



Weatherization Leveraged Partnerships Project

*National hub for the 1,000 Community Action Agencies and
700 Weatherization Subgrantees*

Kathryn Maddux, Project Director

Meg Power, PhD, Senior Advisor

Weatherization Leveraged Partnerships Project

Funded by the Department of Energy to offer training and assistance to the WAP Network in designing private partnerships and programs that leverage the WAP.



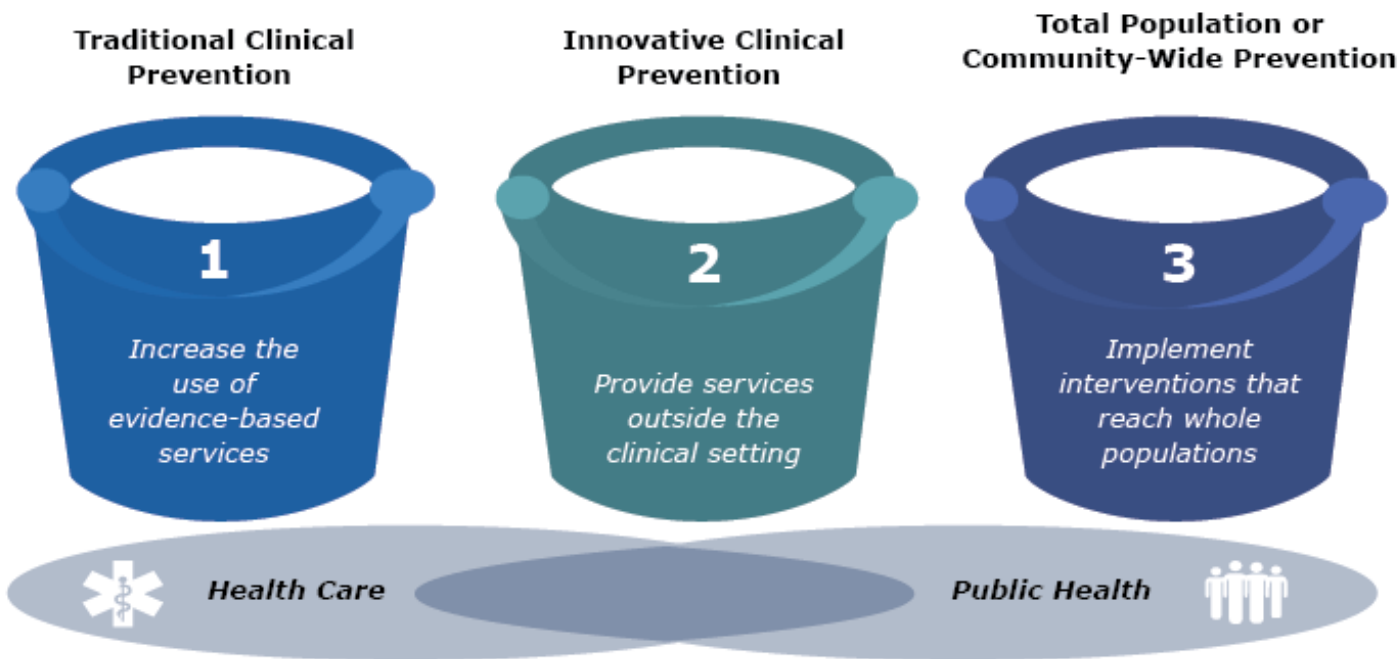


Weatherization and Health Partnerships

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Community Health Administration

PUBLIC HEALTH 3.0

WHAT IS PUBLIC HEALTH?



To read more: <http://journal.lww.com/jphmp/toc/publishahead>



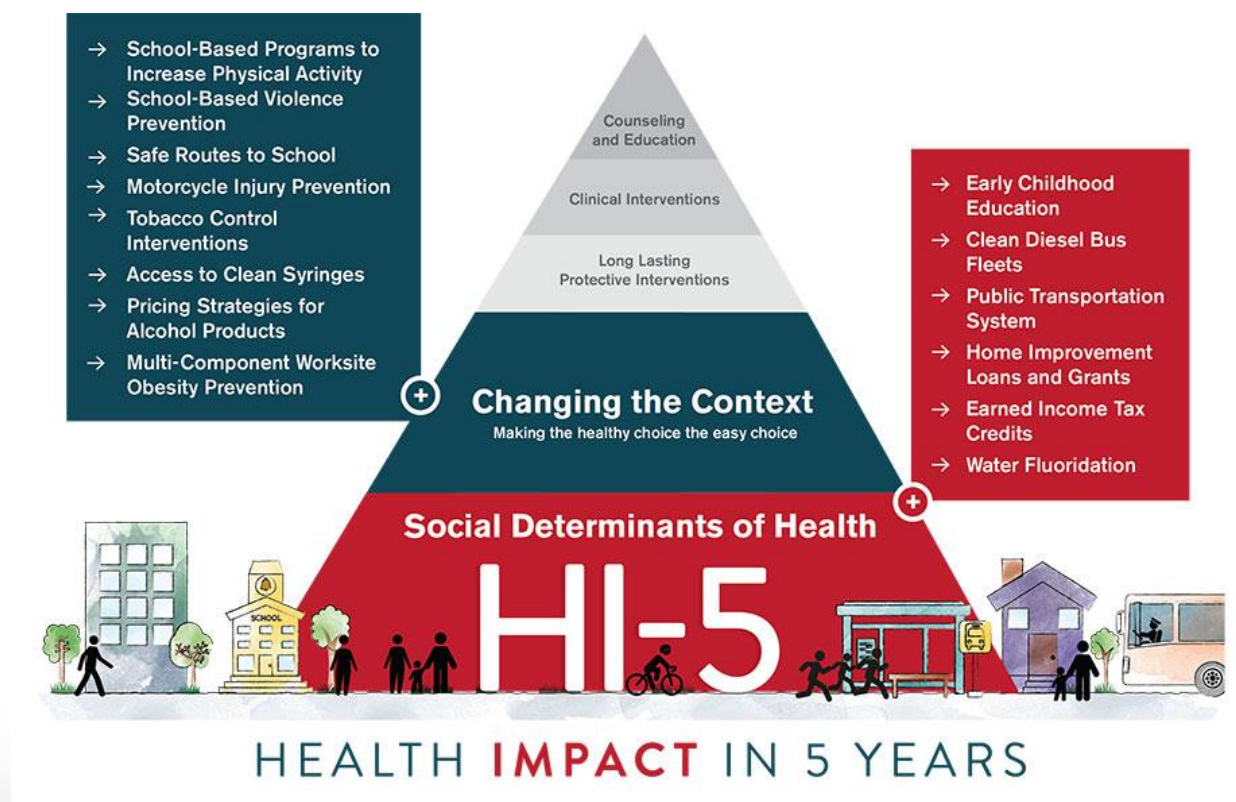
PUBLIC HEALTH 3.0

WHAT ARE THE SOCIAL DETERMINANTS OF HEALTH?



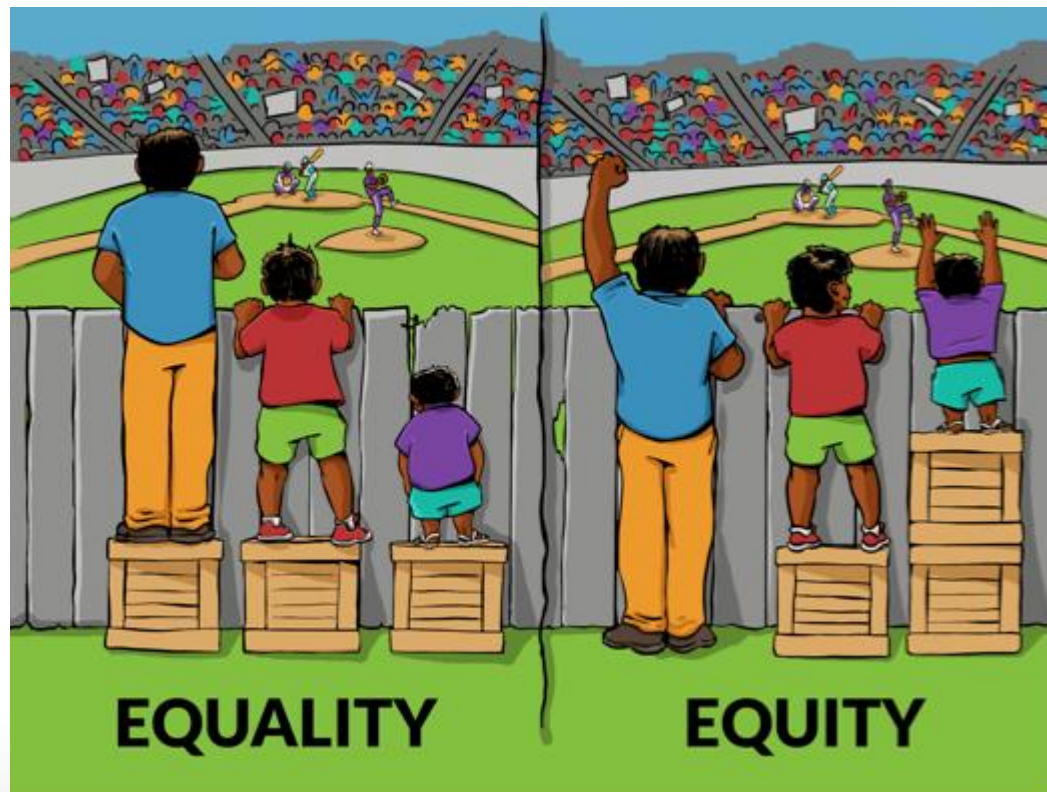
PUBLIC HEALTH 3.0

HOW DO WE MAKE THE BIGGEST IMPACT?



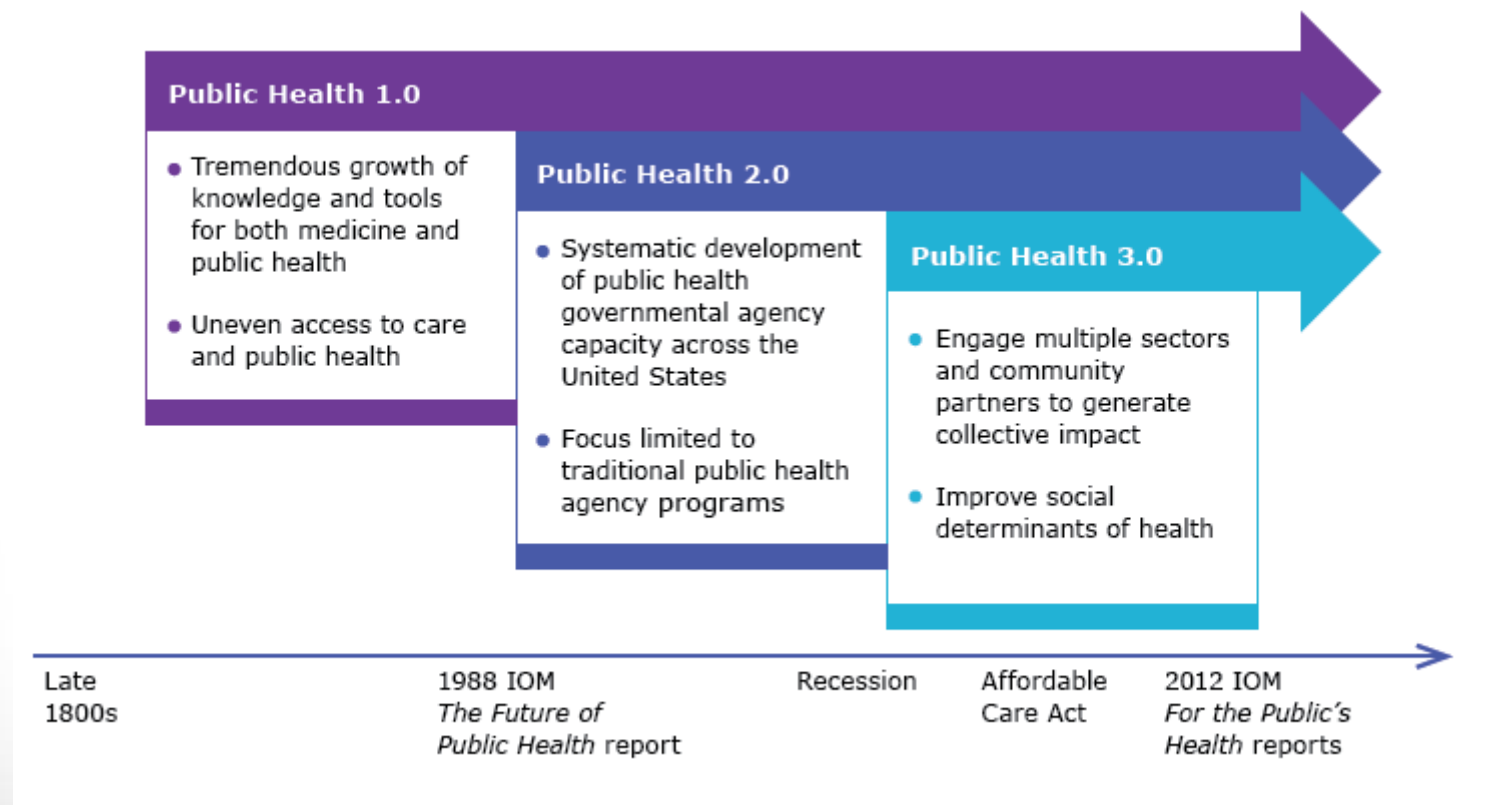
PUBLIC HEALTH 3.0

WHERE DO WE PUT OUR RESOURCES?



PUBLIC HEALTH 3.0

WHAT IS THE ROLE OF THE HEALTH DEPARTMENT?



DC HEALTH

VISION STATEMENT:

To be the healthiest city in America

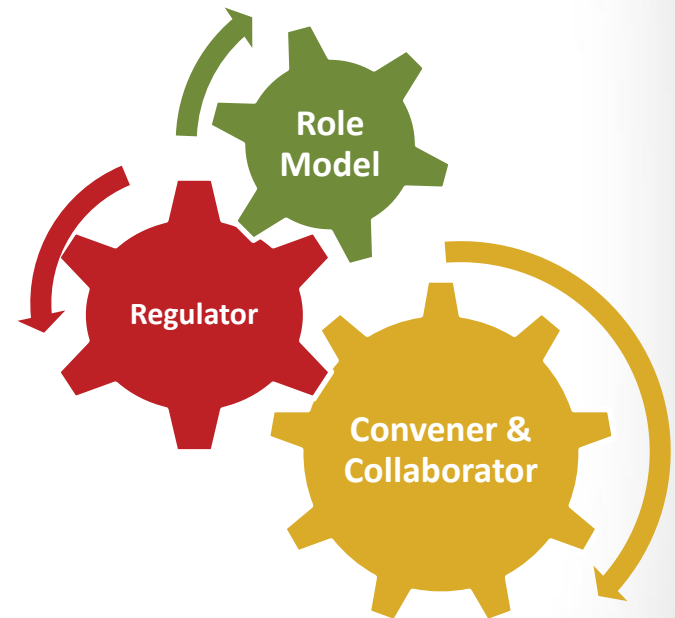
MISSION STATEMENT:

The District of Columbia Department of Health promotes health, wellness and equity across the District, and protects the safety of residents, visitors, and those doing business in our nation's capital.

DC HEALTH

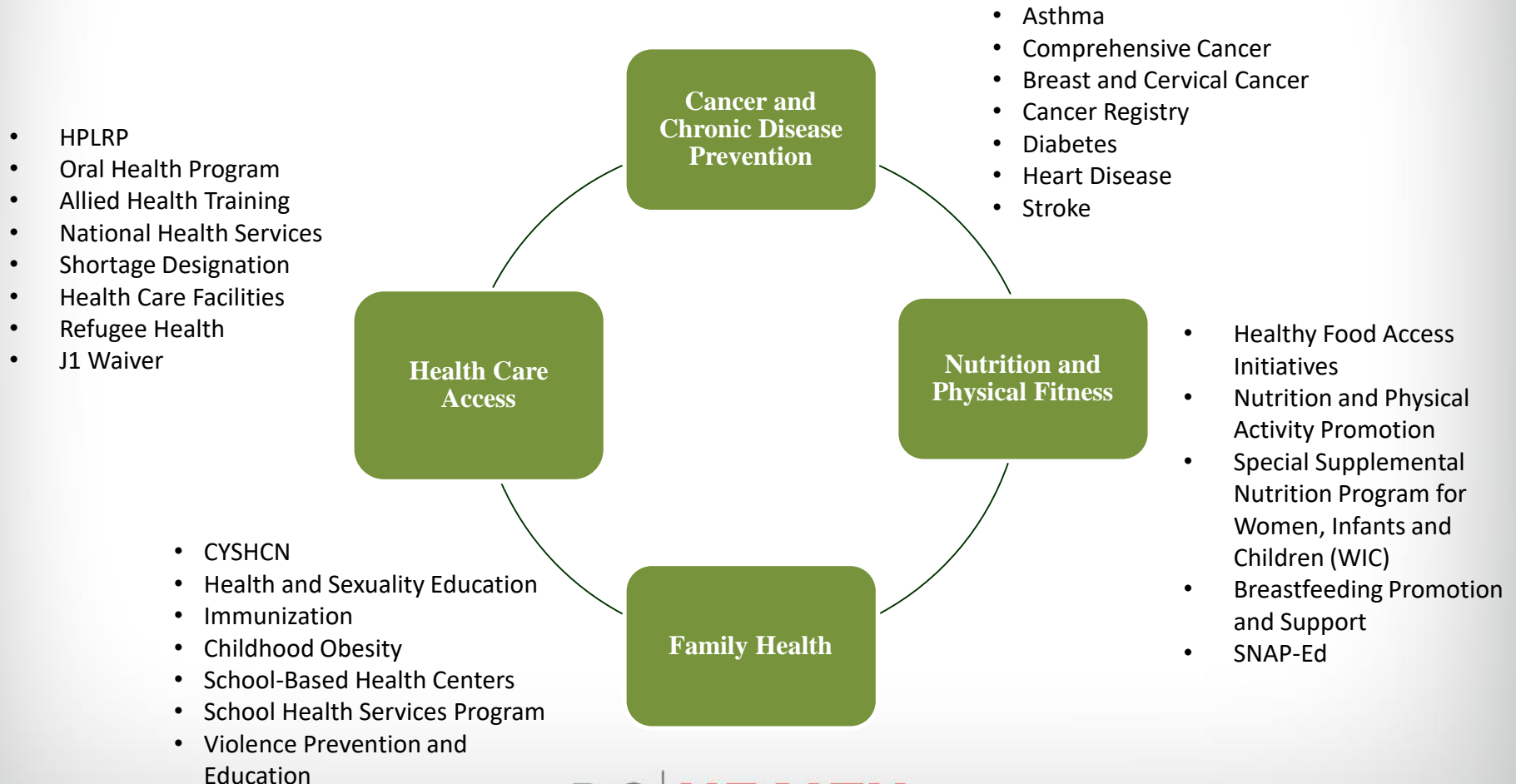
STRATEGIC PRIORITIES

- Promote a culture of health and wellness
- Address the social determinants of health
- Strengthen public-private partnerships
- Close the chasm between clinical medicine and public health
- Implement data-driven and outcome-oriented approaches to program and policy development



DC HEALTH

COMMUNITY HEALTH ADMINISTRATION



PUBLIC HEALTH FUNDING

Federal:

- Centers for Disease Control and Prevention
 - Chronic Disease Management
 - Cancer Control
 - Tobacco Control
- Health Resources and Services Administration
 - Healthcare Access
 - Maternal Child Health Block Grant – Title V of the Social Security Act
 - Maternal Infant and Early Childhood Home Visiting
- United States Department of Agriculture
 - Women, Infants, and Children Program

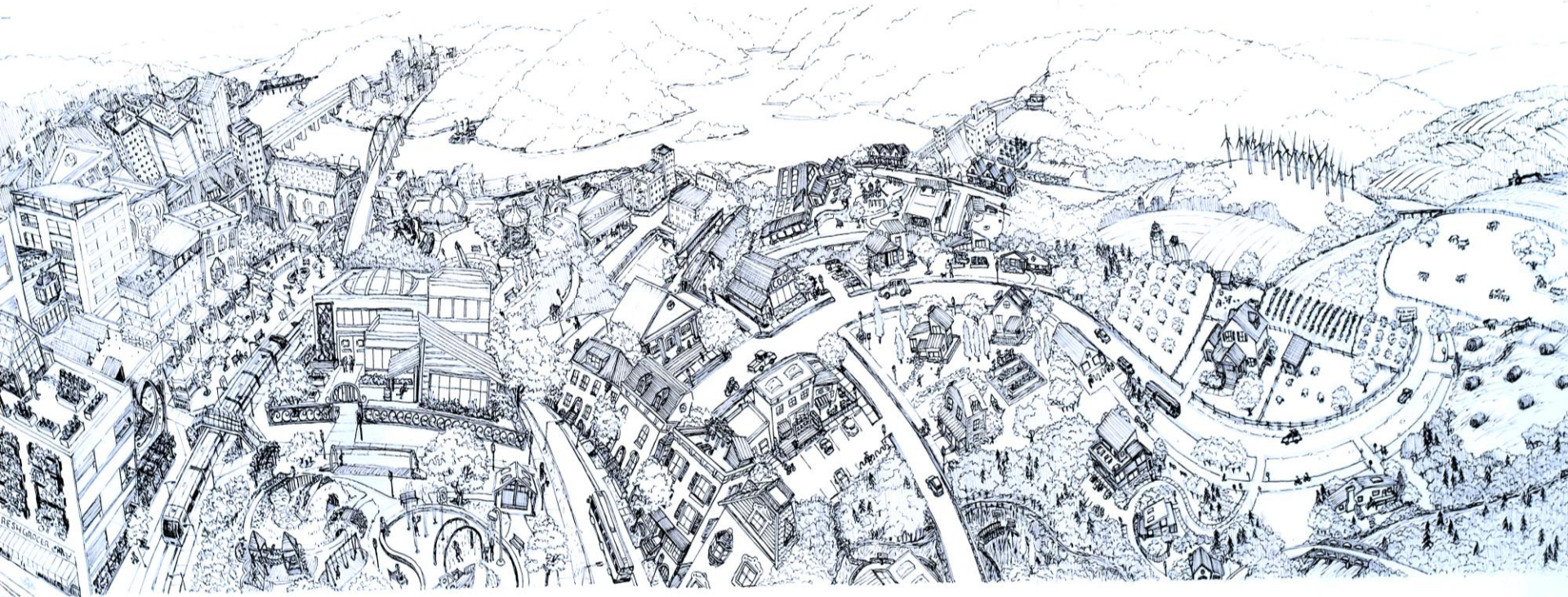
Local:

- Dependent on Jurisdiction



DC | HEALTH

Thank you!



OF HEALTH (SDOH) BENEFITS OF WEATHERIZATION

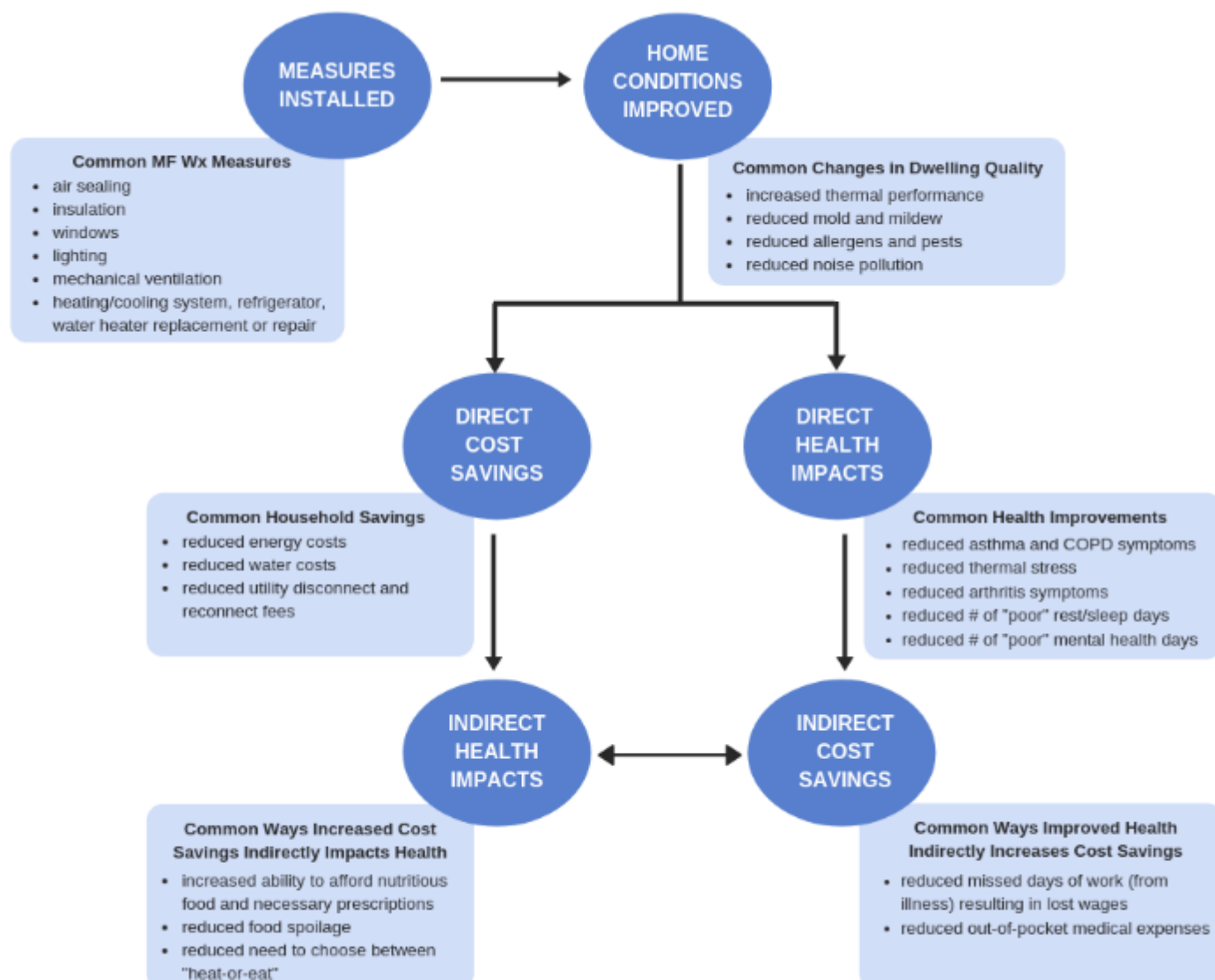
Bruce Tonn
Three³, Inc.
NASCSP
February, 2020



Outline

- How can weatherization improve health?
- Who is this important to?
- What is happening around the US?
- Our own research on the health impacts of weatherization
 - Quantitative evaluations
 - Monetizing health and SDOH benefits
 - Linking Hospitals and Weatherization in Knoxville, TN
- Moving forward

How Can Weatherization Improve Health?



Who benefits from these non-energy impacts of weatherization?

- All household members can benefit from improved health and wellbeing.
- Utilities and ratepayers through reduced costs (e.g.):
 - Disconnects and reconnects
 - Arrearages
- Health care sector benefits from:
 - New treatment option for some severely ill patients
 - Reduced costs for doctor's office, emergency department and hospital visits
- Public health sector benefits from:
 - Additional pathways to prevention of other medical issues such as thermal stress, CO poisoning, trips & falls, etc.

What is happening around the U.S.?

- The energy efficiency sector is moving towards acknowledging and, in some areas, embracing health-related non-energy impacts.
 - Energy and health conferences, and working groups sponsored by the American Council for an Energy Efficient Economy
 - Utility companies and Public Utility Commissions monetizing health-related non-energy benefits for rate cases.
 - State of Washington's Weatherization Plus Health Pilot Program
- The public health sector is beginning to take notice.
 - Robert Wood Johnson Foundation, UMICH School of Public Health
 - Kansas City Children's Health Hospital and healthy homes program
- It has been challenging to effectively engage the health care sector.
 - Discussions have focused on referrals of high-cost patients
 - National Academy of Medicine may sponsor a workshop

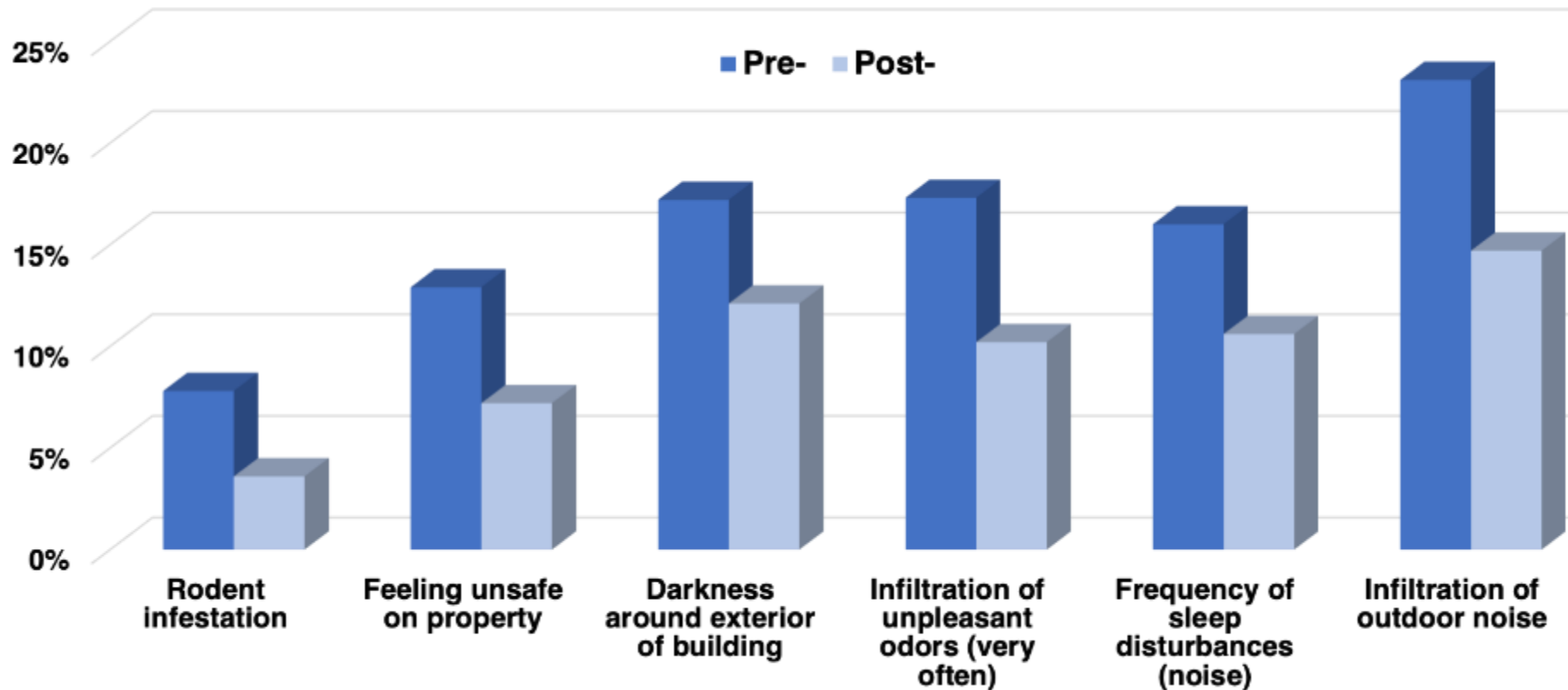
Our key health benefit projects include:

- Knoxville Extreme Energy Makeover (KEEM)
 - Funded by RWJF; single family homes
- Home Uplift (HU) Non-Energy Impact Study
 - Funded by TVA; across Tennessee Valley, including Knoxville
- Low-income Multifamily (LIMF) Health and Resilience
 - Funded by JPB Foundation & Massachusetts utilities; NE, MW
- Weatherization Assistance Program (WAP)
 - Funded by U.S. Department of Energy, national in scope
- Weatherization Plus Health (Wx+H)
 - Funded by Washington State; adds healthy homes measures; past study included analysis of linkable Medicaid data
- Linking Hospitals and Weatherization in Knoxville, TN
 - Funded by the Energy Foundation

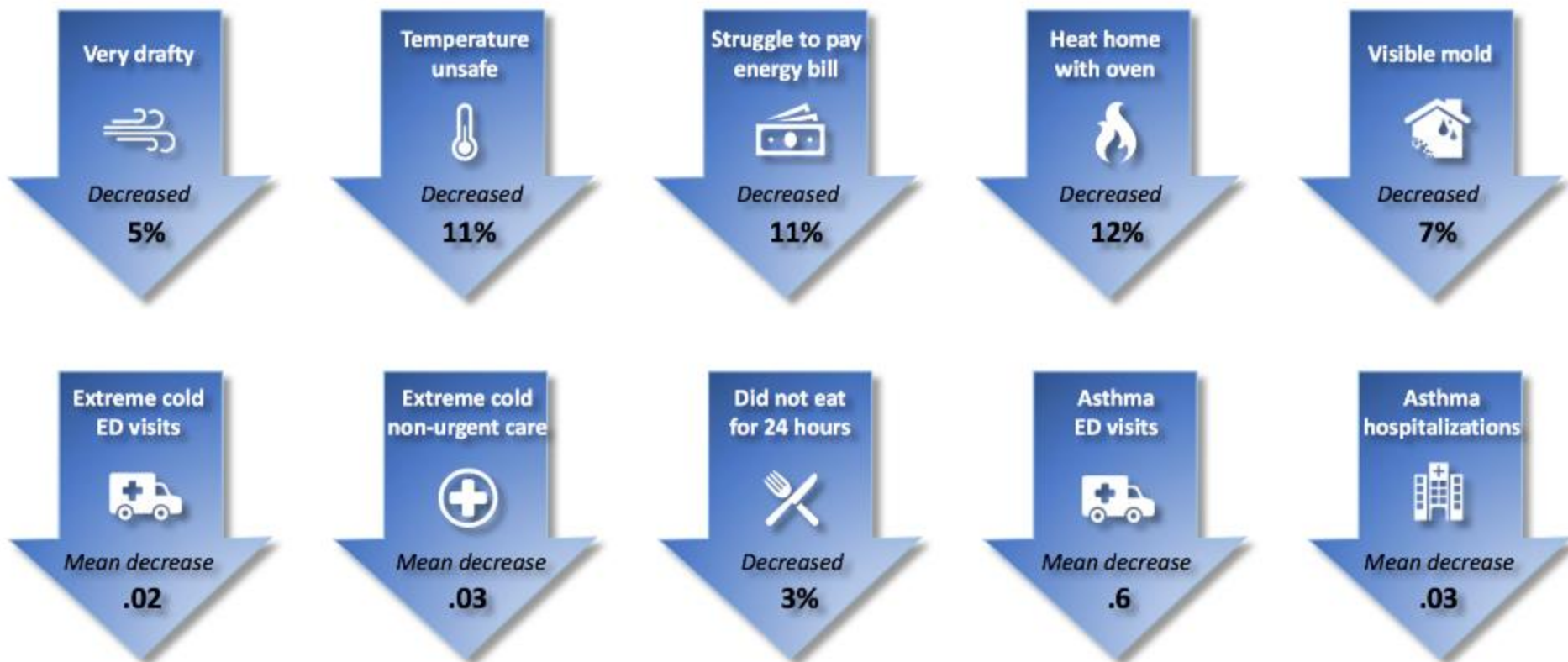
Baseline conditions of homes (pre-weatherization)

- Demographics
 - Typical main respondent is in late 50's; retired or otherwise unemployed
 - KEEM, LIMF, and Home Uplift engage a relatively high number of respondents of color
- Home Conditions
 - Home frequently kept at unsafe temperatures
 - Homes infested with pests and plagued by mold and mildew
- Health Conditions
 - High rates of chronic respiratory conditions and arthritis
 - Health care needed for issues related to thermal stress
- Household Budget Conditions
 - Hard to very hard to pay energy bills
 - Frequently tradeoff off purchasing food and prescriptions to pay energy bills

Dwelling Quality Improvements – LIMF



Health and Budget NEIs – LIMF



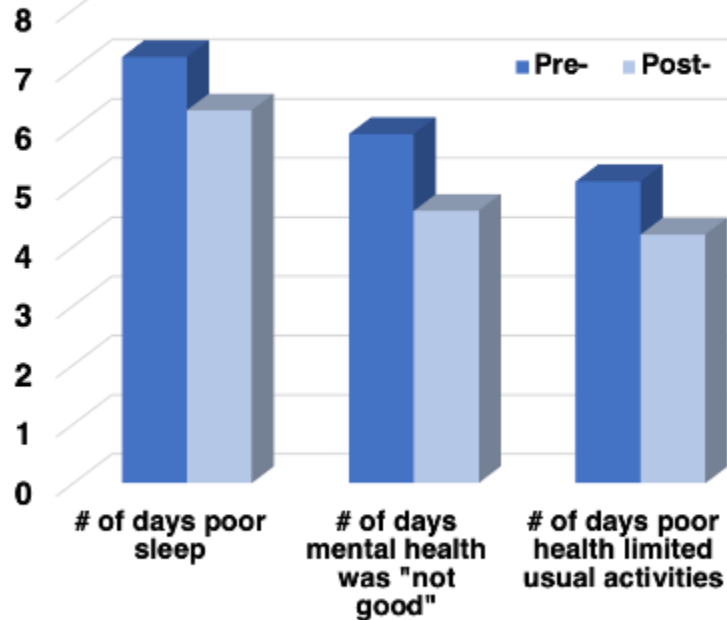
What we have found:

Changes in home conditions after weatherization

Physical Condition of Home	WAP	KEEM	LIMF
Home too drafty reduced	-39%	-18%	-5%
Outdoor noise reduced	-15%	-12%	-8%
Home less infested with cockroaches, other insects, spiders	-16%	-9%	-0.4%
Home is less infested with mice	-6%	-13%	-4.2%
Mildew odor or musty smell reduced	-9%	-12%	--
Mold in home reduced	-9%	-17%	-5.6%
Home less often kept at unhealthy temperatures reduced	-13%	-41%	-11%

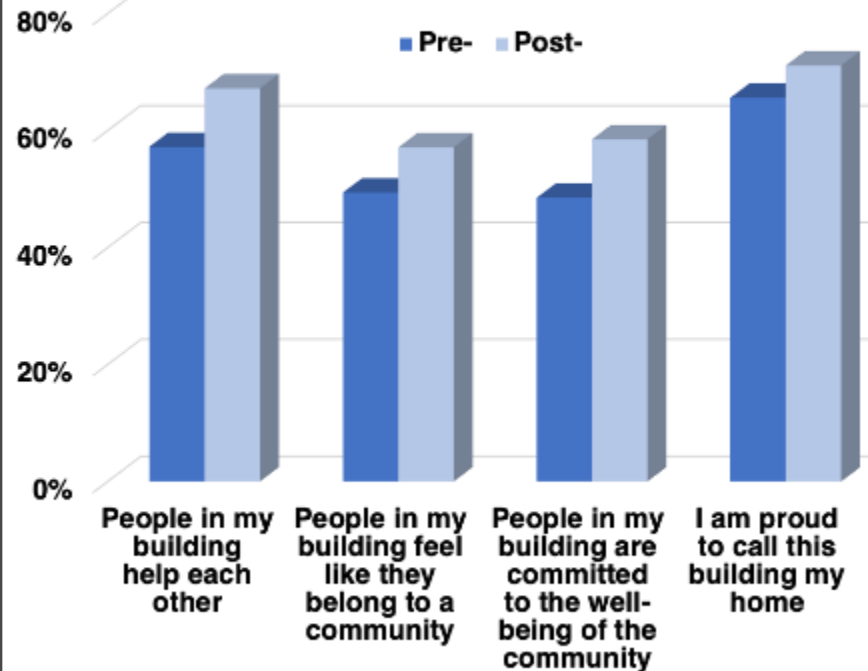
Wellbeing and Quality of Life Impacts – LIMF

(In the last 30 days, how many days...)*

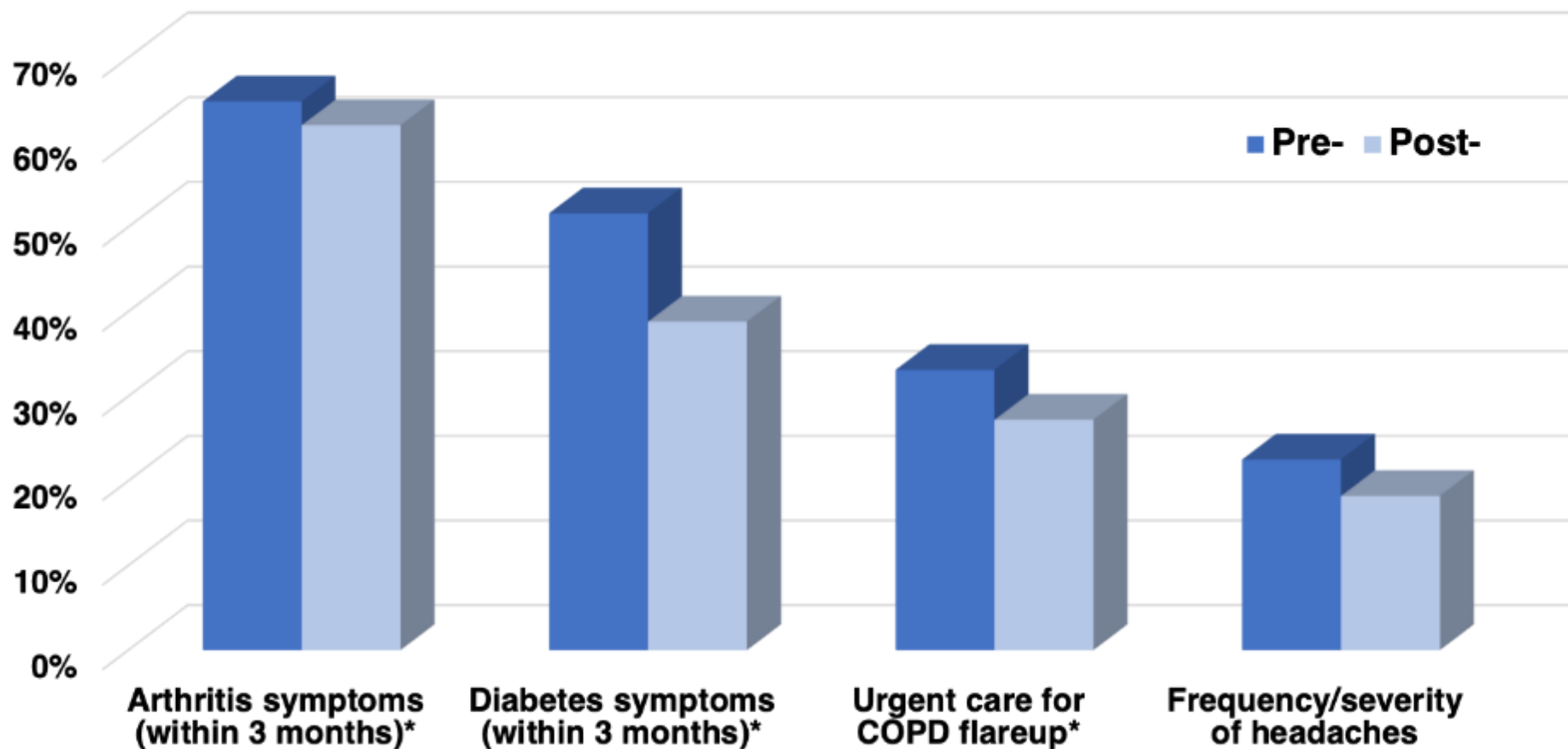


*Mean # of days

(Agree or strongly agree that...)



Exploratory Health NEIs – LIMF



*Of those that reported yes to being diagnosed with the specific chronic condition

What we have found:

Changes in health after weatherization

Health Impacts	WAP	KEEM	LIMF
Asthma symptoms (< 3 months since last) reduced	-11.8%	TBD	+4%
Asthma emergency department visits reduced	-11.5%	TBD	-22%
Asthma hospitalizations reduced	-3.1%	TBD	-12%
Medical attention from being too hot reduced	-0.9%	0.0%	-0.4%
Medical attention from being too cold reduced	-1.7%	-2.5%	-2.3%
Number of days previous month physical health not good reduced	-4.9	-1.2	NA
Number of days previous month mental health not good reduced	-4.4	-3.5	-1.3
Number of days previous month did not get enough rest or sleep reduced	-5.1	-2.2	-0.9

What we have found:

Additional observations about health

- We are observing some positive impacts in these areas
 - Reductions in frequency and magnitude of:
 - headaches
 - arthritis symptoms
 - diabetes symptoms
 - Improvements in oral health
- Many households' health can be at risk due to power outages
 - Electrical medical equipment
 - Refrigerated medicines
 - Spoiled food from refrigerator outages

What we have found:

Changes in budget conditions after weatherization

Survey Item/Group	WAP	KEEM	LIMF
Hard to pay energy bills reduced	-26%	-22%	-11%
Disconnect notices reduced	-10%	-8%	-4%
Did not buy food to pay energy bills reduced	-6%	-8%	-5%
Did not pay energy bills to buy food reduced	-8%	-3%	-4%
Received food assistance (e.g., WIC) reduced	-6%	+2%	-6%
Could not afford prescriptions reduced	-11%	-11%	-6%
Used one or more short-term, high-interest loans to pay utility bills reduced	-7%	+2%	-4%

MA Utility Wx Single Family NEI Study: Monetization Example

	Comparison	Control/ Treatment	Difference	Cost per	Cost* Difference
Urgent Care	0.97	1.20	-0.23	\$1,268	\$292
Hospital Overnight	0.27	0.69	-0.42	\$9,250	\$3,885
Emergency Department	0.22	1.21	-0.99	\$1,659	\$1,642

Cost of Care \$5,819

* Percentage with asthma 20.3%

* Percentage of asthma population with insurance 43%

* Percentage paid out-of-pocket for asthma population 7%

= NEI (\$ per year per household benefit) \$35.55

WAP: Monetized health & household impacts

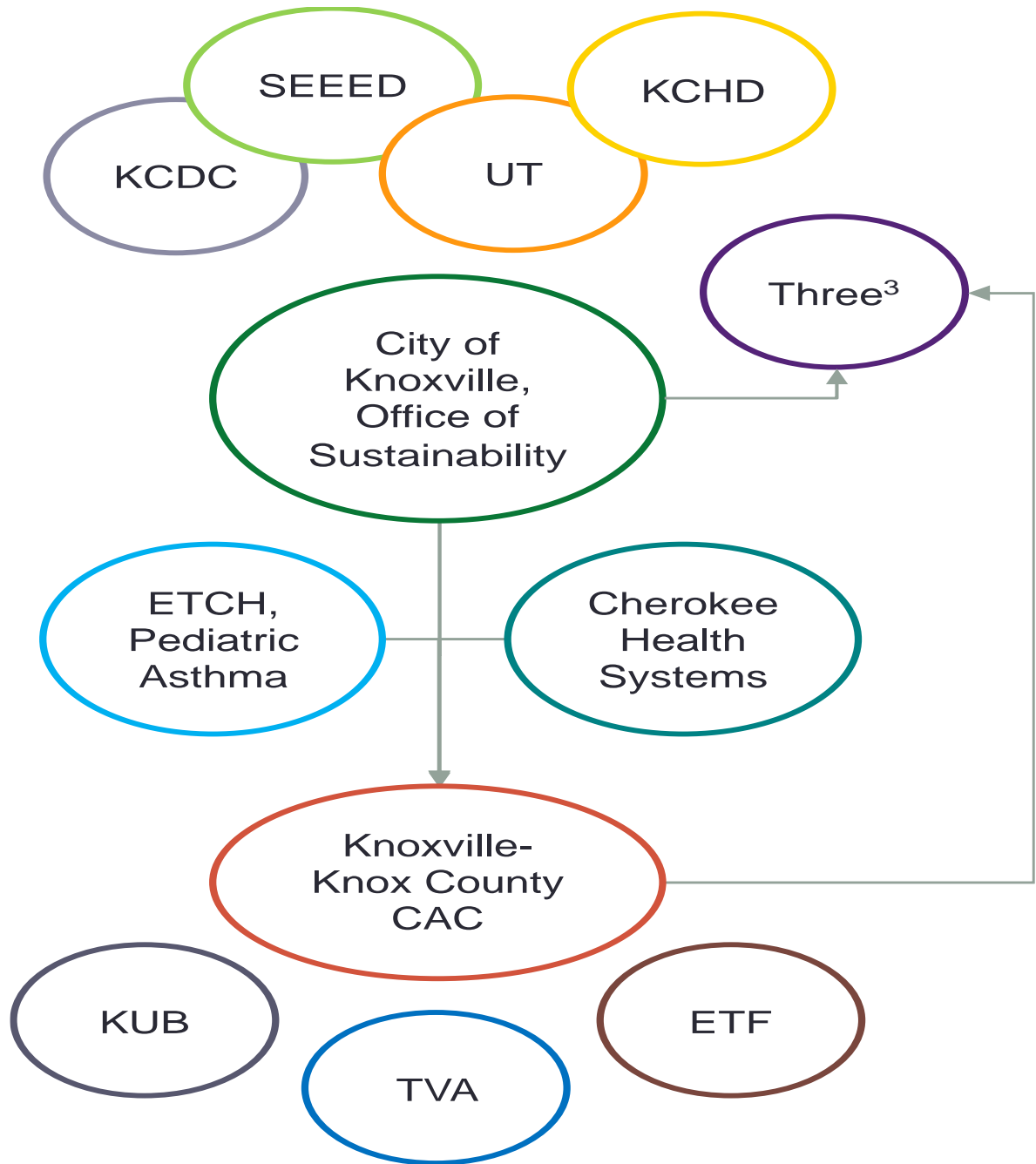
Non-Energy Impacts	Value
Asthma	\$2009
Thermal Stress-Cold*	\$3911
Thermal Stress-Heat*	\$870
Food Assistance Reduction	\$832
Reduction Missed Days at Work	\$201
CO Poisoning*	\$154
Improvement in Prescription Adherence	\$1929
Reduction in Use of Short-Term Loans	\$71
Home Fires*	\$831
Increased Productivity at Work Due to Improved Sleep	\$1813
Increased Productivity at Home Due to Improved Sleep	\$1329
Reduction in Low-Birth Weight Babies	\$198
Average Per Weatherized Home	\$14,148

*Includes value of avoided deaths

Linking Energy Efficiency, Health Care and Public Health Sectors: Energy Foundation Project

- Create new approach/system for linking the health care and energy efficiency sectors in Knoxville (funded by the Energy Foundation)
- Develop lasting relationships amongst stakeholders in Knoxville to make this happen
- Develop processes and protocols to refer patients from health care (Cherokee Health and East Tennessee Children's Hospital) to the local weatherization agency (CAC) to have their homes energy audited and then weatherized
- Complete 7 weatherization jobs using funds from the East Tennessee Foundation. These funds will not be encumbered with restrictions that CAC normally works under in an effort to get homes audited and weatherized quickly upon referral.
- Assess short-term health outcomes for patients whose homes were weatherized and the model's impacts overall

Stakeholders at Knoxville Mayor's Kickoff Meeting – Nov. 2020



Other Activities and Plans

- Weatherization Day
 - Met at CAC for: Wx tutorial, tour of training house, testimonials from COPD patients
- Meetings at Hospitals
- Development of Resources
 - Clinicians checklist to identify patients and homes; focusing on respiratory issues
 - IRB applications
 - Referral processes internal to each hospital
 - Consent forms
 - Energy & health audits
 - Determining measures to install in homes: wx, health homes, maybe fuel switching
- Make Referrals and Document Processes and Health Outcomes

Moving Forward

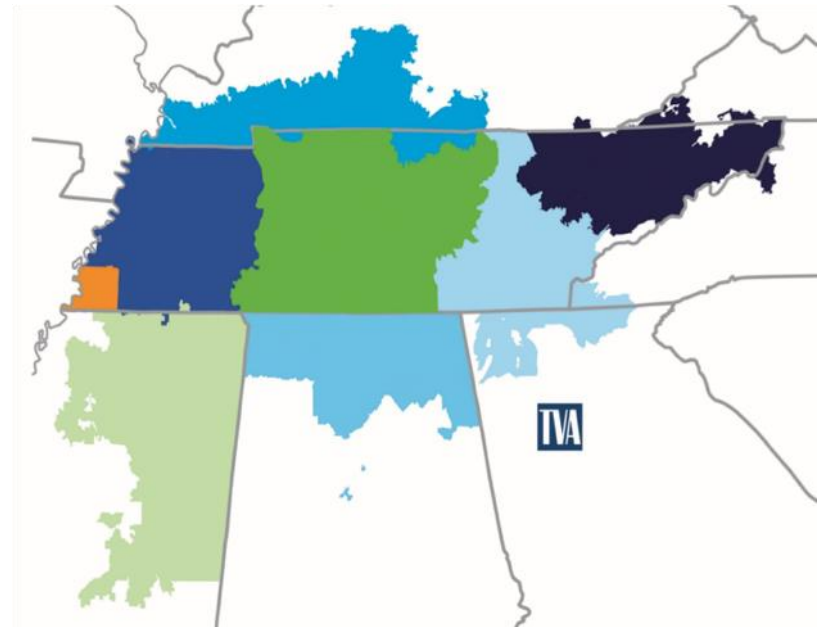
- Continue to conduct evaluations in additional climate zones, and rural areas
- Estimate benefits by measure – weatherization, healthy homes, maybe even climate change resilience
- Collect medical insurance claim and cost data
- Continue to work with health care and others on direct referrals of severely ill patients to wx programs
- Expand range of health issues addressed
 - Arthritis, mental health, PTSD, etc.
- Expand data collection approaches
 - IAQ monitoring
 - Direct measurements of human health

Weatherization and Health Partnerships

Beth Parsons,
Tennessee Valley Authority

About TVA

- Nation's largest public power producer
- 80,000 square-mile service area across seven states
- 154 local power company partners
- 10 million residents

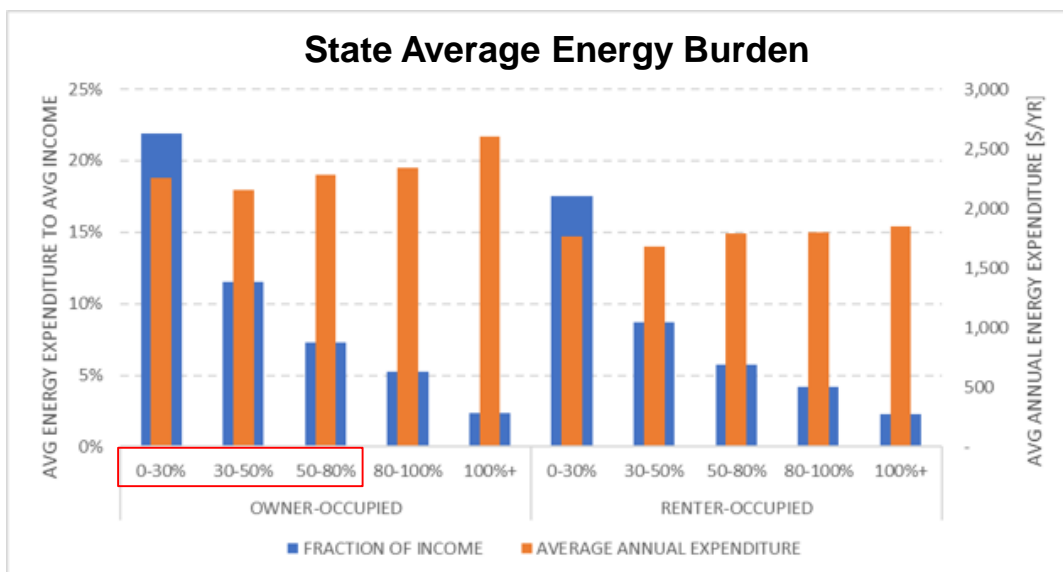


Energy | Environment | Economic Development



The Need in the Valley

Low-income households spend a **higher proportion of their income** on **energy costs** due to a high concentration of electric heating



A History of Low-Income Investment

Extreme Energy Makeovers projects in seven communities across the Valley from 2015 - 2017

3,476

Homes >20 years retrofitted

36%

Average energy savings per home

\$492

Projected annual electric bill savings

17M

kWh saved

\$40M

Investment made

4.3M

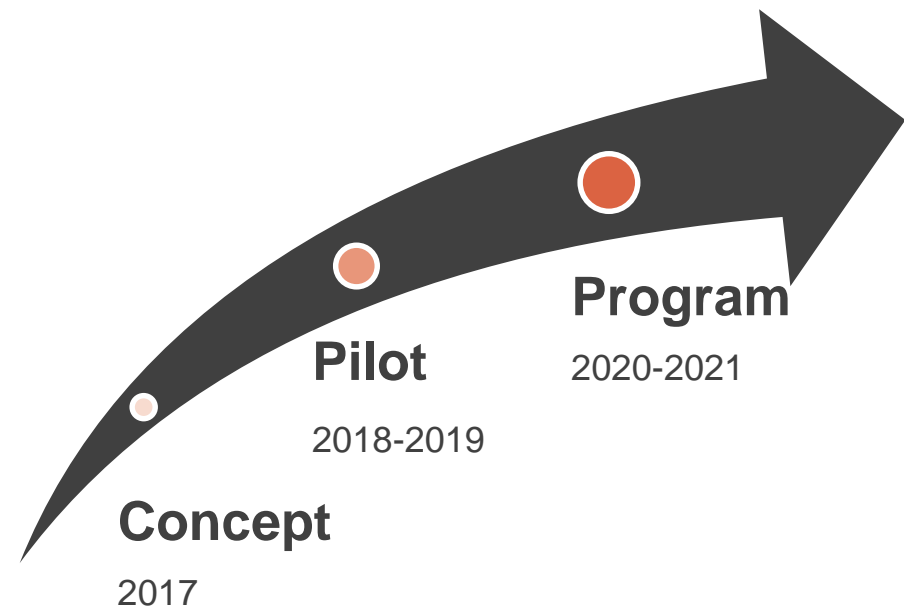
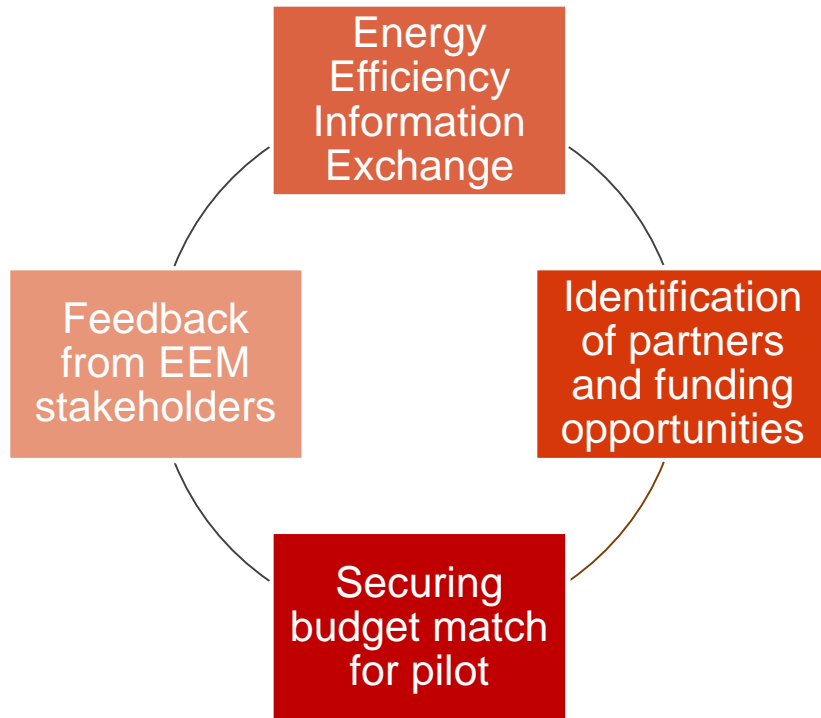
Square-feet of conditioned space improved

\$7,892

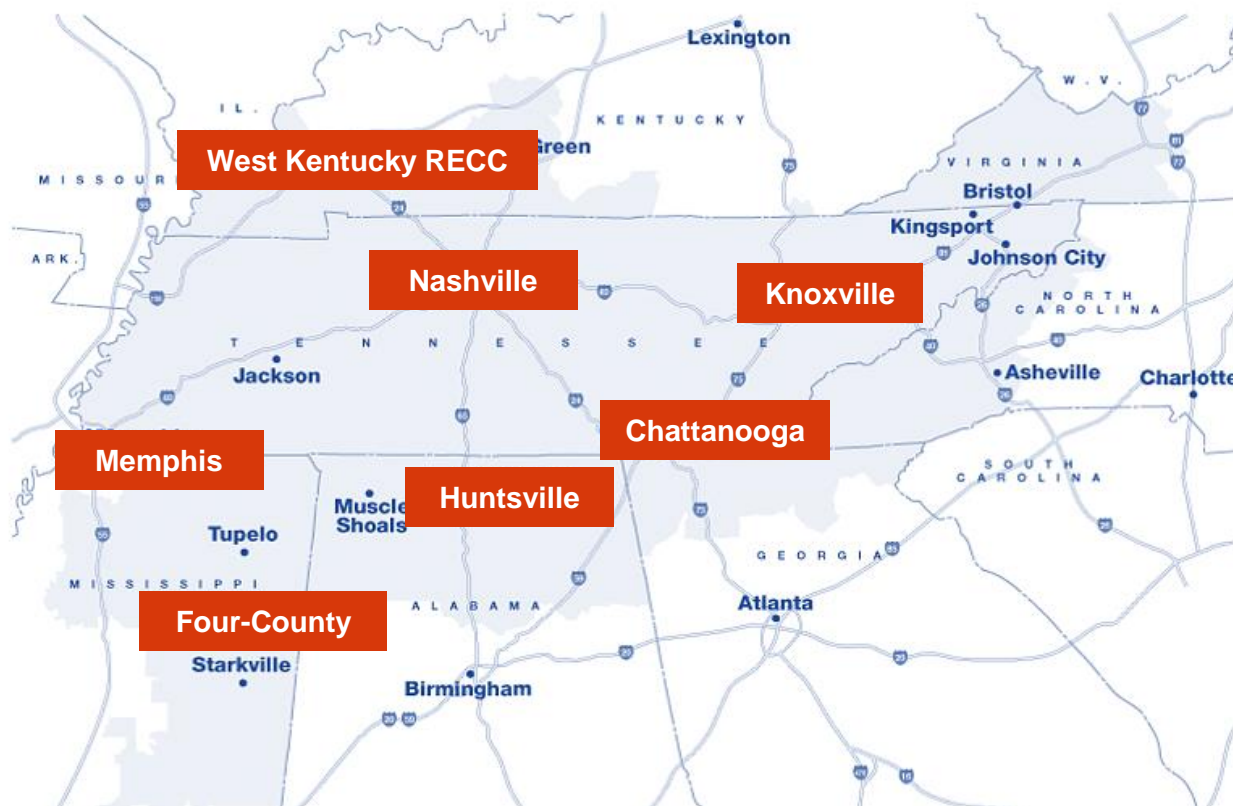
Average cost per home



Home Uplift Development



Home Uplift Pilot Locations



Home Uplift Results (as of Oct. 2019)

55.9 years

Average age of home served

1,342

Homes completed

1,268 ft²

Average square feet per home

\$8,071

Average cost per home



HVAC System



Duct System



Attic and Wall Insulation



Windows and Doors



Water Heating



Lighting



Air Sealing



Refrigerators



Community-Driven Funding Model

- Local Power Company Round Up Programs
- City Governments
- Local Housing Authorities
- State Energy Offices
- Competitive Grants (FHLB)
- Federal Grants (HUD, CDGB)
- Foundations
- Local Nonprofits
- Corporations

Quantifying Non-Energy Impacts

- Traditional EM&V supplemented by partnership with Knoxville-based research firm Three³
- Study seeks to quantify non-energy impacts (NEIs) of Home Uplift for participating homeowners
- Studied NEIs include asthma, COPD, thermal stress, trade-offs to paying energy bills, and quality of life
- Initial results show a strong correlation between weatherization and improved health



Data Gathered by Three³

Indoor Air Temperature

- Thermal stress
- Medical treatment
- Attribution (Heating & Cooling Equipment, Natural Disasters, etc.)

Dwelling Quality & Safety

- Moisture & mold
- Pests
- Drafts & dust
- Noise
- Lighting
- Fires
- Carbon Monoxide
- Food illness

Community & Resilience

- Social cohesion
- Preparedness
- Pride
- Crime
- Neighborhood quality

Health & Wellbeing

- Mental health
- Physical health and activity
- Asthma & COPD
- Lead poisoning
- Blood pressure & cholesterol
- Low birthweight infants
- Arthritis
- Diabetes
- Oral Health
- Trips & falls
- Quality of life

Energy Affordability & Trade-Offs

- Energy security & assistance
- Food security
- Use of short-term loans
- Trade-offs (e.g., prescription use)

There's Power in Partnerships

- Data exchange agreement with TennCare, Tennessee's Medicare provider
- Three³ will cross-reference TennCare data to identify and measure positive health outcomes of Home Uplift participants
- Potential for long-term utility-healthcare partnership model that promises to fundamentally transform the energy assistance model in the Southeast

Future Vision



A sustainable, equitable low-income energy efficiency and educational model deployed across the **Tennessee Valley** in partnership with local power companies, healthcare partners and community-based organizations that **reduces energy burdens** for those in need.

Questions?

<https://bit.ly/2EqB93w>

kmaddux@communityactionpartnership.com

What the Community Action Partnership can do for you

- Facilitate connections to experienced peers
- Assist in data collection, messaging, and getting things off the ground
- Applicable Resources, Tools, and Templates
 - [Funding Survey of Non-Leveraged Funds \(NASCS and CAP Joint Report\)](#)
 - [Leveraging Your WAP: Why and How](#)
 - [Tips on Building Effective Relationships with Utility Regulators](#)
- Trainings and Webinars
 - Upcoming Webinars: March 4 and 11 – Health and Energy Partnerships Spotlight on North Carolina and Missouri
 - March 26 at 2pmET – NREL: Weatherization Admin Training Modules
 - [Cap Solar – Financing Available to the CAP /WAP Networks](#)