
|                                       | Alcohol-impaired driving deaths                 | 5%     | Fatality Analysis Reporting System                                   |
| Access (10%)                          |   |        |  |
| Focus Area                            | Measure   | Weight | Source   |
| Access to care                        | Primary care physicians                         | 25%    | Area Health Resource File/American Medical Association               |
|                                       | Mental health providers                         | 75%    | CMS, National Provider Identification file                           |
| Social and Economic Environment (15%) |   |        |  |
| Focus Area                            | Measure   | Weight | Source   |
| Income                                | Median Household Income and Percent of Pop >65  | 10%    | American Community Survey  |
|                                       | Food Insecurity                                 | 25%    | Feeding America Data Map   |
| Family and social support             | Social associations                             | 25%    | County Business Patterns   |
| Community safety                      | Violent crime                                   | 20%    | Uniform Crime Reporting – FBI  |
|                                       | Injury deaths                                   | 20%    | CDC WONDER mortality data  |
| Physical Environment (10%)            |   |        |  |
| Focus Area                            | Measure   | Weight | Source   |
| Air and water quality                 | Air pollution - particulate matter <sup>1</sup> | 30%    | Environmental Public Health Tracking Network                         |
|                                       | Drinking water violations                       | 15%    | Safe Drinking Water Information System                               |
| Housing                               | Severe housing problems                         | 25%    | Comprehensive Housing Affordability Strategy (CHAS) data             |
|                                       | Food Desert                                     | 30%    | United States Department of Agriculture<br>Economic Research Service |



# Conceptual Matrix: General Population

| Health Outcomes (30%)                 |   |        |  |
|---------------------------------------|---|--------|--|
| Focus Area                            | Measure                                     | Weight | Source   |
| Health Outcomes                       | Life Expectancy                             | 25%    | National Center for Health Statistics – Mortality files                            |
|                                       | Perceived Poor or Fair Health               | 40%    | Behavioral Risk Factor Surveillance System   |
|                                       | Perceived Poor Physical Health Days         | 15%    | Behavioral Risk Factor Surveillance System   |
|                                       | Perceived Poor Mental Health Days           | 20%    | Behavioral Risk Factor Surveillance System   |
| Health Behaviors (25%)                |   |        |  |
| Focus Area                            | Measure                                     | Weight | Source   |
| Tobacco Use                           | Adult Smoking                               | 10%    | Behavioral Risk Factor Surveillance System   |
| Diet and Exercise                     | Adult Obesity                               | 5%     | CDC Diabetes Interactive Atlas   |
|                                       | Food Environment Index                      | 10%    | USDA Food Environment Atlas, Map the Meal Gap                                      |
|                                       | Physical Inactivity                         | 10%    | CDC Diabetes Interactive Atlas   |
|                                       | Access to Exercise Opportunities            | 5%     | Business Analyst, Delorme map data, ESRI, & U.S. Census Files                      |
|                                       | Insufficient Sleep                          | 5%     | Behavioral Risk Factor Surveillance System   |
| Race and Ethnicity                    | Race  | 15%    | U. S. Census Bureau, American Community Survey, 5-Year Estimates                   |
|                                       | Language Factor                             | 15%    | American Community Survey, 5-year estimates  |
| Alcohol and Drug Use                  | Excessive Drinking                          | 5%     | Behavioral Risk Factor Surveillance System   |
|                                       | Alcohol-impaired Driving Deaths             | 5%     | Fatality Analysis Reporting System   |
| Sexual Activity                       | Sexually Transmitted Infections             | 5%     | National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention              |
|                                       | Teen Births                                 | 10%    | National Center for Health Statistics – Natality files                             |
| Access (10%)                          |   |        |  |
| Focus Area                            | Measure                                     | Weight | Source   |
| Access to Care                        | Primary Care physicians                     | 15%    | Area Health Resource File/American Medical Association                             |
|                                       | Mental Health Providers                     | 25%    | CMS, National Provider Identification file   |
|                                       | Rural as Indicator of Access to Specialists | 30%    | The Texas Demographic Center (U.S. Bureau of the Census State Data Center Program) |
|                                       | Uninsured Adults                            | 30%    | Small Area Health Insurance Estimates  |
| Social and Economic Environment (25%) |   |        |  |
| Focus Area                            | Measure                                     | Weight | Source   |
| Education                             | High School Graduation                      | 5%     | State-specific sources & EDFacts   |
|                                       | Some College                                | 10%    | American Community Survey  |
| Income                                | Median Household Income                     | 10%    | American Community Survey  |
|                                       | Average Household Size                      | 15%    | U. S. Census Bureau, American Community Survey, 5-Year Estimates                   |
| Employment                            | Unemployment                                | 15%    | Bureau of Labor Statistics   |
| Family and social support             | Food Insecurity                             | 10%    | Feeding America Data Map   |
|                                       | Social Associations                         | 5%     | County Business Patterns   |
|                                       | Children in single-parent households        | 10%    | American Community Survey  |
| Community safety                      | Violent crime                               | 10%    | Uniform Crime Reporting – FBI  |
|                                       | Injury deaths                               | 10%    | CDC WONDER mortality data  |
| Physical Environment (10%)            |   |        |  |
| Focus Area                            | Measure                                     | Weight | Source   |
| Air and water quality                 | Air pollution - particulate matter          | 30%    | Environmental Public Health Tracking Network                                       |
|                                       | Drinking water violations                   | 5%     | Safe Drinking Water Information System   |
| Housing                               | Severe housing problems                     | 35%    | Comprehensive Housing Affordability Strategy (CHAS) data                           |
|                                       | Food Desert                                 | 30%    | United States Department of Agriculture<br>Economic Research Service               |

Background Content  
Nrupen Bhavsar, PhD

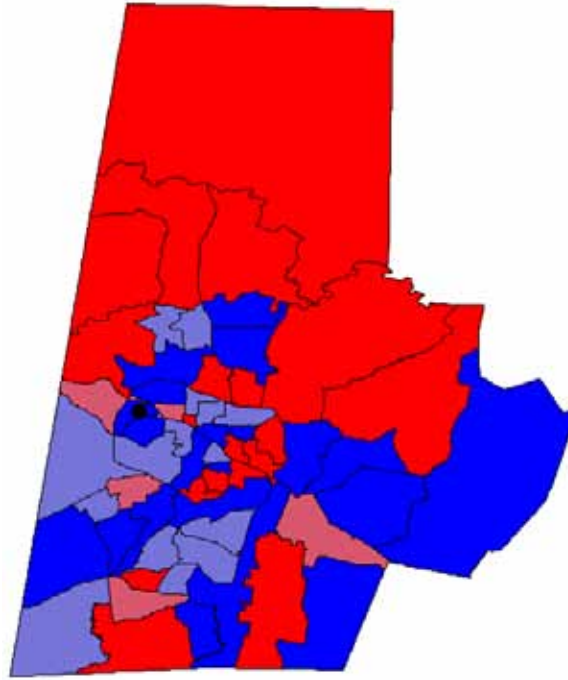


# Linking Neighborhood and Individual Health with EHR Data

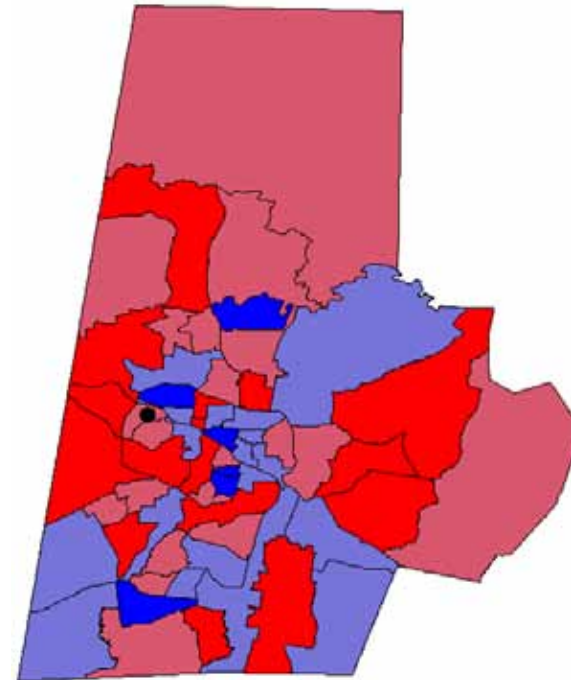
Nrupen Bhavsar, PhD  
Duke University School of Medicine

# Components of Gentrification Index

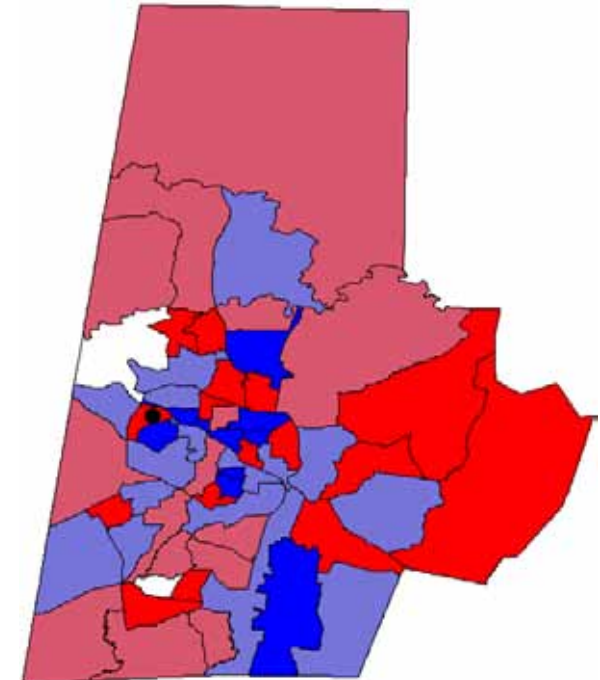
Percent with bachelor's degree



Median rent price

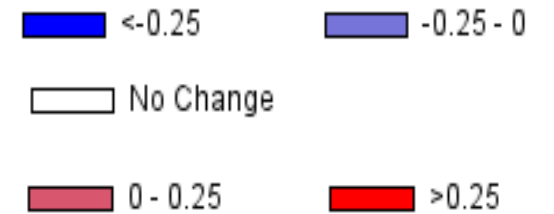


Median income



Proportion below poverty level

Difference in z-score between 2010 and 2015:



# Data Linkage

Figure 4: Data linkage using FIPS codes

| Data source: U.S. Census Bureau |   |                  |           |                           | Data source: EPA |                     | Data source: Durham City/County |                 | Data source: EHR Data |              |     |       |     |        |
|---------------------------------|---|------------------|-----------|---------------------------|------------------|---------------------|---------------------------------|-----------------|-----------------------|--------------|-----|-------|-----|--------|
| FIPS                            | Level   | Total Population | Black (%) | Household Income (Median) | FIPS             | PM2.5 Concentration | FIPS                            | Number of Parks | Patient ID            | FIPS         | Age | Race  | Sex | Stroke |
| 370630001011                    | Block Group 1, Census Tract 1.01, Durham County, North Carolina | 1369             | 34        | 38446                     | 370630001011     | 8.8                 | 370630001011                    | 0               | 1                     | 370630001011 | 35  | Black | F   | Yes    |
| 370630001012                    | Block Group 2, Census Tract 1.01, Durham County, North Carolina | 1705             | 56        | 45455                     | 370630001012     | 8.8                 | 370630001012                    | 0               | 2                     | 370630001012 | 67  | Black | M   | Yes    |
| 370630001021                    | Block Group 1, Census Tract 1.02, Durham County, North Carolina | 2900             | 38        | 29483                     | 370630001021     | 9                   | 370630001021                    | 2               | 3                     | 370630001021 | 78  | White | M   | No     |
| 370630001022                    | Block Group 2, Census Tract 1.02, Durham County, North Carolina | 1620             | 19        | 51740                     | 370630001022     | 8.9                 | 370630001022                    | 1               | 4                     | 370630001022 | 42  | Asian | F   | Yes    |
| 370630002001                    | Block Group 1, Census Tract 2, Durham County, North Carolina    | 1320             | 36        | 30329                     | 370630002001     | 9.2                 | 370630002001                    | 0               | 5                     | 370630002001 | 80  | White | M   | No     |

A

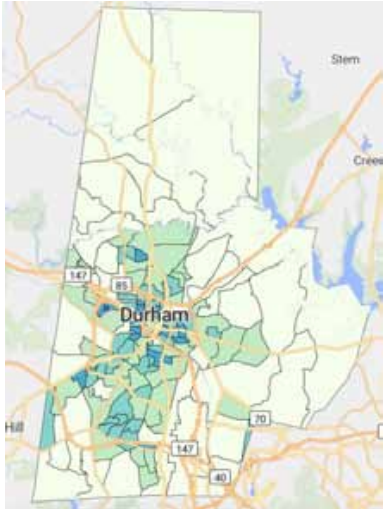
B

Linked SDOH Data Resource

| FIPS         | Total Population | Black (%) | Household Income (Median) | PM2.5 Concentration | Number of Parks |
|--------------|------------------|-----------|---------------------------|---------------------|-----------------|
| 370630001011 | 1369             | 34        | 38446                     | 8.8                 | 0               |
| 370630001012 | 1705             | 56        | 45455                     | 8.8                 | 0               |
| 370630001021 | 2900             | 38        | 29483                     | 9                   | 2               |
| 370630001022 | 1620             | 19        | 51740                     | 8.9                 | 1               |
| 370630002001 | 1320             | 36        | 30329                     | 9.2                 | 0               |

B

| Linked SDOH + EHR Dataset |              |     |       |     |                     |                 |        |
|---------------------------|--------------|-----|-------|-----|---------------------|-----------------|--------|
| Patient ID                | FIPS         | Age | Race  | Sex | PM2.5 Concentration | Number of Parks | Stroke |
| 1                         | 370630001011 | 35  | Black | F   | 8.8                 | 0               | Yes    |
| 2                         | 370630001012 | 67  | Black | M   | 8.8                 | 0               | Yes    |
| 3                         | 370630001021 | 78  | White | M   | 9                   | 2               | No     |
| 4                         | 370630001022 | 42  | Asian | F   | 8.9                 | 1               | Yes    |
| 5                         | 370630002001 | 80  | White | M   | 9.2                 | 0               | No     |



# Defining Gentrification

## ○ American Community Survey (ACS) – long form of census

- |   |
|---|
| 1. Mean household income                        |
| 2. Mean gross rent price                        |
| 3. % population with bachelors degree or higher |
| 4. % living below poverty level                 |

Positive change

Negative change

Gentrification

Must meet 3 of 4 criteria

## ○ Neighborhoods must be eligible to be gentrified

- Low SES at baseline
- Compare block group level with mean of Durham County
- Negative z-score at baseline (i.e., #1-3 < Durham, #4 > Durham)



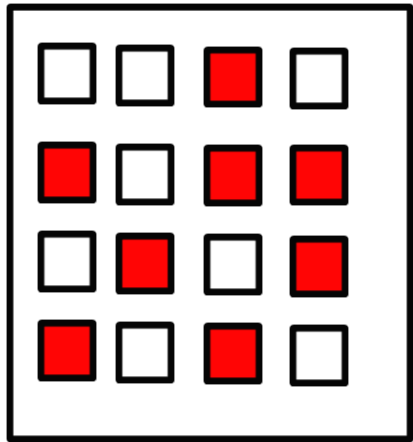
6-7 minutes per person

- Jen will provide a brief background on SDOH (and social needs), then
  - Using IMPAQ's food need index as an example, discuss how publicly available data can be used to drive policy and planning
  - What are some of the benefits/challenges with using publicly available data for SDOH work?
- Elisa will discuss Kaisers programs
  - How Kaiser uses data to measure risk and connect people to resources
  - How Kaiser uses data to drive strategy from a policy perspective
  - How Kaiser engages the community
  - What are some benefits/challenges in using Kaiser's data
- Nrupen can discuss his research on gentrification
  - How Duke uses EHR data in research to drive strategy from a policy perspective (?)
  - How Nrupen is engaging the community with his research (Durham Compass?)
  - What are some of the benefits/challenges in using EHR data for this work



# Measuring Neighborhood Health

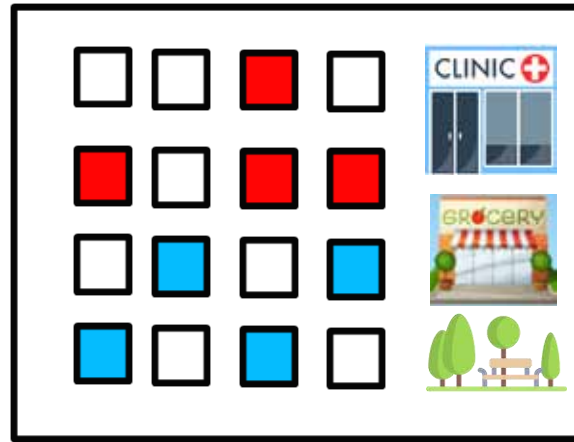
Pre-gentrification



Time 0

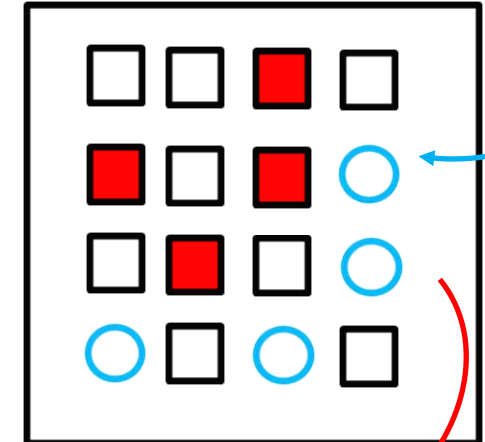
Prevalence =  $8/16 = 50\%$

Post-gentrification



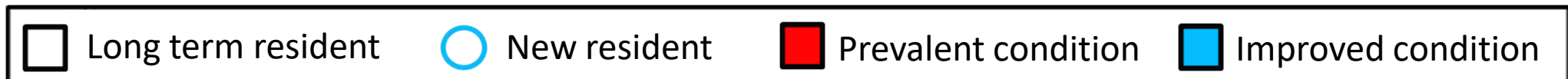
Time 1

Prevalence =  $4/16 = 25\%$



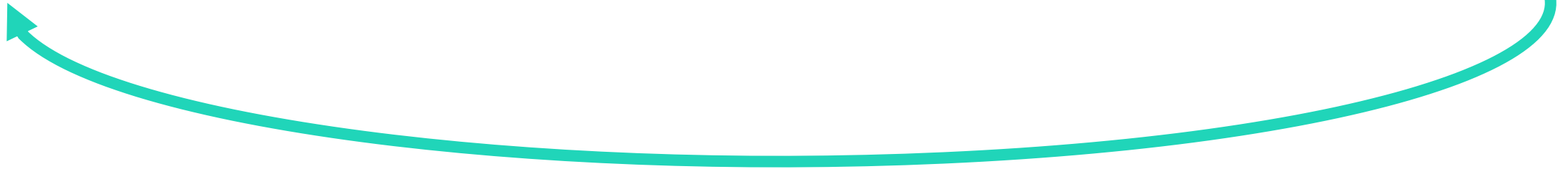
Time 1

Prevalence =  $4/16 = 25\%$





# Measuring Health: EHR Data for Clinical Research



# Measuring the Health of Neighborhoods

- American Community Survey

- Nationwide survey - information on social, economic, housing, and demographic characteristics about nation's population
  - Contacts 3.5 million households every year
- Enumeration of US population required by the US Constitution
  - Additional information collected to inform policy, allocate funds, evaluate need for schools, etc.
- There is short form and long form: ACS = long form
- Over 1400 socioeconomic variables
- Agency for Healthcare Risk and Quality (AHRQ) risk score

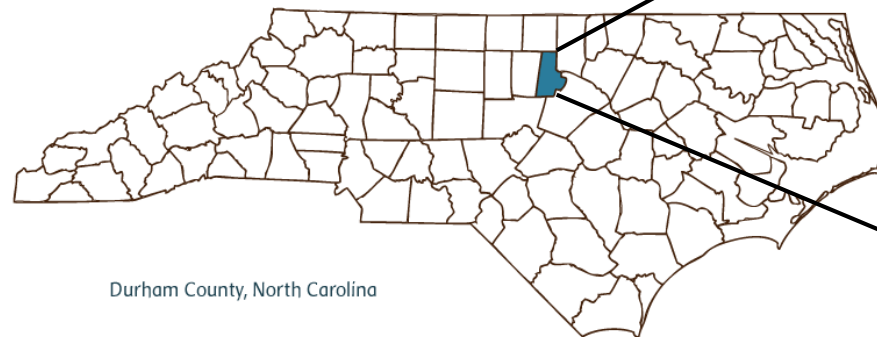


# Data Sources

- Duke University Health System
  - Duke University Medical Center
  - Duke Regional
  - Duke Raleigh

- Lincoln Community Health Center

- Un-insured
- Under-insured
- Undocumented



Durham County, North Carolina



>90%  
Durham  
residents



# Street Corner Over 28 Years

Alligator Shoe Store

1989



1993



2001



GENTRIFICATION

2006



2007



Whole Foods

2017

