

Healthy Housing and Indoor Air Quality: A Chicago Field Study

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Housing is a Social Determinant of Health



Economic Stability

- Employment
- Food Insecurity
- **Housing Instability**
- Poverty

Education

Social and Community Context

Health and Health Care

Neighborhood and Built Environment

- Access to Foods that Support Healthy Eating Patterns
- Crime and Violence
- Environmental Conditions
- **Quality of Housing**



Health Benefits of Energy Efficiency

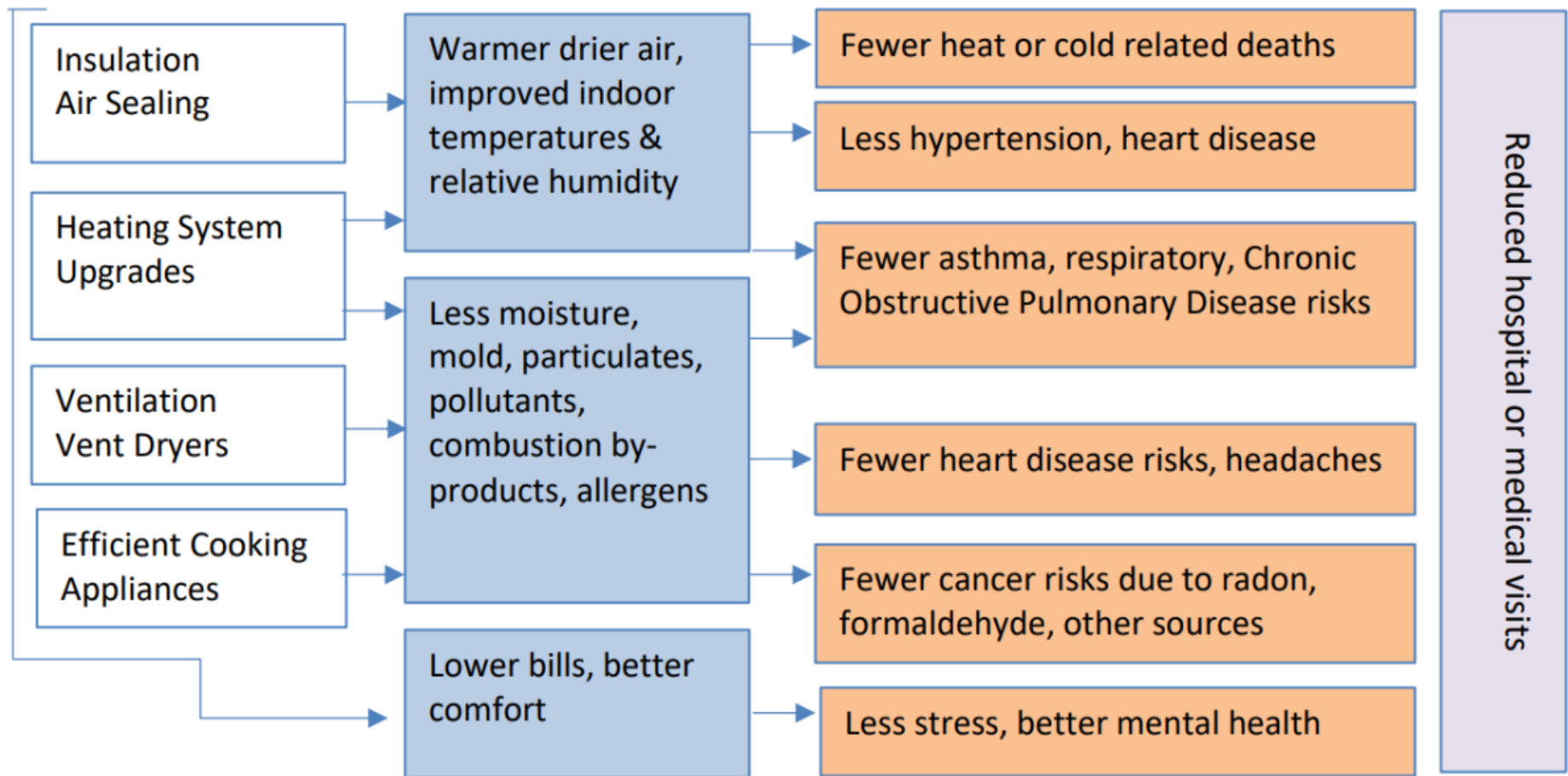
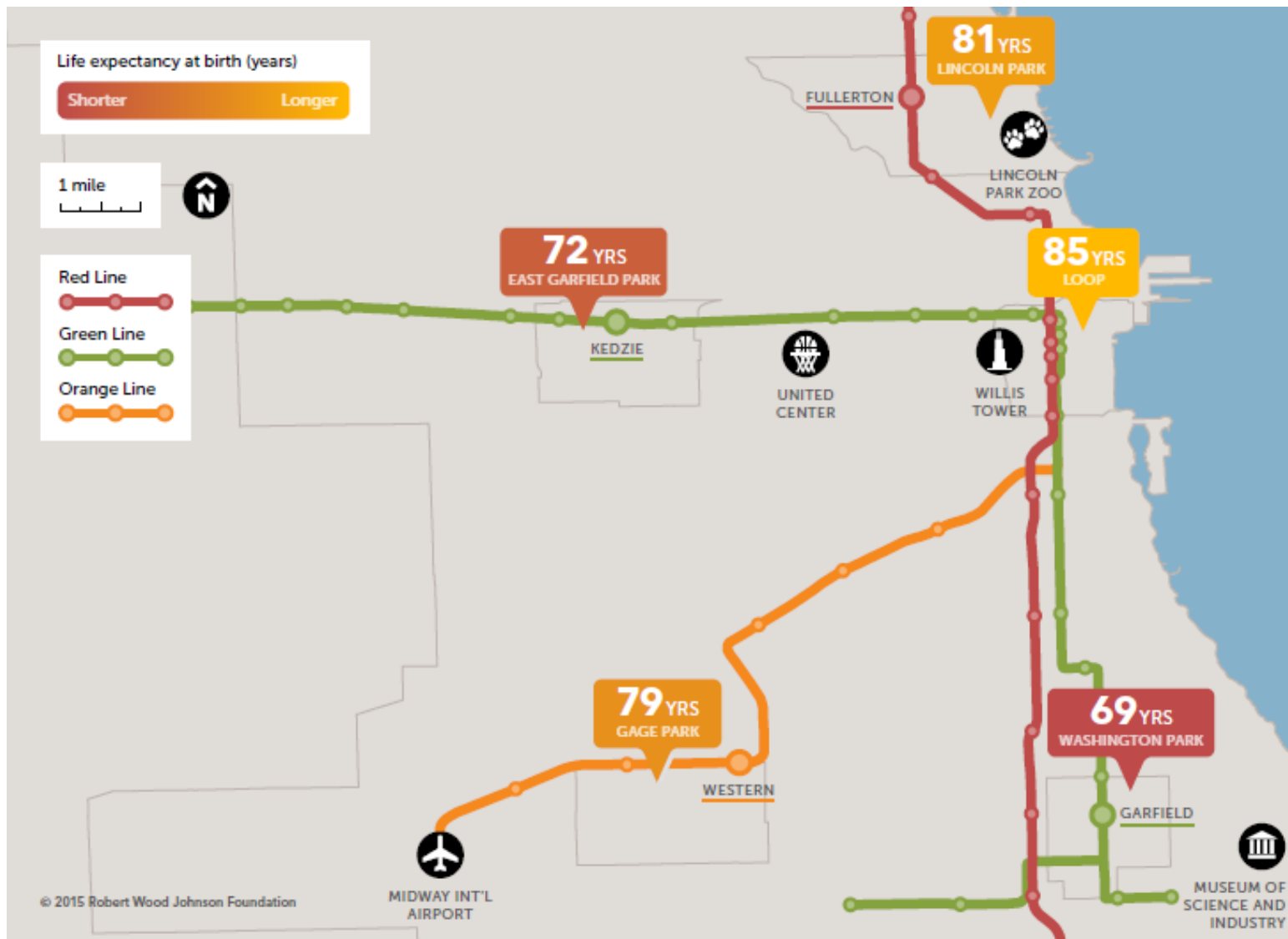
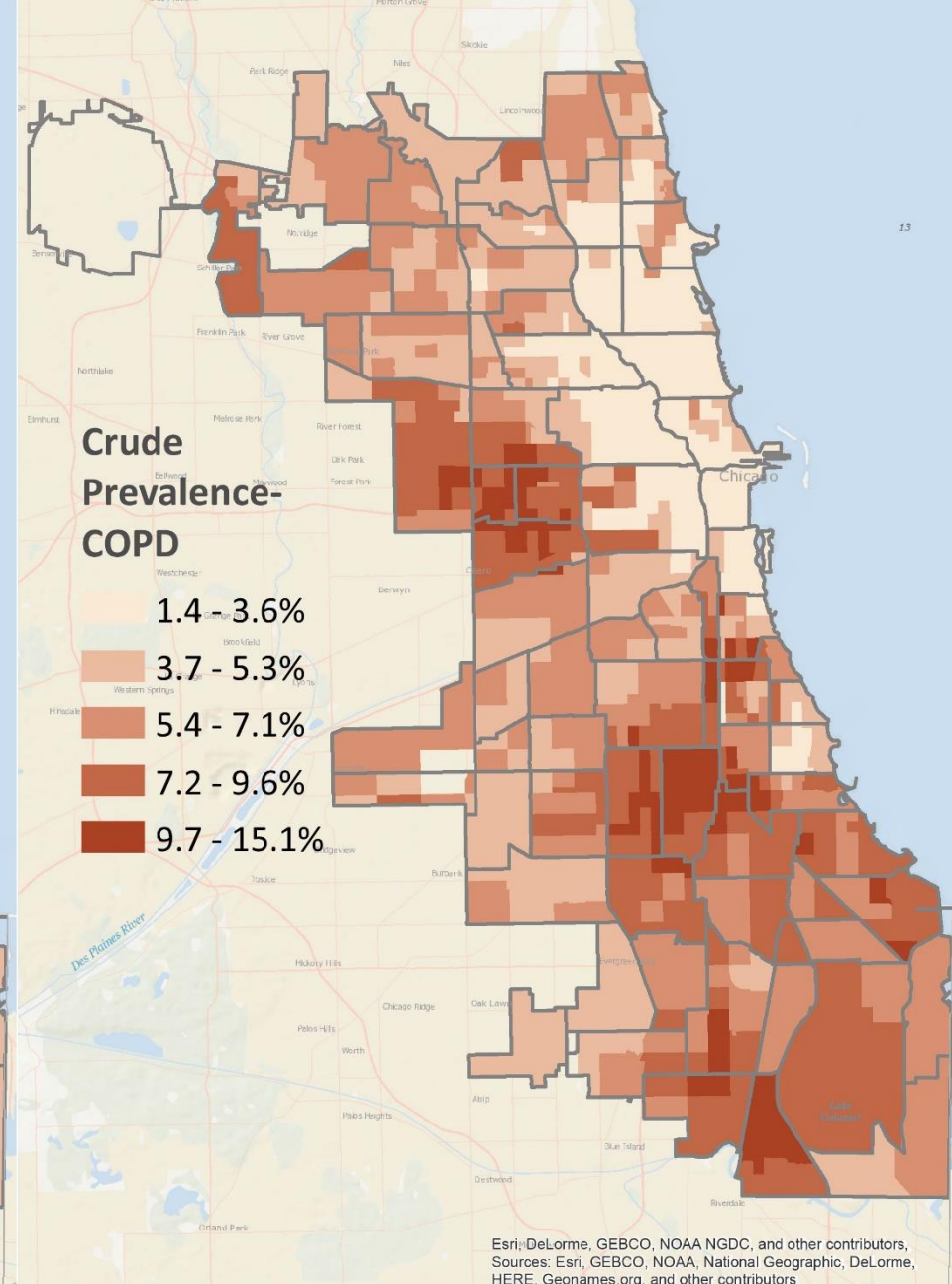
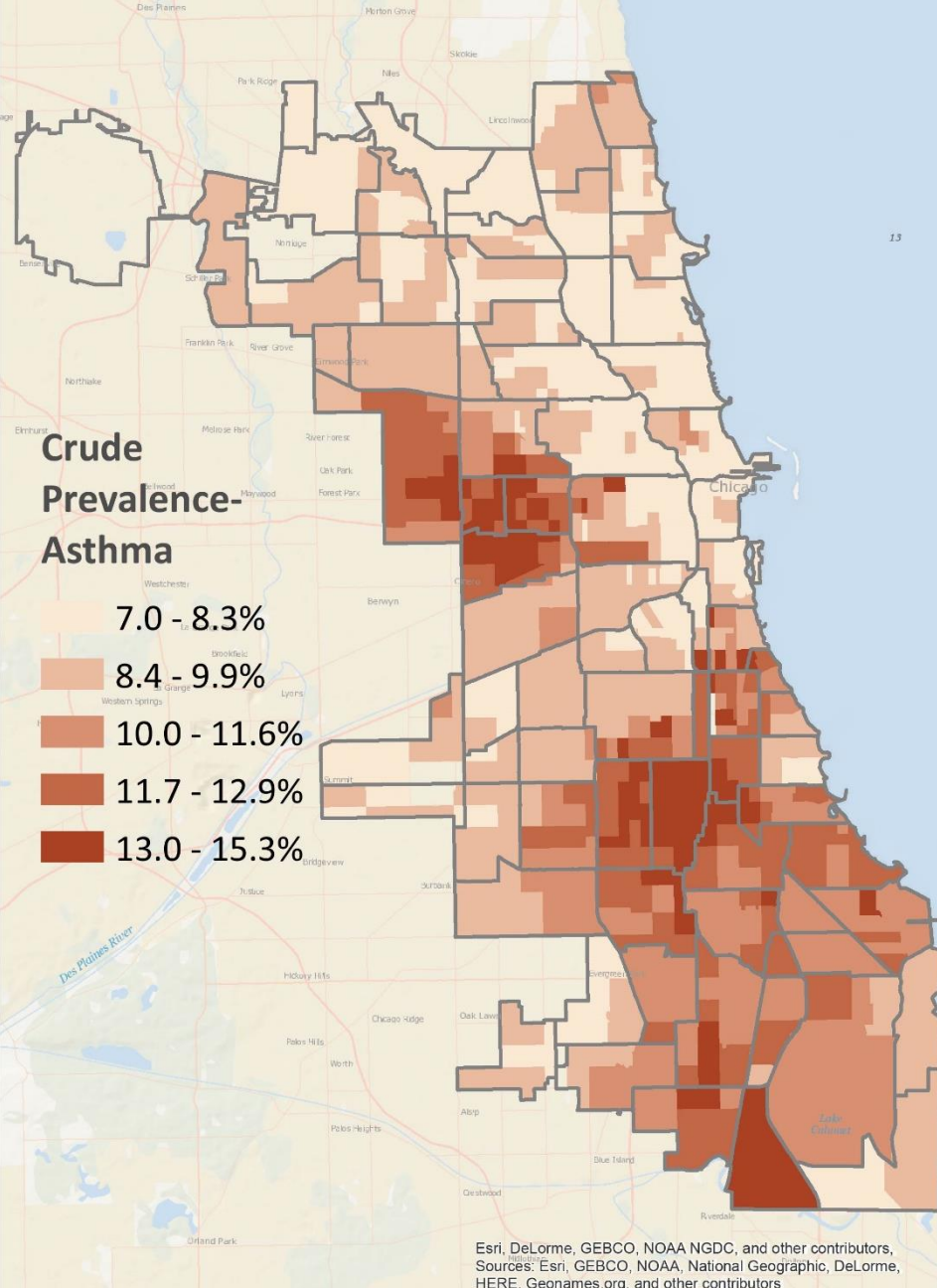


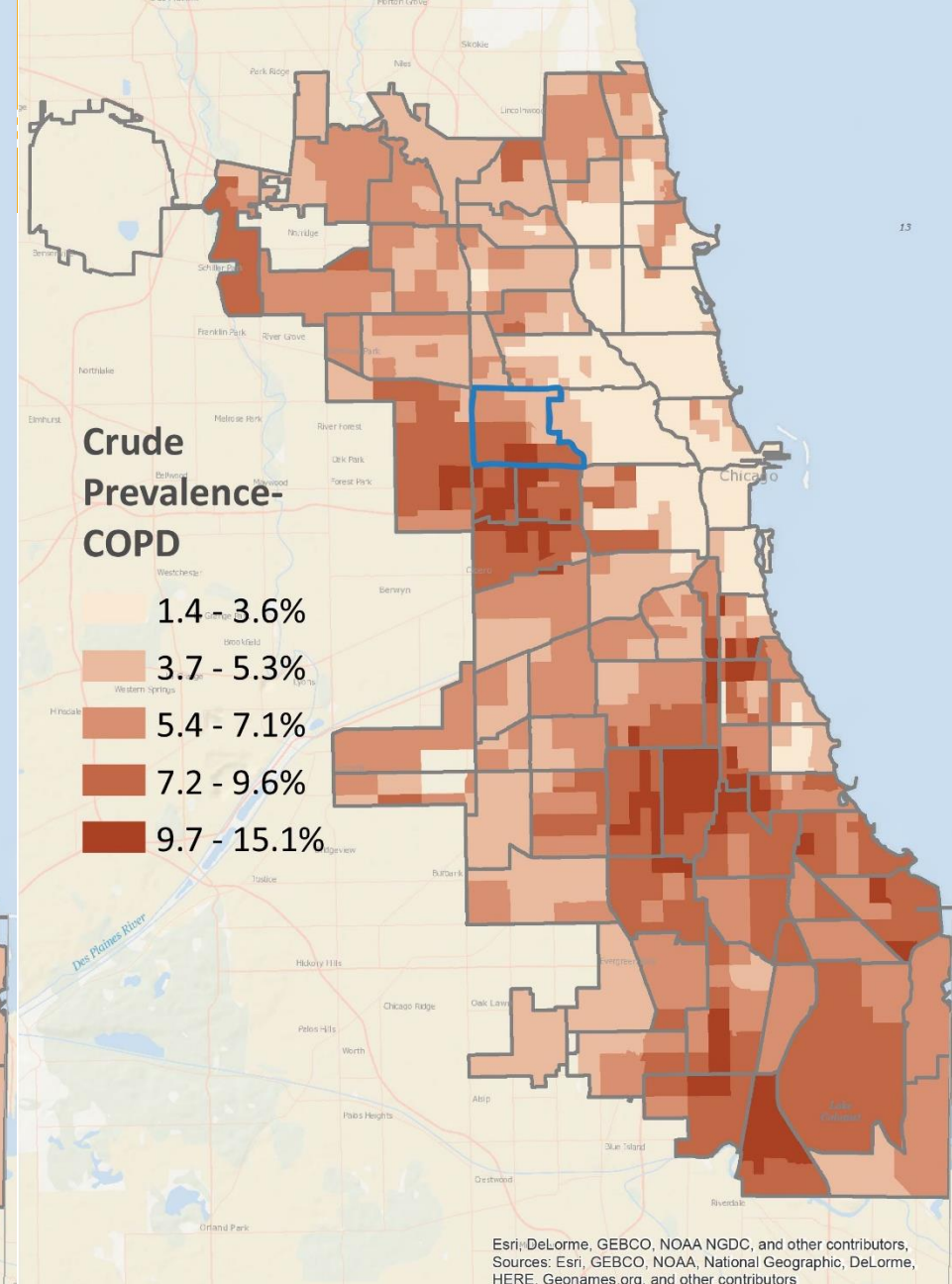
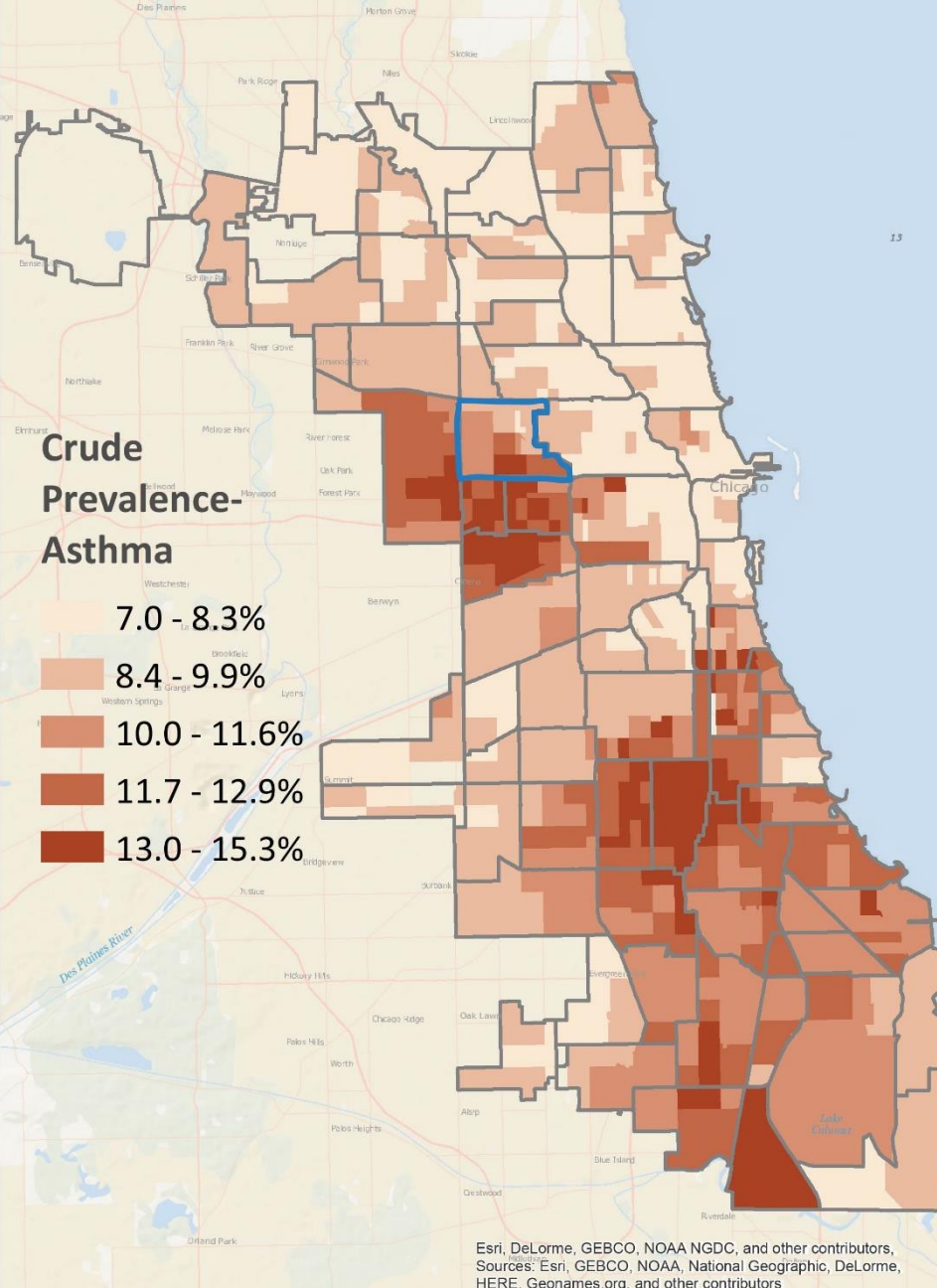
Diagram source: Tohn Environmental Strategies; The National Center for Healthy Housing; Three³.
“Occupant Health Benefits of Residential Energy Efficiency”



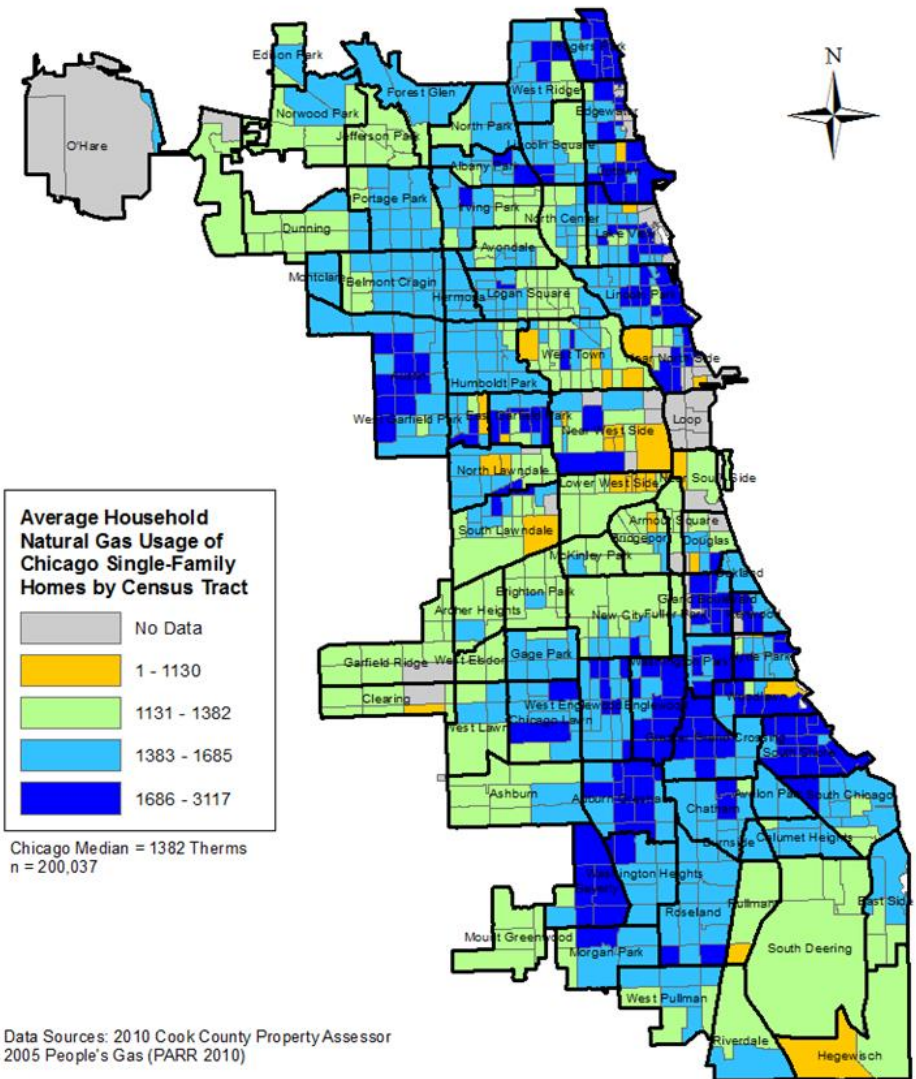
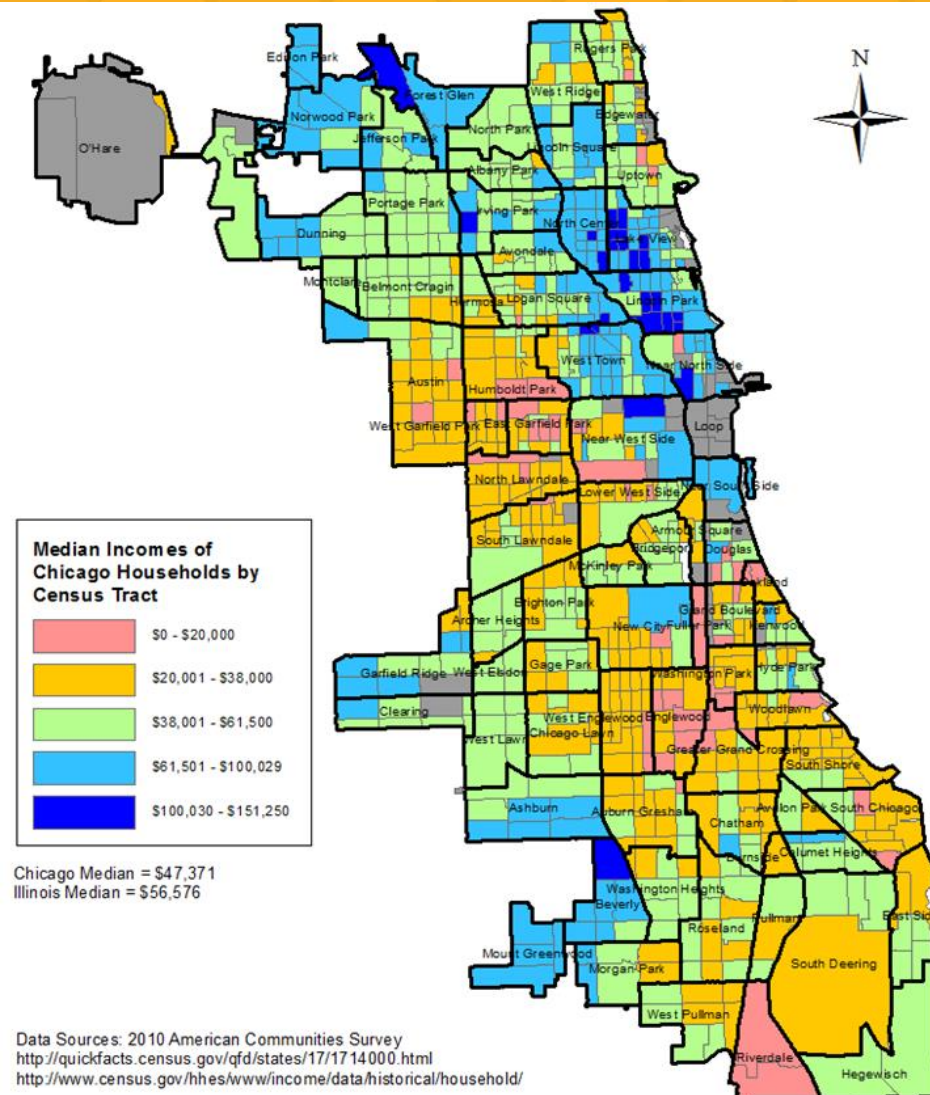
Short Distances = Large Gaps in Health



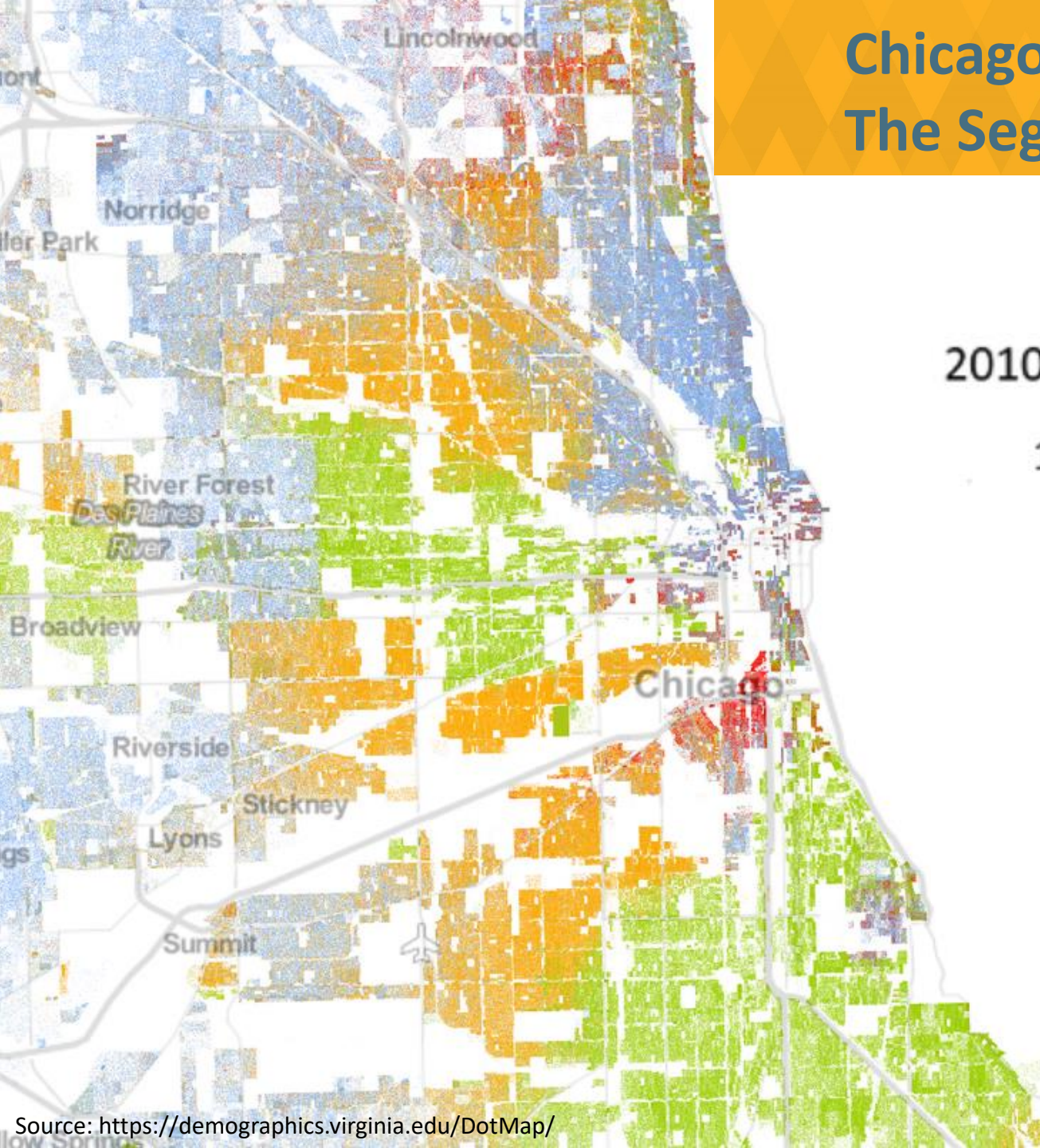




Energy Cost Burden



Chicago – The Segregated City...



2010 Census Block Data

1 Dot = 1 Person

- White
- Black
- Asian
- Hispanic
- Other Race / Native American / Multi-racial



Healthy and Affordable Housing

Improving housing quality and lowering energy costs help low-income families avoid:

Unstable
Housing



For a very low-income family, the **average savings due to energy upgrades is 3%** of their income – helping to reduce housing costs and the impact of rising energy costs.¹

Food
Insecurity



When families spend less of their income on housing and utility costs, they can spend more on food, healthcare, child enrichment,² and other household needs.

Health
Problems



When the burden of utility bills is reduced, infants and toddlers are 23% less likely to be at nutritional risk for growth problems³ and adults experience an 18% decrease in hypertension rates.⁴



Why is health important to our mission?

1. Health and safety upgrades are a precursor to doing energy work. If we can address health issues in buildings, we can do more energy retrofits.

Audience Poll:

What are the most common health and safety issues you encounter in homes?



Why is health important to our mission?

1. Health and safety upgrades are a precursor to doing energy work. If we can address health issues in buildings, we can do more energy retrofits.
 - 2014-2017, 50% of applicants to Chicago Bungalow Association Energy Savers program for income-qualified single-family homes were rejected due to H&S issues.
 - Revised weatherization program under IL's 2016 Future Energy Jobs Act added H&S funding, and brought walkaway rate down to 15%.



Why is health important to our mission?

1. Health and safety upgrades are precursor to doing energy work. If we can address health issues in buildings, we can do more energy retrofits.
2. We know from the research side that when we do energy work well, we improve occupant health outcomes.



Bridging Health and Energy: Indoor Air Quality



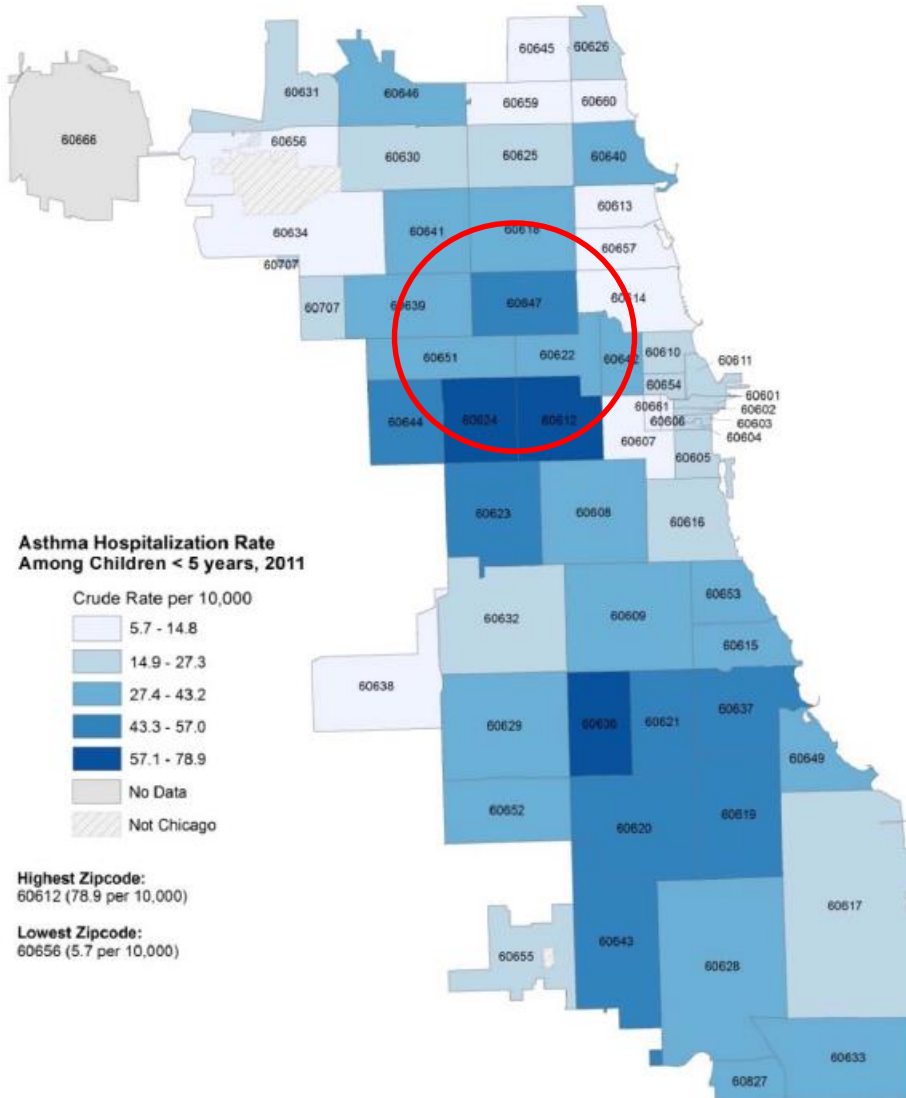
Indoor Air Quality

- We spend over 90% of our time indoors, exposed to pollutants originating from within the home.
- The EPA estimates that the average person receives 72% of chemical exposure at home:
 - Combustion appliance byproduct (carbon monoxide & particulates)
 - Ventilation problems
 - Mold
 - Toxic building materials and products

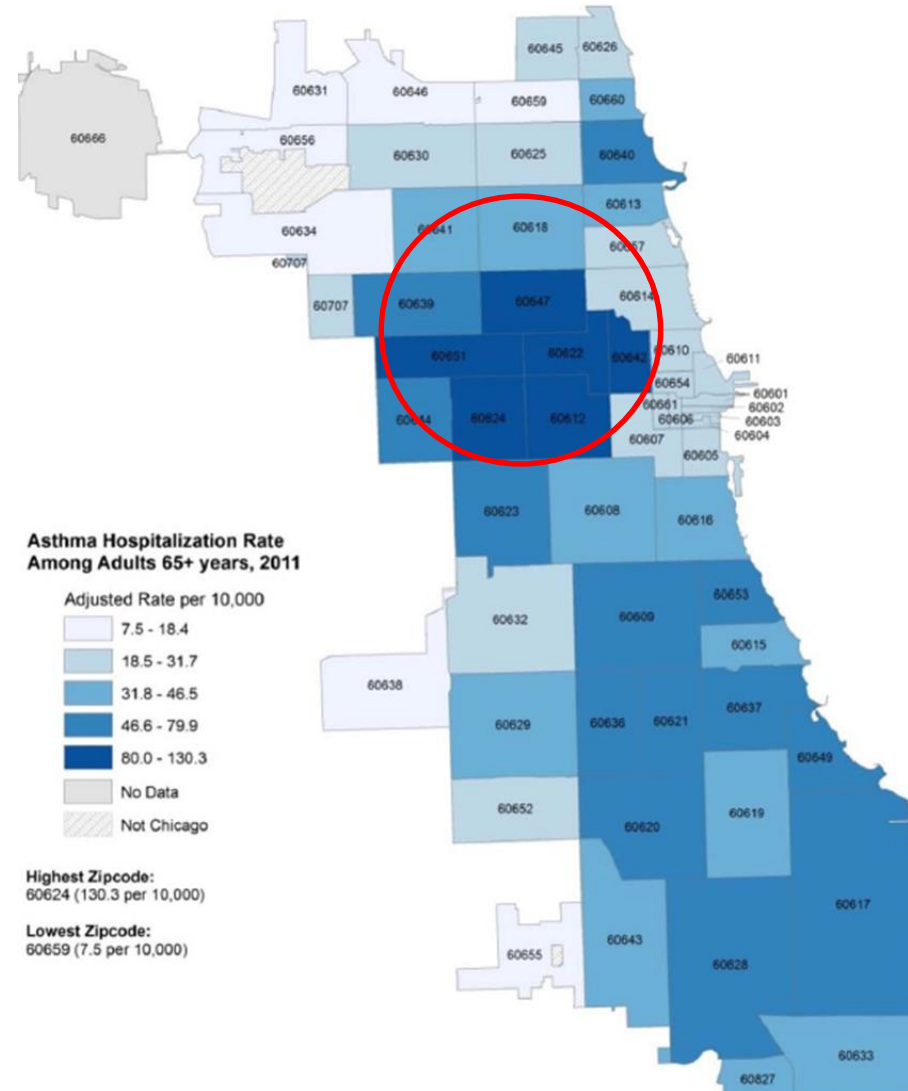


Asthma Hospitalization Rates

Children <6



Adults 65+



Project #1: Home-Based Asthma Intervention

Target Population:

- Asthma patients-hospitalized in the past 12 months
- Uninsured or Medicaid

Participants Receive:

- Personalized, home-based asthma education
- Healthy homes supplies (up to \$400)
- Minor home improvements to reduce exposure to allergens/asthma triggers (up to \$4,000)
- Enrolling in energy efficiency programs (up to \$6,500)



Project #1: Home-Based Asthma Intervention



Identifies and enrolls high-utilizing asthma patients, provides asthma education and PCP connection.



ELEVATE ENERGY
Smarter energy use for all

Leverages expertise in energy efficiency and weatherization sectors to assess and remediate environmental triggers of asthma.



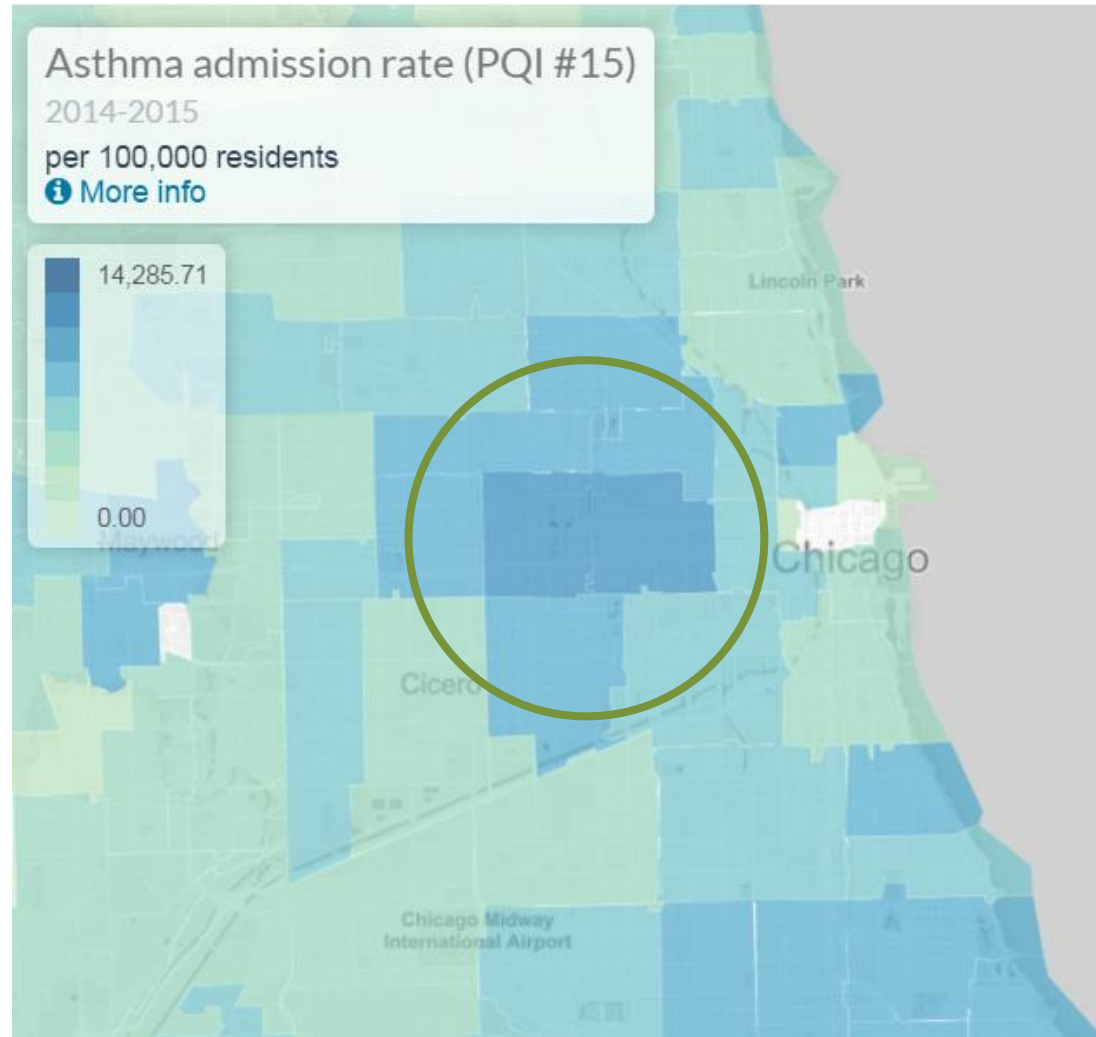
Green & Healthy Homes Initiative®

Provides comprehensive technical assistance modules, including stakeholder analysis, intervention planning, and sustainable funding options ranging from Pay For Success (PFS) financing to direct reimbursement.

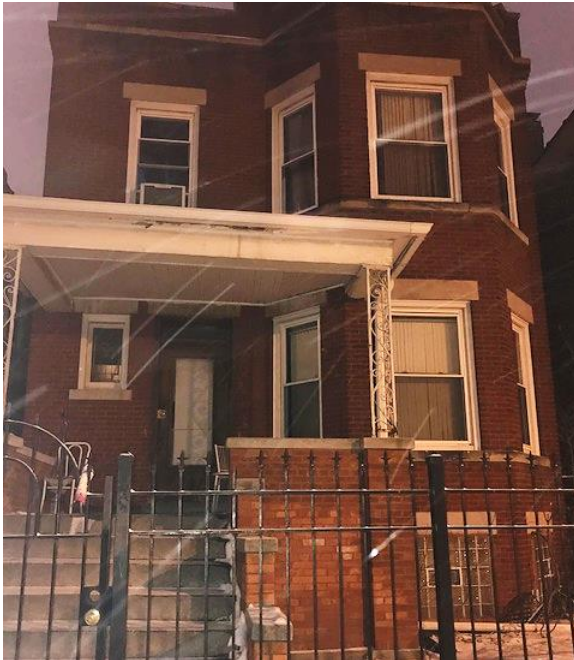


Project #1: Hospital Service Area

- A community served by the hospital suffered very high rates of hospitalization for asthma, especially among children
- Illinois rate of hospitalization among children was 156 per 100,000
- West Side Chicago rates for children ranged from 145 to 487 per 100,000



Program participant story



Project Cost: \$4,380

Primary Funding Sources:

Chicago Community Trust,
Community Benefits Dollars

Pre-Intervention:

- Two unit building
- Built 1907
- 55 year old woman and her 25 year old daughter both with asthma
- Both had been hospitalized in the past 6 months

Healthy Housing Interventions:

- Replaced water heater and new venting
- Boiler clean and tune
- Replaced venting for dryer
- Patched walls
- Removed carpeting and replaced flooring
- Addressed negative pitch on water heater
- Caulked and sealed bathtub
- Pest management
- Provided Healthy Homes supplies

Project #1: Combustion Safety

Before



After



Disconnected flue vent for the water heater. Deadly carbon monoxide is being emitted to the basement when it should be vented to the outside.



Project #1: Preliminary Results

- **19 out of 20** participants **improved their Asthma Control Test (ACT) score**
- **18 out of 20** reached a **score of at least 19**. (19+ =participant has “controlled” asthma)
- The average improvement was 7.11 points—a **56% improvement over average baseline ACT score**
- **72%** of those who responded **experienced reduced interference with work and school** due to asthma and a **reduced reliance on their rescue inhaler**



Project #2: Breathe Easy Study

- 3-year study funded by the Department of Housing and Urban Development (HUD Healthy Homes Technical Study)
- Learn about improving ventilation systems and indoor air quality in homes and the impact it can have on respiratory health (asthma).



Project #2: Breathe Easy Study

Study details:

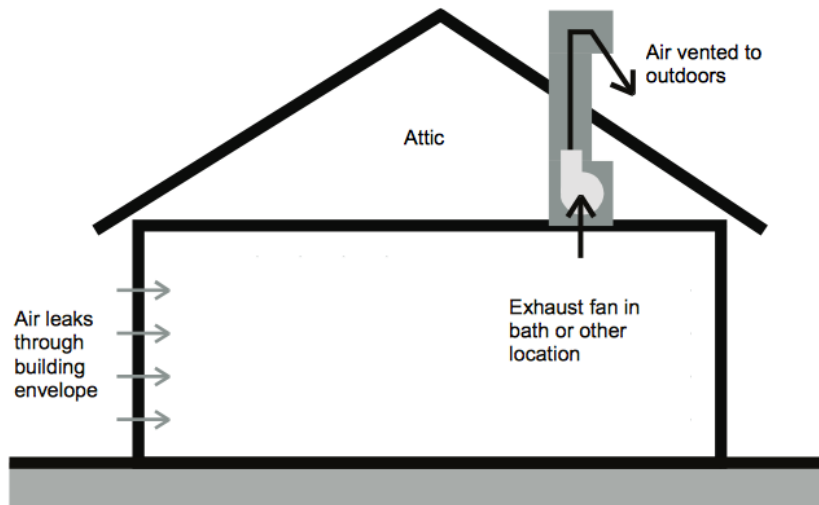
- Install 3 types of ventilation systems to provide meet ASHRAE 62.2 standard for air flow rates
- Measure pre (Year 1) and post (Year 2) indoor air quality and asthma symptoms
 - And real-world cost of installation

Project status:

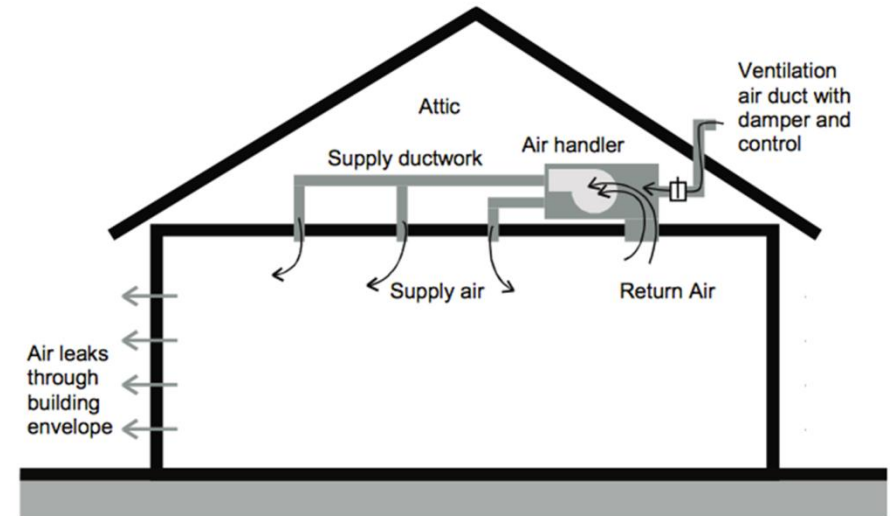
- 41 homes enrolled in the study (54 participants with asthma).
- Installation complete; beginning post-install data collection



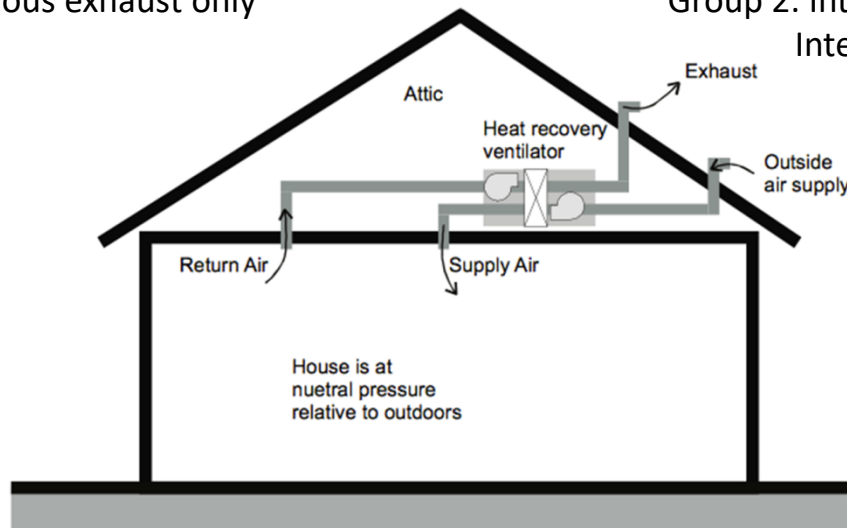
Project #2: Ventilation systems



Group 1: Continuous exhaust only



Group 2: Intermittent Central-Fan-Integrated Supply



Group 3: Balanced Supply and Exhaust with ERV



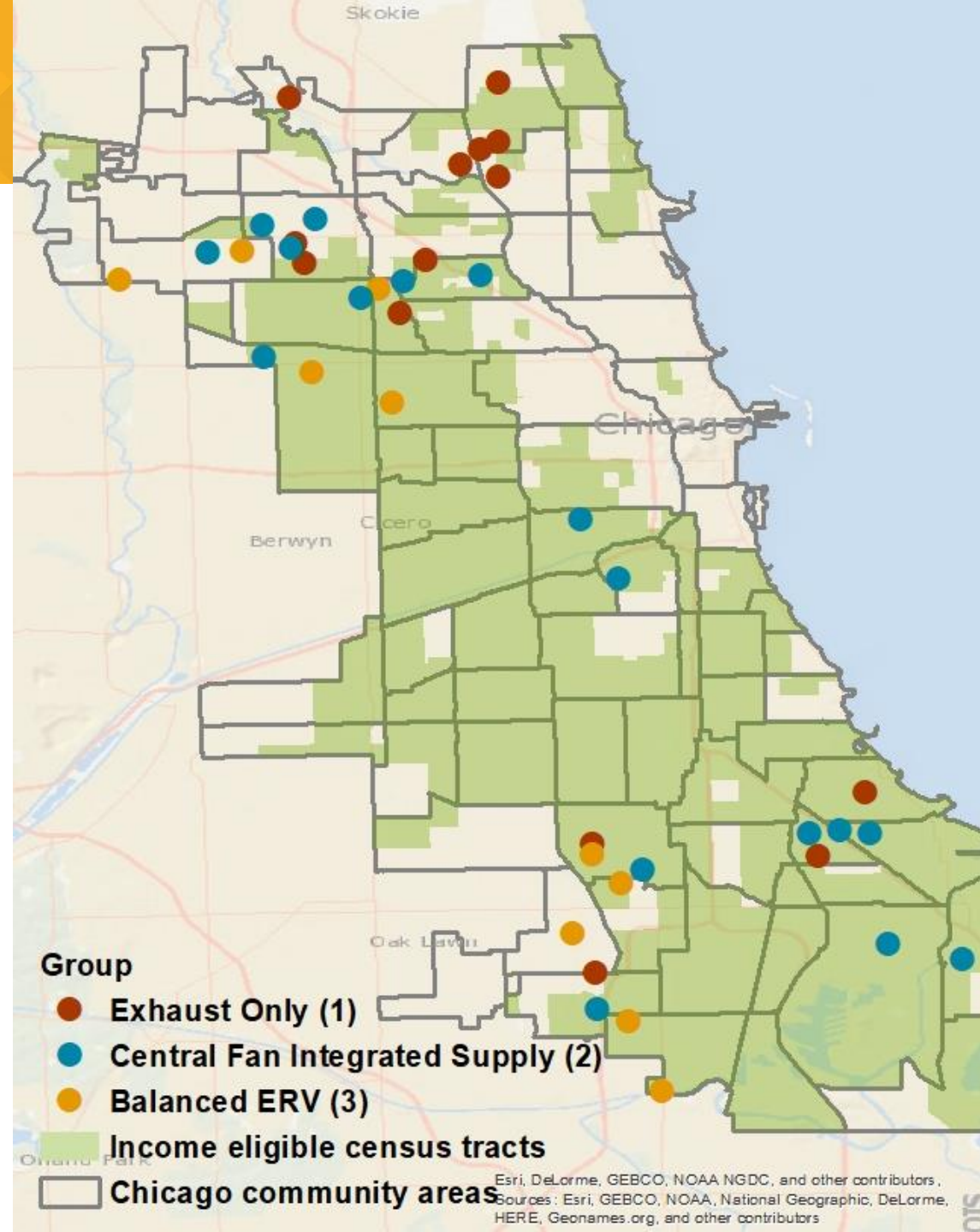
Project #2: Study Homes

- 27 homes (66%) are iconic Chicago bungalows
- 15 homes (37%) have previously been weatherized
- 31 homes (76%) have health and safety issues, such as improperly vented combustion appliances, mold or dampness, chipping paint, or other issues

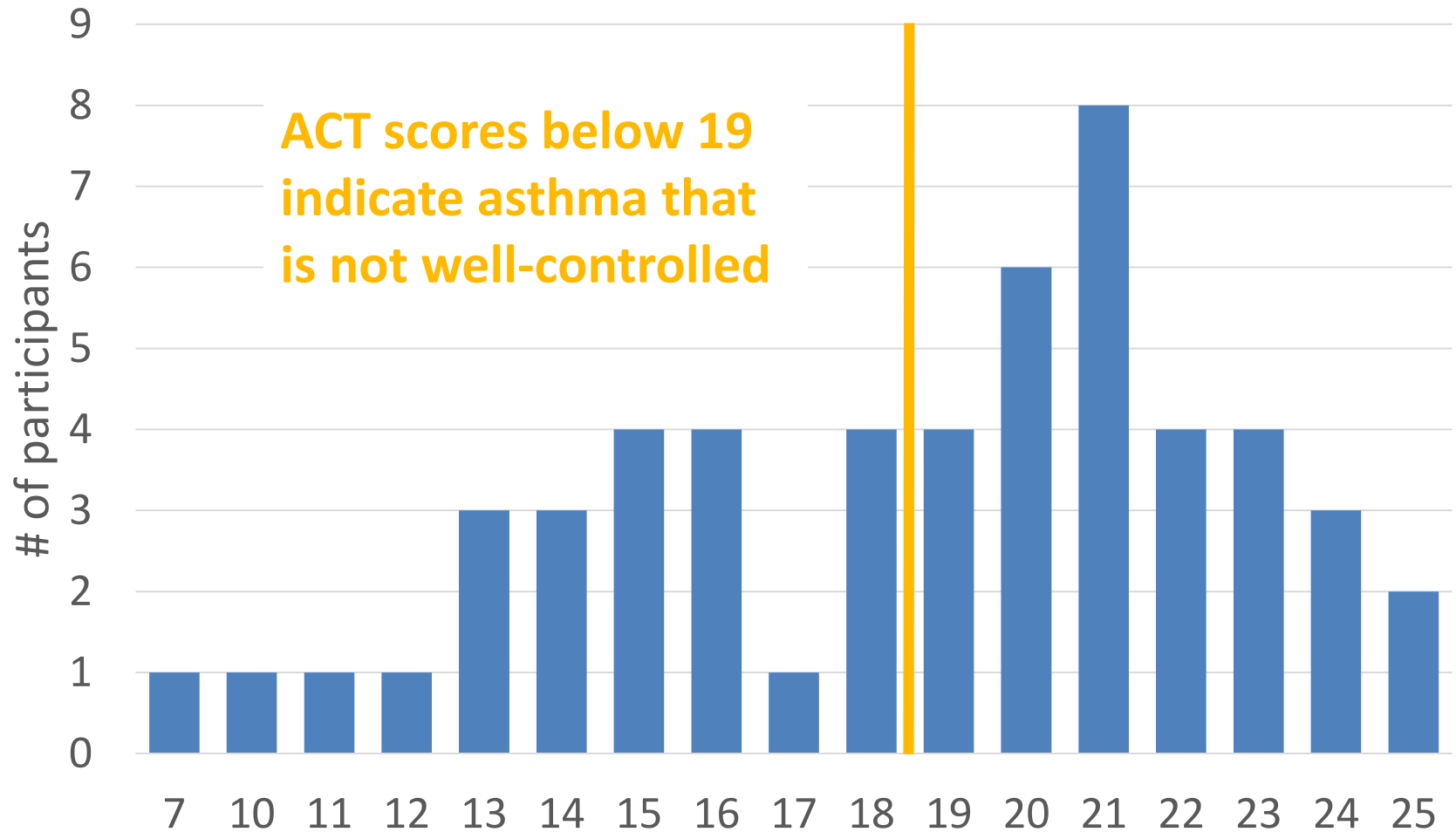


Project #2: Study Homes

- 28 homes (68%) are in low-income census tracts that are income-eligible for free energy efficiency work.



Project #2: Median ACT Score (Year 1)



Project #3: Health and Safety (Utility)

- \$200,000 invested by ComEd (electric utility) for H&S on our income-eligible multi-family energy efficient program
- Remove barriers to making buildings more energy efficient



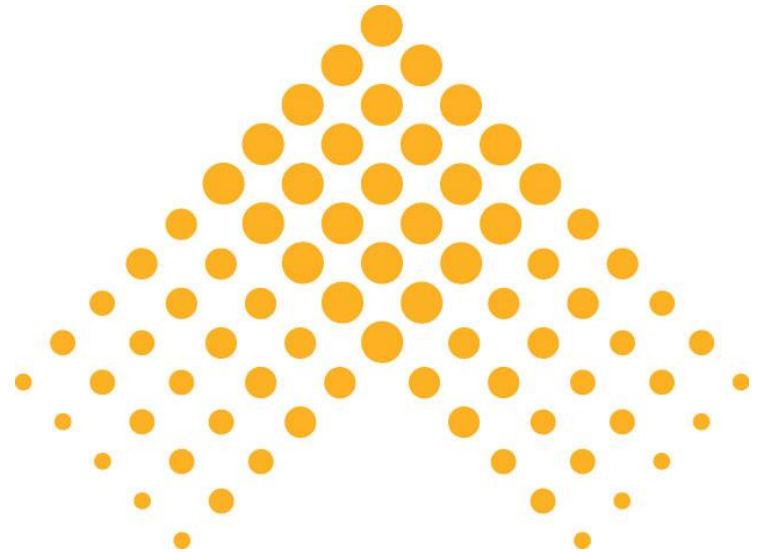
Questions? -- Stay in Touch

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