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

- Inform and Engage
- Inform and Engage
- Inform and Engage
- Inform and Engage
Introductions

- First step of Stakeholder Engagement: Understanding what interests you

![Name Tag]

Name
Affiliation
Interest in Subject
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

Jonathan Wilson
Research Director
National Center for Healthy Housing
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)
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 CO₂
    - Reduced NOₓ
    - Reduced radon*

- Some preliminary evidence of cost-effectiveness
“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.”

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 NO₂, PM
Home Performance: A New Part of Health Care

Kevin Kennedy, MPH, CIEC
Environmental Health

2015 Winner-HUD Secretary’s Award for Healthy Homes
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
Asthma and allergies strike 1 out of 5 Americans

<table>
<thead>
<tr>
<th>Condition</th>
<th>Affected Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parkinson’s</td>
<td>5 million</td>
</tr>
<tr>
<td>Alzheimer’s</td>
<td>5 million</td>
</tr>
<tr>
<td>Stroke</td>
<td>6 million</td>
</tr>
<tr>
<td>Cancer</td>
<td>12 million</td>
</tr>
<tr>
<td>Coronary Heart Disease</td>
<td>13 million</td>
</tr>
<tr>
<td>Diabetes</td>
<td>26 million</td>
</tr>
</tbody>
</table>

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Social service expenditures as % of GDP

Health expenditures as % of GDP

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

- Healthy Food
- Mental Health Care
- Hospital
- Safe Housing/Shelters
- Schools
- Public Assistance (Food stamps, TANF, WIC, Child Care)
- Emergency Assistance
- Rehabilitation/Disabilities
- Transportation
- 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

HEALTHCARE FINANCING OF HEALTHY HOMES:

Findings from a 2014 Nationwide Survey of State Reimbursement Policies

November 2014
Rebecca Morley, MSPH, and Amanda Reddy, MS, National Center for Healthy Housing
Kate Horton, JD, MPH, RN, and Mary-Beth Malcarey, JD, MPH, Milken Institute School of Public Health at the George Washington University


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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

<table>
<thead>
<tr>
<th>Asthma Tier I Interventions</th>
<th>Asthma Tier II Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEPA vacuum</td>
<td>Beds and/or pillows</td>
</tr>
<tr>
<td>Non-scented bleach</td>
<td>Carpet removal</td>
</tr>
<tr>
<td>Non-scented cleaning Furnace filters</td>
<td>Air conditioning unit</td>
</tr>
<tr>
<td>Smoking cessation kit</td>
<td>Floor replacement</td>
</tr>
<tr>
<td>Mattress/pillow covers</td>
<td>HEPA air filter unit</td>
</tr>
<tr>
<td></td>
<td>Bathroom vent installation</td>
</tr>
<tr>
<td></td>
<td>HVAC duct cleaning</td>
</tr>
</tbody>
</table>

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

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

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

24% of Surveyed Households have Specific Concerns about Home Risks

Share of Owner Households Expressing ‘Healthy Home’ Concerns (Percent)

- Not Concerned, 56
- Specific Concerns, 18
- Suspected Risks, 6
- Unsure, 21

Share Expressing Any Concern or Suspected Risks: 24%

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."

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?”

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):

- Managing household dust and/or pet dander: 47%
- Dampness or moisture issues: 36%
- Water quality/purity issues: 25%
- Outdoor pollution surrounding the home: 22%
- Air pollution from indoor cooking/heating: 18%
- Lack of sufficient ventilation: 15%
- Radon gas in the home: 14%
- Excessive dryness of air: 12%
- Chemicals from the building/structure itself: 9%
- Chemicals from interior furnishings: 9%
- Excessive outdoor noise(s): 7%
- Asbestos insulation: 6%
- Insufficient natural light: 6%
- Lead paint: 4%
- Noise issues within the home: 3%
- Excessive illumination coming from outdoors: 3%

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.”


Is Home Performance Healthy?

Energy Performance

Very Healthy & Efficient?

Very Healthy

Unhealthy & Inefficient

Very Efficient

Healthier Home

**Thanks to Eric Werling for conceiving of this illustration**
Kevin Kennedy, kkennedy@cmh.edu

Center for Environmental Health

Children’s Mercy Hospitals & Clinics

816-960-8918
Creating Energy Efficient and Healthy Building Environments

Ellen Tohn
Tohn Environmental Strategies
etohn@tohnenvironmental.com
2016
Families “Touched” Each Year

<table>
<thead>
<tr>
<th>Issue</th>
<th>NH</th>
<th>Omaha</th>
<th>Vermont</th>
<th>Minn.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>3000</td>
<td>2200</td>
<td>7,000</td>
<td>3400</td>
</tr>
<tr>
<td>Energy</td>
<td>1800 (1,000 low income)</td>
<td>1150 (400 low income)</td>
<td>4,000</td>
<td>2500</td>
</tr>
<tr>
<td>Housing</td>
<td>800</td>
<td>200</td>
<td>1300+</td>
<td>1600</td>
</tr>
</tbody>
</table>
Vermont Families Have Health Risks

- **33%** Homes that need a new smoke detector and carbon monoxide alarm
- **17%** Pre-1978 homes with peeling paint causing risk of lead poisoning
- **25%** Households with people who have asthma/respiratory issues
- **14%** Families living in homes with mobility issues
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.
<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hoarding -- NO REFERRAL CURRENTLY AVAILABLE</td>
<td>1</td>
<td>1.1%</td>
</tr>
<tr>
<td>Lead hazard repairs - Vermont Housing &amp; Conservation Board</td>
<td>15</td>
<td>15.8%</td>
</tr>
<tr>
<td>Lead educational outreach - Dept. of Health</td>
<td>4</td>
<td>4.2%</td>
</tr>
<tr>
<td>Smoking cessation Quitline - COMPLETE QUESTION 29</td>
<td>9</td>
<td>9.5%</td>
</tr>
<tr>
<td>Smoke free housing &amp; second hand smoke risks - Dept of Health</td>
<td>1</td>
<td>1.1%</td>
</tr>
<tr>
<td>CENTRAL VT - Housing repairs, low income: Central VT Community Land Trust</td>
<td>9</td>
<td>9.5%</td>
</tr>
<tr>
<td>NORTHEAST VT - Housing repairs, low income: Rural Edge</td>
<td>12</td>
<td>12.6%</td>
</tr>
<tr>
<td>WESTERN VT - Housing repairs, low income: NeighborWorks of Western VT</td>
<td>28</td>
<td>29.5%</td>
</tr>
<tr>
<td>SOUTHEAST VT - Housing repairs, low income: Windham &amp; Windsor Housing Trust</td>
<td>14</td>
<td>14.7%</td>
</tr>
<tr>
<td>SOUTHEAST VT - High energy use, low income: Southeastern VT Community Action (SEVCA) Weatherization</td>
<td>1</td>
<td>1.1%</td>
</tr>
</tbody>
</table>
NYC Green Preservation Program

- 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 ft²)
  - 0% loans energy efficiency & water conservation
  - 1% loans moderate rehab
  - GPNA use estimated at 5,000 units/year
Mrs. Pete’s home had high heating costs & mold. Weatherization turned her down. ReHEET solved the problems.
How Would You?

• 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

Spread The Word.... One Touch and health integration can happen
www.onetouchhousing.com

Contact:
Ellen Tohn, Tohn Environmental Strategies
etohn@tohnenvironmental.com
Visit the Residential Program Solution Center: energy.gov/rpsc

Suggestions? Email BBRPSolutionCenter@ee.doe.gov
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**.

Explore more resources at [www.energy.gov/rpsc](http://www.energy.gov/rpsc)!