

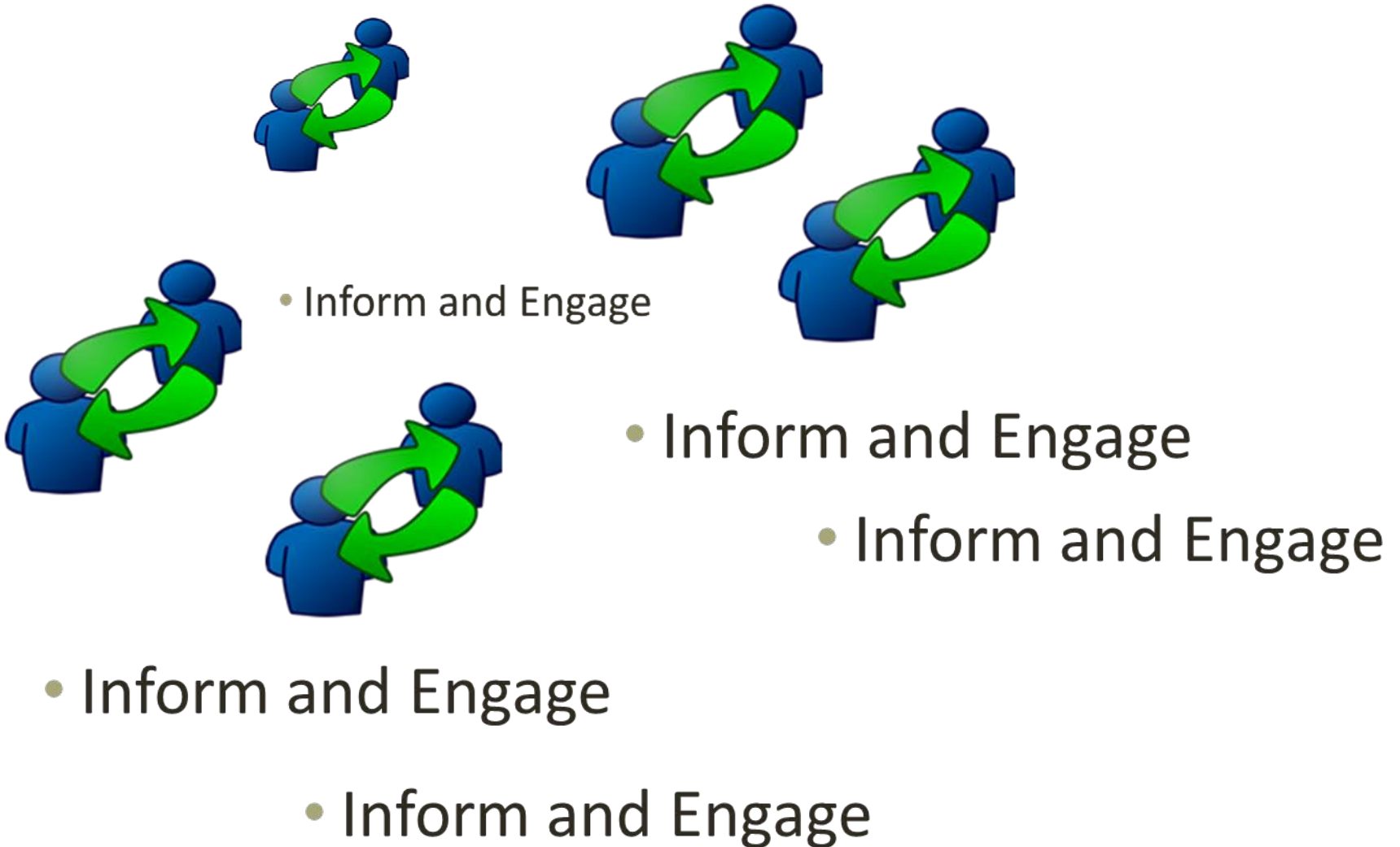


# Health and Home Performance: A Game Changer

## Session Objectives:

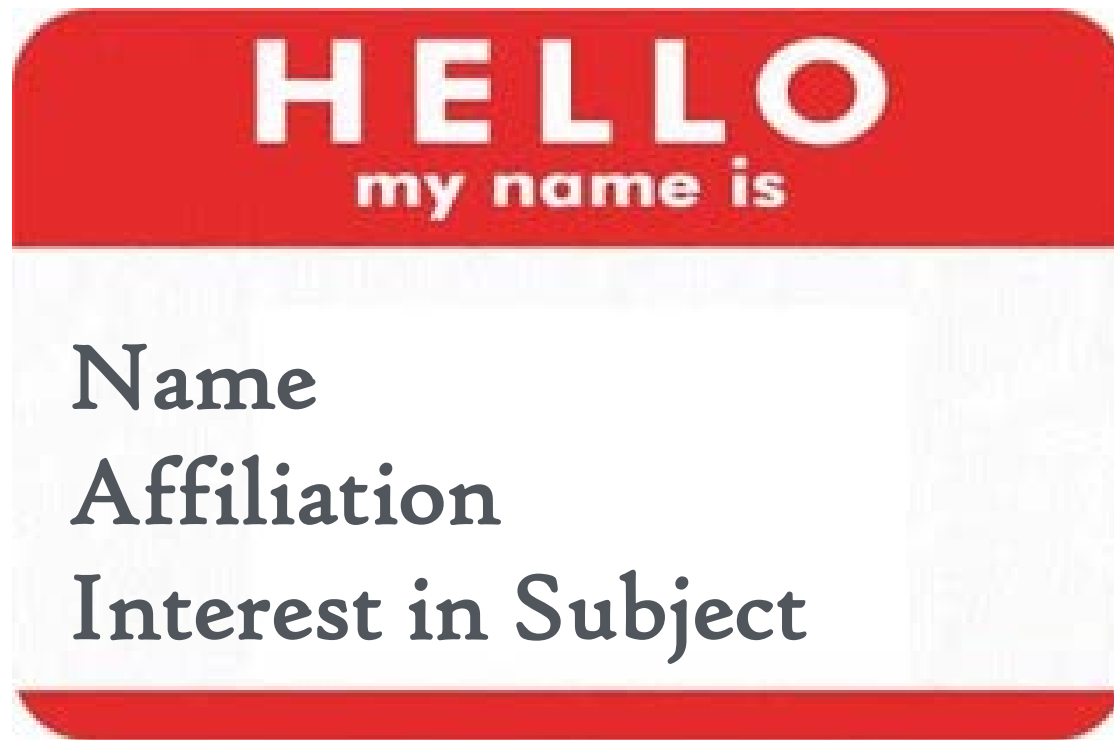
- Better understand the impact between home performance and health
- Learn from the body of work that has been already done relating to home performance and health
- Gain insights from the barriers involved with home performance and health

# Overarching Objective



# Introductions

- First step of Stakeholder Engagement:  
Understanding what interests you



# Digging a Little Deeper

- **What is your current knowledge?**
- **What are your interests/concerns about health and home performance?**
- **What value do you place on bringing health into your work?**
  - If valued, what audiences/clients would you like to influence?

# Health and Home Performance Initiative

Identify and leverage substantiated benefits to occupant health from home performance improvement:

- Literature review (National Center for Healthy Housing)
- Roadmap to leverage home performance-health connection to grow industry
- Create consumer marketing directed at stakeholders identified as key to the process



# Housing and Health: Effects of Energy Conservation Upgrades



**NCHH**

Jonathan Wilson  
Research Director  
National Center for Healthy Housing

[www.nchh.org](http://www.nchh.org)

# Literature Review Overview

- **Goal:**

- Investigate impact of home performance measures on resident health

- **Objectives:**

- Build the case for contractors and home performance advocates so they can:
  - Educate home performance clients
  - Educate current funders (utilities, DOE)
  - Educate medical community



# Literature Review Process

- Identify sources of literature
  - Pubmed.gov database
  - Government (Building America, Oak Ridge)
- Identify key words for search
- Search titles/abstracts for best fit articles
- Prepare a matrix with findings (ongoing)
- Summarize findings in white paper (spring)

# Current Status

- NCHH has summarized 46 studies so far:
  - Green rehab-new construction/gen rehab (11)
  - Ventilation (9)
  - Weatherization (7)
  - Insulation (5)
  - Other housing (moisture/mold/safety) (5)
  - General energy conservation/heating (3)
  - Stand alone air cleaners (3)
  - Stove replacement (2)
  - Lighting (1)

# Process Observations

- Most work includes likely *home performance activity*.
- *Green renovations* go beyond standard packages, but *ventilation upgrades & moisture controls* arguably have *greatest health impact*.
  - Exception: No smoking policy studies.
- Studies with *low-income residents* made up about *half* of the results. Impact is open to discussion.
- Studies included *single family units (all or partial)* in *~2/3rds* of results. Again, impact open to discussion.
- Report includes mix of domestic & foreign studies. Some *foreign studies have limitations* due to different housing stock.

# Main Findings

- Energy conservation with improved ventilation is associated with:
  - Improved respiratory health (especially among people who have an existing illness like asthma)
  - Improved comfort (temperature and humidity)
  - Improved Indoor Air Quality
    - Reduced Particulate Matter
    - Reduced VOCs (esp. formaldehyde)
    - Reduced CO<sub>2</sub>
    - Reduced NO<sub>x</sub>
    - Reduced radon\*
- Some preliminary evidence of cost-effectiveness

# Occupant Behavior Matters

“Participants with extremely low incomes who had window AC units and were responsible for their electric utility costs were often selective in when they ran the appliance. These participants lived in an area with some of the highest air pollution and asthma prevalence in the region. In addition, our data show that both building ventilation and occupant behaviors (e.g., use of active combustion sources in building) are important factors affecting residents’ exposure to PM in residential green buildings.”

Patton AP, et al. Airborne Particulate Matter in Two Multi-Family Green Buildings: Concentrations and Effect of Ventilation and Occupant Behavior *Int. J. Environ. Res. Public Health* 2016, 13(1), 144.

# Other Factors to Consider

- Poor practices can have an adverse impact
  - Insulation materials matter – can have negative health effects
    - Spray Foam (isocyanate) mixed badly
    - UFFI
  - Inadequate ventilation – radon/VOC/mold levels may increase
- Supplemental practices can have benefits
  - Special ventilation systems – better IAQ and respiratory health outcomes
  - Replacement of gas/wood stoves – reductions in NO<sub>2</sub>, PM

# National Center for **HEALTHY HOUSING**

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@nchh



[Facebook.com/Healthy Housing](https://www.facebook.com/HealthyHousing)



[www.nchh.org/Resources/Blog.aspx](http://www.nchh.org/Resources/Blog.aspx)

# Home Performance: A New Part of Health Care

Kevin Kennedy, MPH, CIEC  
Environmental Health



*2015 Winner-  
HUD Secretary's Award  
for Healthy Homes*



**Children's Mercy**  
**HOSPITALS & CLINICS**  
— Kansas City —



# Stand Up If-



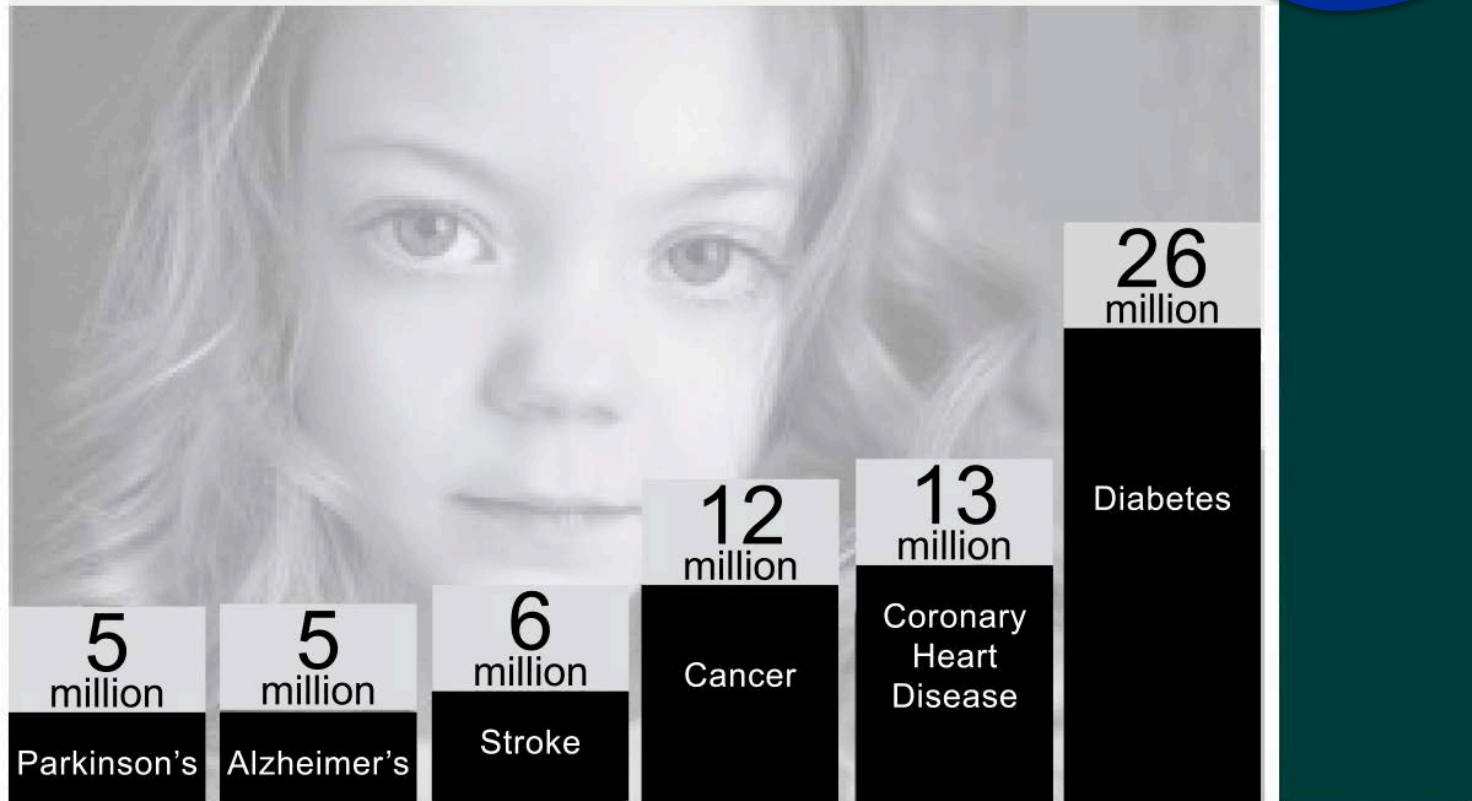
# Stats for common indoor-related health concerns

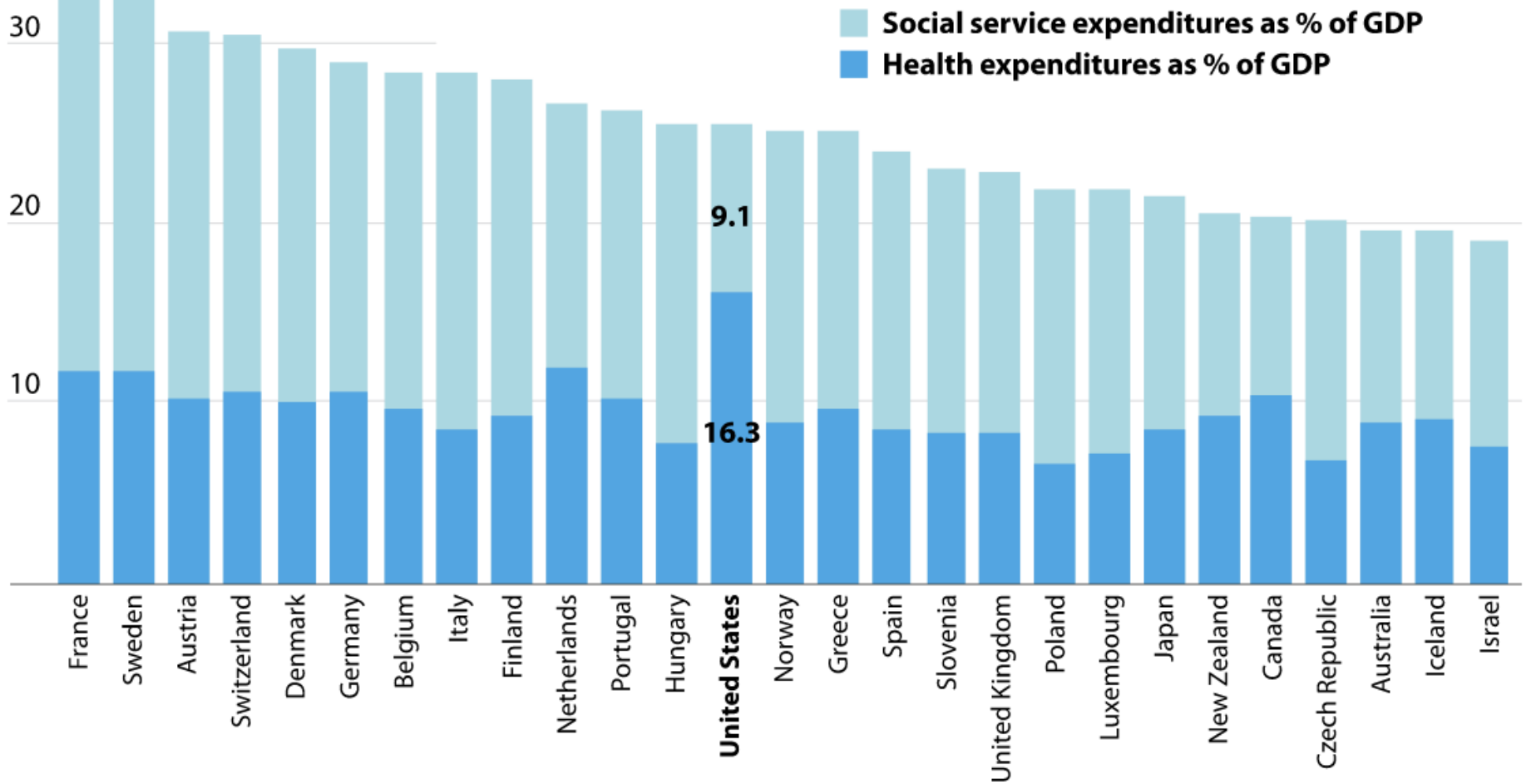
- Asthma – ~9 % nationwide- 1 in 11
  - ~56% Atopic (Allergic)
- Environmental Allergies – ~20%
  - ~25% of allergies to dust mite
  - ~25% Pollen
  - ~25% Molds
  - ~25% Pets

From: [www.aafa.org](http://www.aafa.org)



# Asthma and allergies strike 1 out of 5 Americans





## Health at a Glance 2009 – OECD Publishing



# The Future of Health Care

Centers for Medicare and Medicaid Services are reorganizing the US health care system using the “Triple Aim” approach:

- Reduce per capita health care costs
- Improving the experience of care by addressing quality and satisfaction
- Improve the health of target populations.

Berwick, Institute for Healthcare Improvement, 2008



# Health Care System-Wide Change

Communities must focus on six essential approaches, including:

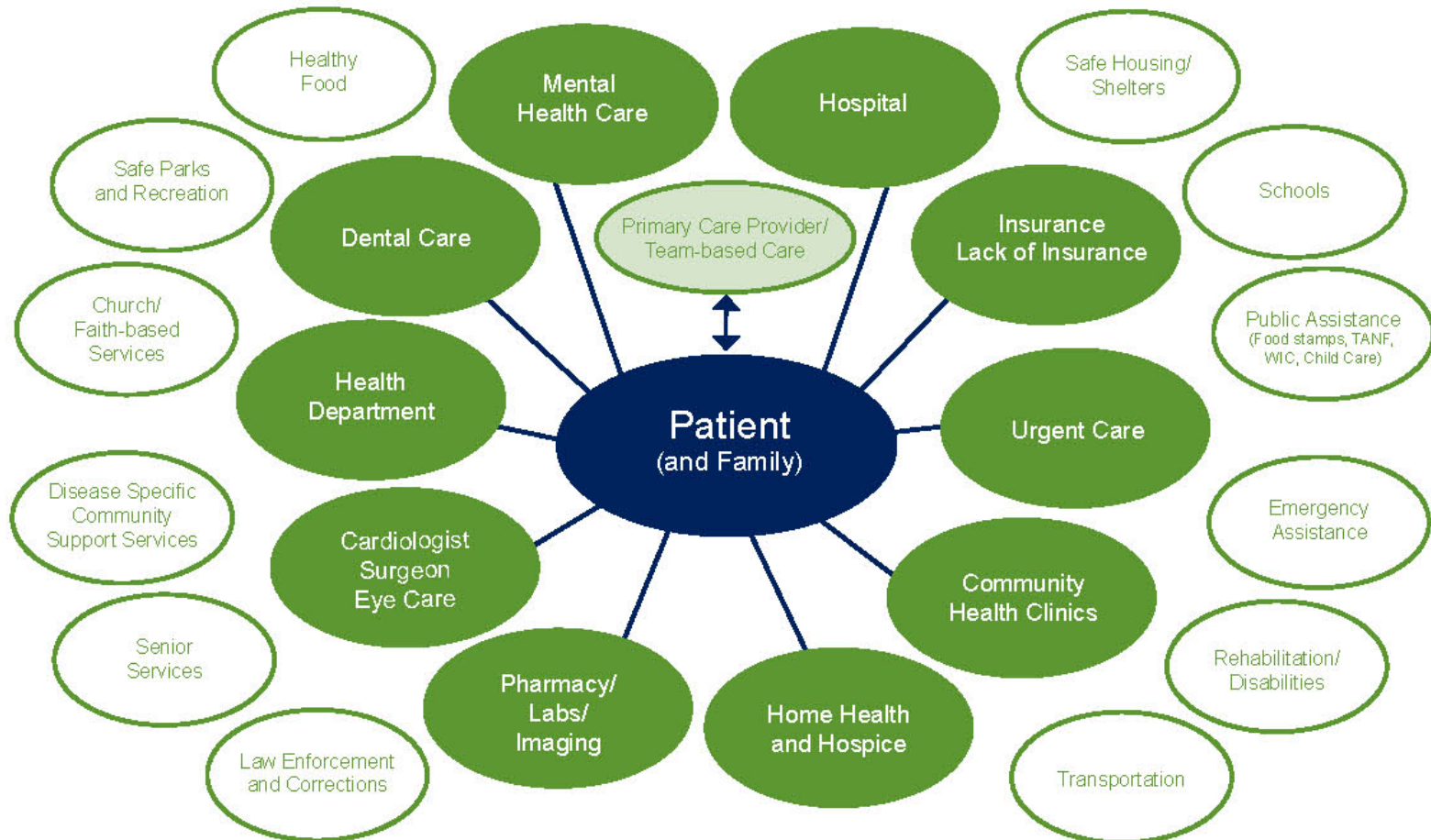
- Family-centered medical homes
- Health Care practice redesign
- Care plans and care planning
- Greater support for patient self-management
- Organized health care systems
- Sharing resources.

Berwick, Institute for Healthcare Improvement, 2008



# Patient-centered Medical Home

Coordinated and Integrated Care



- IHI Triple Aim**
- Better Health
  - Better Care
  - Reduced Cost

- Quality Care**
- Safe and Effective
  - Patient Centered
  - Timely and Efficient
  - Equitable

# Important Survey of State-by-State Reimbursement Policies



National Center for  
Healthy Housing

## HEALTHCARE FINANCING OF HEALTHY HOMES:

Findings from a  
2014 Nationwide  
Survey of State  
Reimbursement  
Policies



**November 2014**

Rebecca Morley, MSPP, and Amanda Reddy, MS, National Center for Healthy Housing  
Katie Horton, JD, MPH, RN, and Mary-Beth Malcarney, JD, MPH, Milken Institute School of Public Health at the George Washington University

<http://www.nchh.org/Resources/HealthcareFinancing/Snapshot.aspx>



# Key Findings:

- **27 states (54%) reported having some Medicaid reimbursement policy in place for**
  - **home-based asthma services**
  - **follow-up services for children with lead exposure.**
- **7 states (14%) reported that one or more private payers in the state provide or reimburse for home-based asthma services**
- **An additional 7 states (14%) report that one or more private payers are actively exploring putting these services into place.**
- **only 3 states (6%) reported knowledge of private payers who reimburse for or provide lead follow-up services**

# Mich. Dept. of Community Health

## Asthma Tier I Interventions

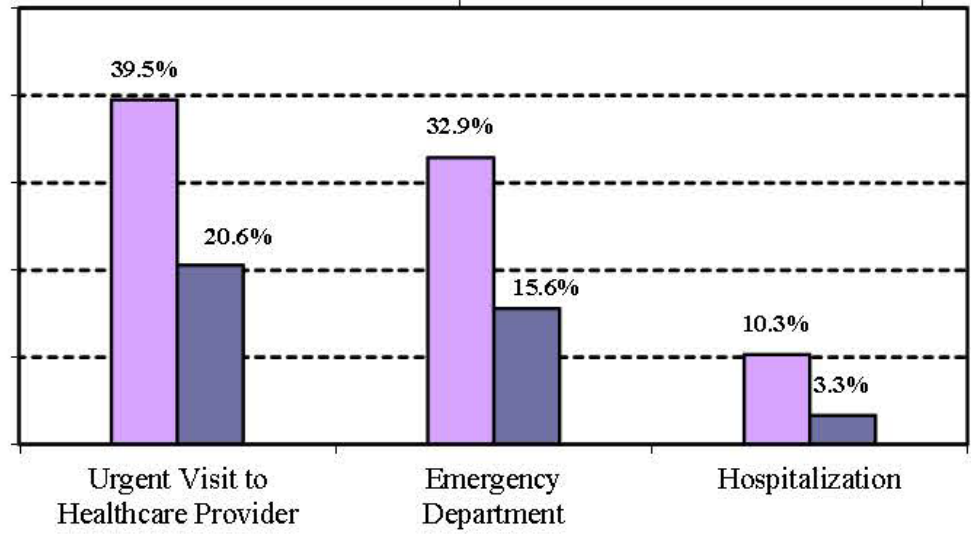
HEPA vacuum  
 Non-scented bleach  
 Non-scented cleaning Furnace filters  
 Smoking cessation kit  
 Mattress/pillow covers

## Asthma Tier II Interventions

Beds and/or pillows  
 Carpet removal  
 Air conditioning unit  
 Floor replacement  
 HEPA air filter unit  
 Bathroom vent installation  
 HVAC duct cleaning

**Cost Benefit (3 years)**  
**Total Program Cost:**  
**\$1,299,207**  
**Net Benefits:**  
**\$2,524,193**

■ Reported at Baseline  
 ■ Reported at Six Month Followup



Case Studies: The Benefits of Home Visits for Children with Asthma- National Center for Healthy Housing, Report, 2014





The Harvard Joint Center for Housing Studies advances understanding of housing issues and informs policy through research, education, and public outreach.

Working Paper, March 2016

# Challenges and Opportunities in Creating Healthy Homes: Helping Consumers Make Informed Decisions

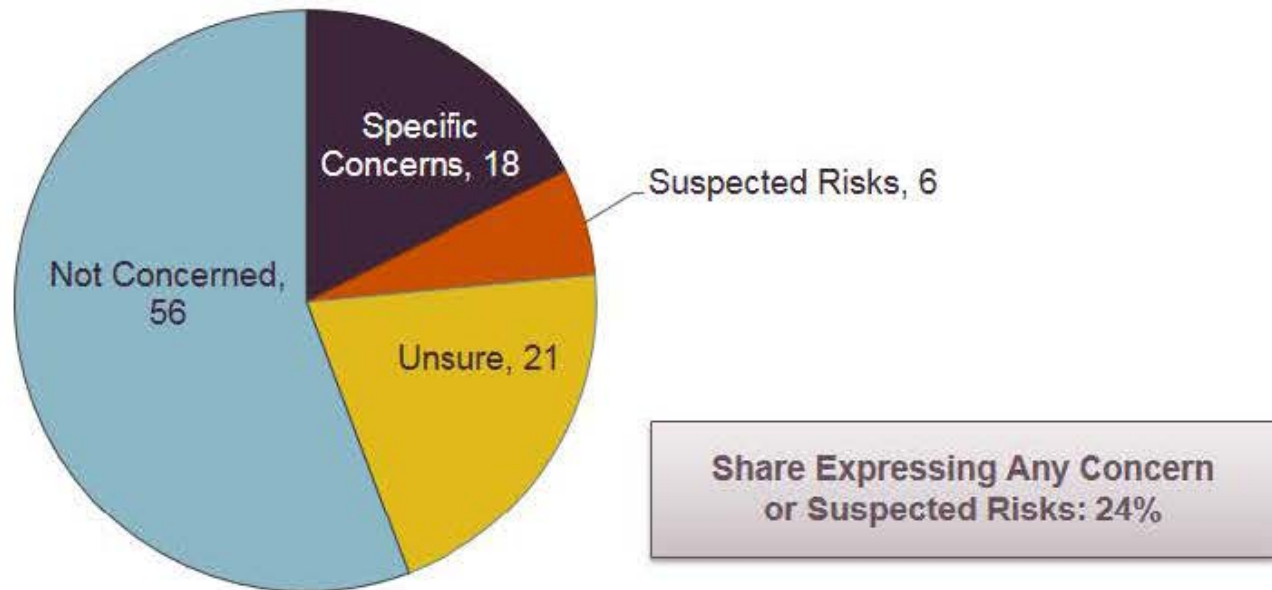


**Mariel Wolfson**  
2012 Meyer Fellow, JCHS  
**Elizabeth La Jeunesse**  
Research Analyst, JCHS

[http://www.jchs.harvard.edu/sites/jchs.harvard.edu/files/healthy\\_homes\\_wolfson\\_la\\_jeunesse.pdf](http://www.jchs.harvard.edu/sites/jchs.harvard.edu/files/healthy_homes_wolfson_la_jeunesse.pdf)

# 24% of Surveyed Households have Specific Concerns about Home Risks

Share of Owner Households Expressing 'Healthy Home' Concerns (Percent)



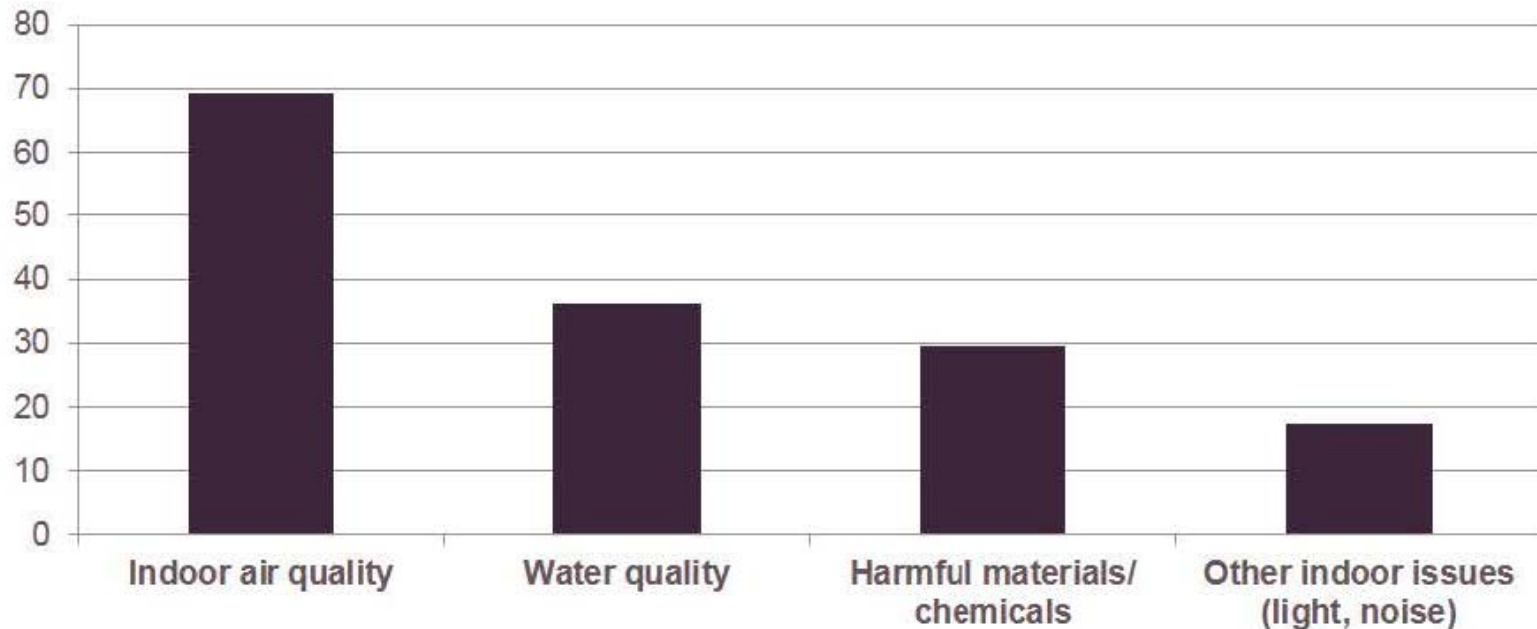
Notes: Sample size is 2,249. Households were asked, "In the past few years, how concerned have you been about your current home negatively affecting your or another occupant's health? This may include but is not limited to concerns related to mold/moisture, indoor air quality, asthma, chemicals in the home, noise insulation problems, light issues or other "healthy housing" issues important to you."

Source: JCHS tabulations of Healthy Home Owner Survey, The Farnsworth Group.

[http://www.jchs.harvard.edu/sites/jchs.harvard.edu/files/healthy\\_homes\\_wolfson\\_la\\_jeunesse.pdf](http://www.jchs.harvard.edu/sites/jchs.harvard.edu/files/healthy_homes_wolfson_la_jeunesse.pdf)

# Homeowner Interest in Healthy Housing

Share of Homeowners Concerned about 'Healthy Housing' who Cited the Following Specific Issue(s) (Percent)



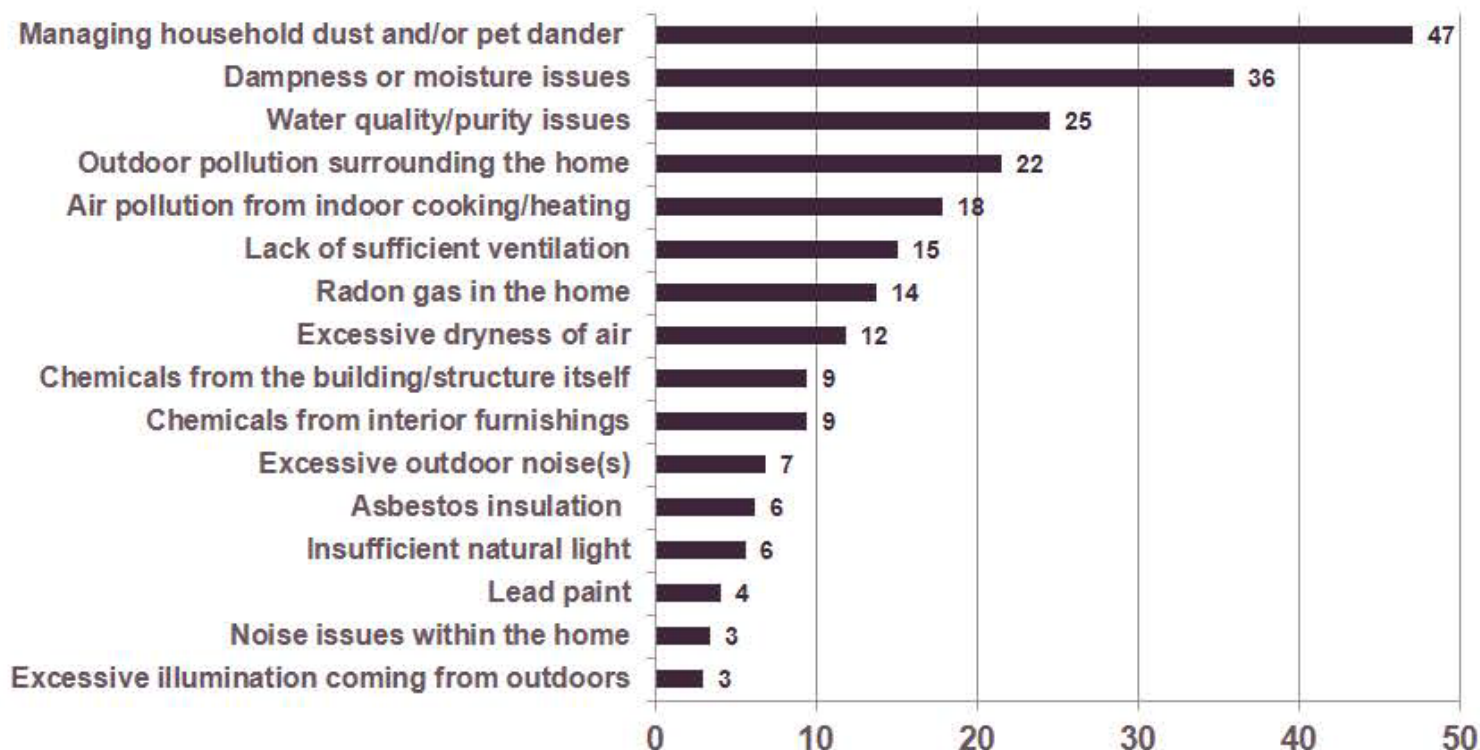
Notes: Sample size is 529. Households that expressed some basic level of healthy housing concern were asked, "Which general category(ies) best describes your concern about the impact of your home on your household's health?"

Source: JCHS tabulations of Healthy Home Owner Survey, The Farnsworth Group.

[http://www.jchs.harvard.edu/sites/jchs.harvard.edu/files/healthy\\_homes\\_wolfson\\_la\\_jeunesse.pdf](http://www.jchs.harvard.edu/sites/jchs.harvard.edu/files/healthy_homes_wolfson_la_jeunesse.pdf)

# Top Concerns: Dust, Dampness, Water Quality, and Air Quality

Share of Homeowners Concerned about Indoor Air & Environmental Quality Issues who Identified the Following Issues as Among their Top Three Concerns (Percent):



Notes: Sample size is 465. Households that expressed some basic interest in 'invisible' healthy housing issues were asked, "Among the healthy home issues that concern your household, please select up to three of them that generate the most concern."

Source: JCHS tabulations of Healthy Home Owner Survey, The Farnsworth Group.

[http://www.jchs.harvard.edu/sites/jchs.harvard.edu/files/healthy\\_homes\\_wolfson\\_la\\_jeunesse.pdf](http://www.jchs.harvard.edu/sites/jchs.harvard.edu/files/healthy_homes_wolfson_la_jeunesse.pdf)

# Is Home Performance Healthy?



\*\*Thanks to Eric Werling for conceiving of this illustration



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Center for Environmental Health

Children's Mercy Hospitals & Clinics

816-960-8918





# Creating Energy Efficient and Healthy Building Environments

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Ellen Tohn  
Tohn Environmental Strategies  
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2016



# Families “Touched” Each Year

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Issue	NH	Omaha	Vermont	Minn.
Health	3000	2200	7,000	3400
Energy	1800 (1,000 low income)	1150 (400 low income)	4,000	2500
Housing	800	200	1300+	1600

# Vermont Families Have Health Risks

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# Vermont Families Need Services

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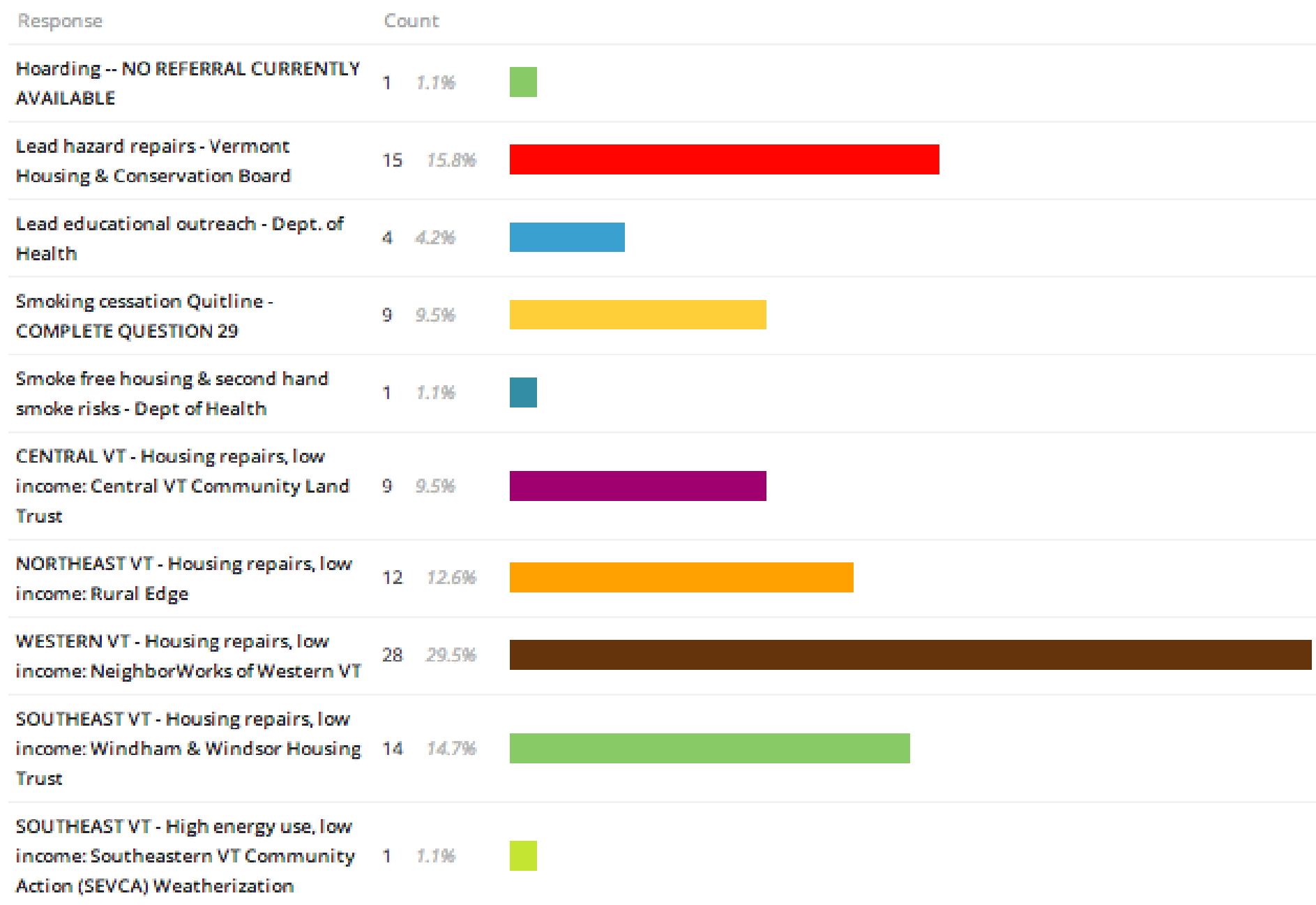
## One out of three families

Every one out of three families visited by a One Touch partner requires a referral

We discovered that the grandparents were taking care of their grandchild and could use help repairing peeling lead paint, something we would not have uncovered without One Touch

Weatherization/Energy Coach

[Referrals] 29. Vermont regions EXCLUDING BURLINGTON/WINOOSKI: The family could benefit from referrals to: (check all that apply)



Total: 95

# NYC Green Preservation Program

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- Housing Preservation and Development (HPD) Green Preservation Program (\$45MM)
- GPNA includes health-related assessments (IPM and green cleaning).
  - Buildings with 5-50 units (cap 50,000 ft<sup>2</sup>)
  - 0% loans energy efficiency & water conservation
  - 1 % loans moderate rehab
  - GPNA use estimated at 5,000 units/year

# Isles NJ ReHEET Links Energy & Health

## Comprehensive Assessment and Project Oversight

### Healthy Homes Assessment



Lead, mold, moisture, pests, fire hazards and indoor chemical use

### Energy Audit



Blower Door test, combustion analysis, CO/smoke detector, lights, water use, radon risk and ventilation

### Single Scope of Work

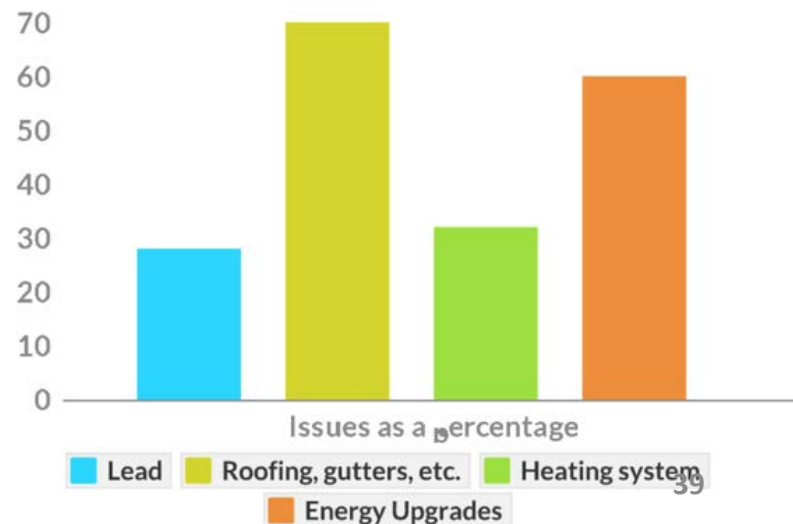


Determine order of work, manages contractors and provides final inspection



Mrs. Pete's home had high heating costs & mold. Weatherization turned her down. ReHEET solved the problems.

### Most common issues addressed



# How Would You?

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- Engage health partners? Who are potential health partners? What messages would resonate?
- Bring health into audit protocols or work specs? Where will you look for guidance?
- Build in cross training or capacity building? What type of training is needed?
- Measure success?



# Moving Forward

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Spread The Word.... One Touch and health integration can happen

[www.onetouchhousing.com](http://www.onetouchhousing.com)

Contact:

Ellen Tohn, Tohn Environmental Strategies

[etohn@tohnenvironmental.com](mailto:etohn@tohnenvironmental.com)



# Visit the Residential Program Solution Center: [energy.gov/rpsc](http://energy.gov/rpsc)

The image shows a screenshot of the Better Buildings Residential Program Solution Center website. The page features a navigation menu on the left with links like 'Solution Center Home', 'About', 'Handbook Index', 'Quick Links', 'Proven Practices', 'Energy Data Facts', and 'Glossary'. A central image shows a compass on a keyboard. Below it, a section titled 'Explore the Solution Center' includes icons for 'Market Position & Business Model', 'Program Design & Customer Experience', and 'Evaluation & Data Collection'. A 'RECENTLY UPDATED RESOURCES' section lists various articles. A process flow diagram on the right illustrates the four stages: Strategy Development, Planning, Implementation, and Evaluation.

**Strategy Development**

**Planning**

**Implementation**

**Evaluation**

**Better Buildings**  
U.S. DEPARTMENT OF ENERGY

Suggestions? Email [BBRPSolutionCenter@ee.doe.gov](mailto:BBRPSolutionCenter@ee.doe.gov)

# Related Resources in the Residential Program Solution Center

## Health and home performance resources:

- Read the [case study](#) featuring nonprofit GTECH Strategies to learn about their initiative to improve indoor air quality through home energy upgrades.
- Leverage complementary benefits of energy efficiency to broaden your reach & identify partnership opportunities with this [Tip for Success](#).
- Learn about best practices for including non-energy benefits of energy efficiency in program marketing & cost-effectiveness testing in ACEEE's [Recognizing the Value of Energy Efficiency's Multiple Benefits](#).



- While you're there, see the latest [Proven Practices](#) post on [Evaluating Residential Program Success](#).