Efficiency Vermont

NeighborWorks® OF WESTERN VERMONT

NEIGHBORWORKS OF WESTERN VERMONT HEAT SQUAD

Healthy Homes are Here to Stay

Laura Capps, Brian Just, Melanie Paskevich

Why are you here today?

Learning Objectives

1. List the 8 key principles of a healthy home.
2. Articulate the findings to date from local healthy home research.
3. Understand which resources can help you understand more about healthy homes.
4. Identify key healthy home concepts to incorporate into your everyday business practices.

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NeighborWorks of Western VT

- **Nonprofit** housing organization
- One-stop-shop
- Provide all the answers and support homebuyers and homeowners need
- Keep customer's best interest front and center
- **Realty, Lending, Financial Counseling and Education, Home Repair, HEAT Squad**
- Part of a national nonprofit network, *NeighborWorks America*

NEIGHBORWORKS REALTY
NEIGHBORWORKS LENDING
NEIGHBORWORKS HOMEOWNERSHIP
NEIGHBORWORKS HOME REPAIR
NEIGHBORWORKS H.E.A.T. SQUAD

Meet the HEAT Squad

- Providing **support** to improve efficiency, comfort, health & safety of homes, regardless of income since 2010
- **Reduced cost audits**, same day audit reports, objective advice, help with contractors, in-house financing
- Available in 8 VT counties, 9 KY counties
- Completed over **4,200 audits and 1,600 projects**
- Partners: Efficiency VT, Green Mountain Power, WAP, Local Contractors, Energy Committees

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- Nation's first Efficiency Utility (2000)
- Serve every ratepayer
  - From snowmaking and cheese caves to municipal lighting and high performance homes
- No-cost engineering and education services

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Agenda

- Why healthy homes
- What we've learned to date
- Integrating healthy homes into your business
- Call to action

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Why Healthy Homes?

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Asthma Triggers

Images: *www.cdc.gov*

Lead paint

Image: *www.cdc.gov*

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Asbestos

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Asbestos

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Radon

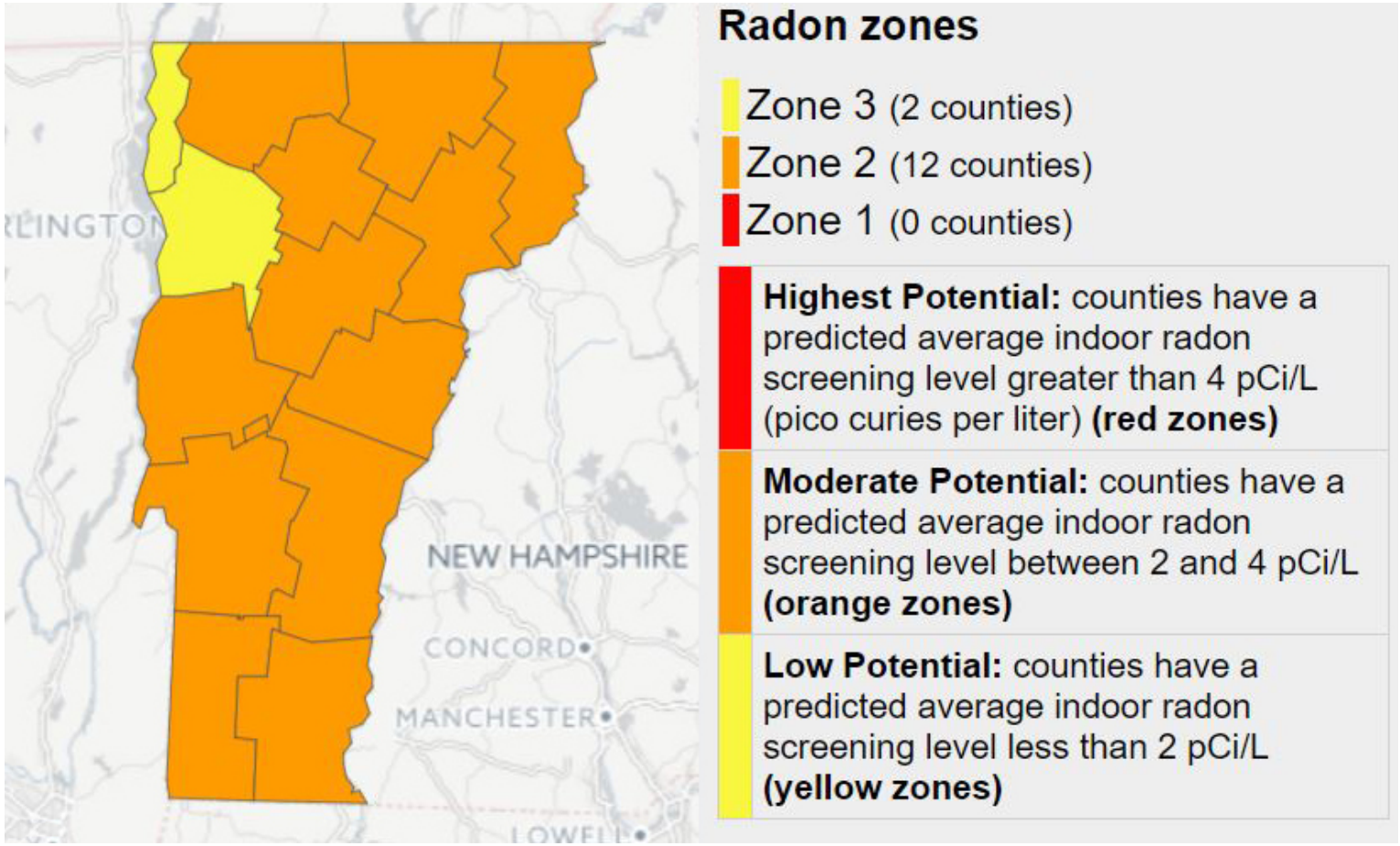

Image: *modified from www.epa.gov*

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Combustion equipment

Image: *www.cdc.gov*

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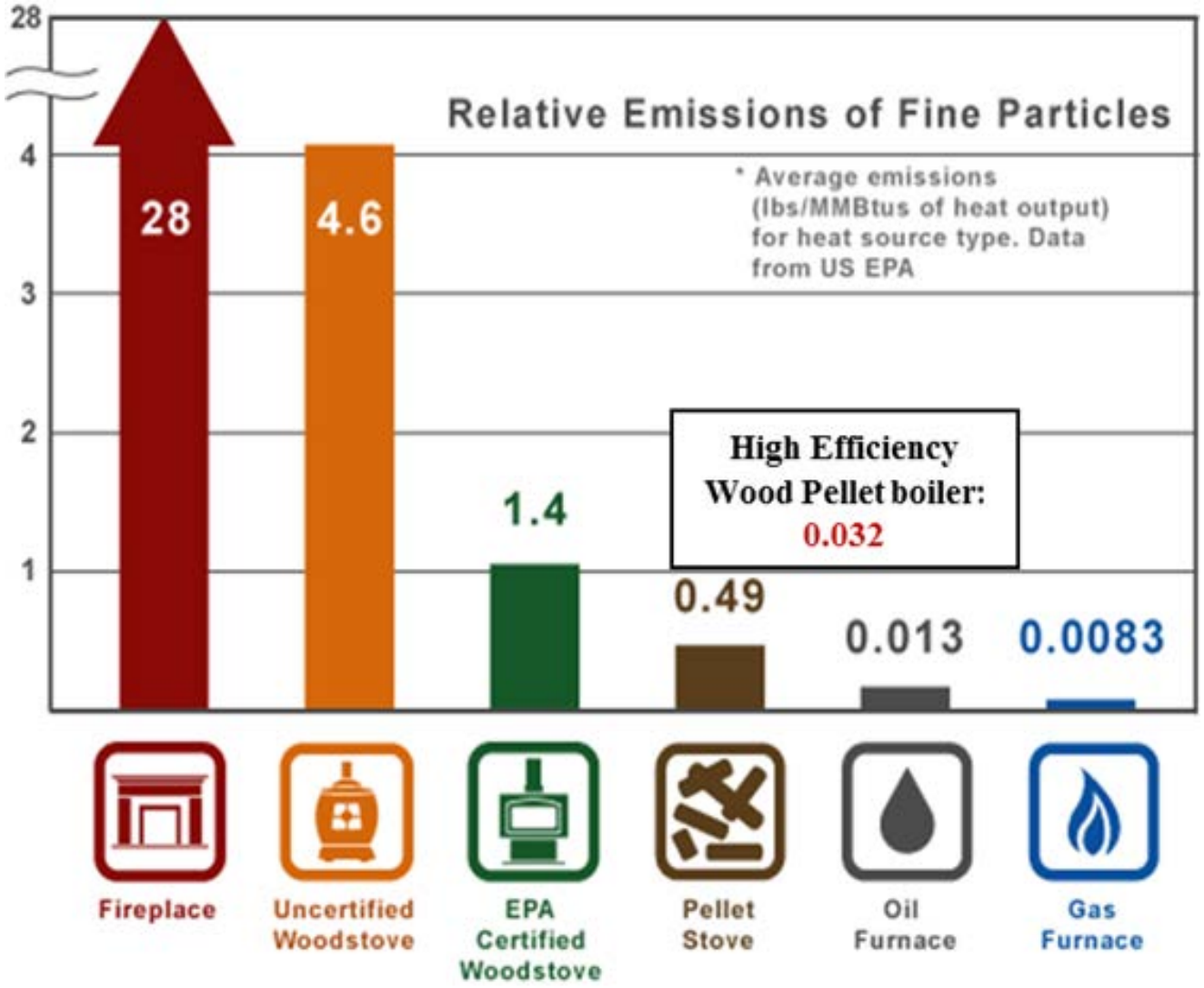
Particulate emissions



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But wait, there's more...

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Research: 1

- Body burden: The pollution in newborns. Environmental Working Group, July 14, 2005. http://www.ewg.org/research/body-burden-pollution-newborns

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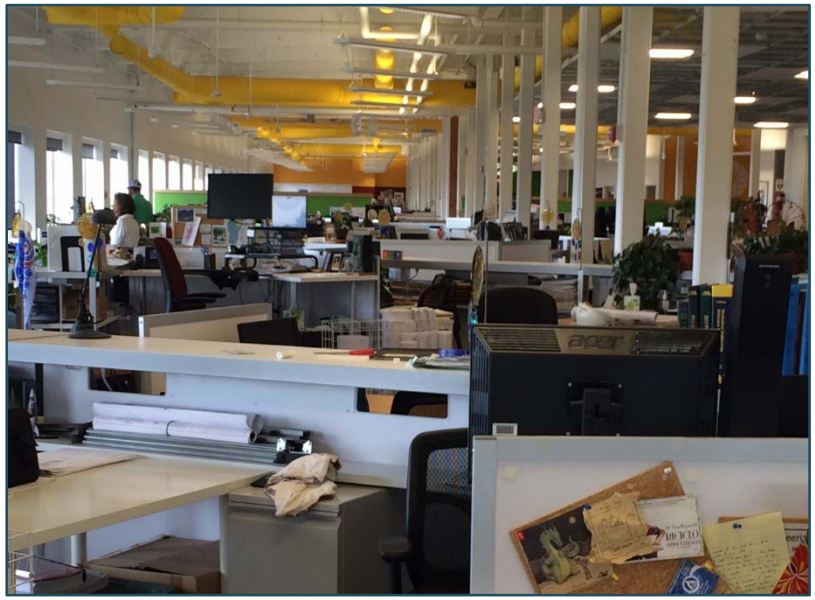
Research: 2

- Body burden: The pollution in newborns. Environmental Working Group, July 14, 2005. http://www.ewg.org/research/body-burden-pollution-newborns
- Associations of cognitive function scores with carbon dioxide, ventilation, and volatile organic compound exposures in office workers: a controlled exposure study of green and conventional office environments. Allen JG, MacNaughton P, Satish U, Santanam S, Vallarino J, Spengler JD. 2016. Environ Health Perspect 124:805–812. DOI: 10.1289/ehp.1510037



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Research: 3

https://www.ispot.tv/ad/7iw7/benjamin-moore-natura-paint-safe-enough-for-your-family

- Body burden: The pollution in ne
  14, 2005. http://www.ewg.org/re
- Associations of cognitive functio
  volatile organic compound expo
  study of green and conventional
  P, Satish U, Santanam S, Vallarino
  Perspect 124:805–812. DOI: 10.1
- Common Household Chemicals and the Allergy Risks in Pre-School Age Children. Choi H, Schmidbauer N, Sundell J, Hasselgren M, Spengler J, et al. (2010). PLoS ONE 5(10): e13423. DOI: 10.1371/journal.pone.0013423

Efficiency Vermont

Research: 4

- Body burden: The po roup, July 14, 2005. http://www wborns
- Associations of cogn lation, and volatile organic com d exposure study of green and c Naughton P, Satish U, Santanam th Perspect 124:805–81
- Common Household Age Children. Choi H, Sch r J, et al. (2010). PLoS ONE 5(10): e13423. DOI: 10.1371/journal.pone.0013423
- Cancer incidence among male Massachusetts firefighters, 1987–2003. Kang, Dongmug, et al. American journal of industrial medicine 51.5 (2008): 329-335. DOI: 10.1002/ajim.20549

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Research: 5

- Body burden: T
  14, 2005. http:
- Associations o
  volatile organi
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  P, Satish U, Sar
  Perspect 124:8
- Common Hou
  Children. Choi
  (2010). PLoS O
- Cancer incider
  Dongmug, et a
  DOI: 10.1002/a

PHTHALATES

Used to make plastic softer and more flexible, especially vinyl (PVC) materials such as vinyl flooring, vinyl blinds, and food packaging. They may also be found in personal care products and fragranced products.

Total number of chemicals from this class in our study: 8

Example chemicals: DEHP (di-2-ethylhexyl phthalate); BBzP (butyl benzyl phthalate)

ENVIRONMENTAL PHENOLS

Used as preservatives in personal care products like shampoo, lotions, cosmetics; as part of plastic materials such as reusable water bottles and in cleaning products such as detergents.

Total number of chemicals from this class in our study: 10

Example chemicals: MeP (methyl paraben), BPA (bisphenol A)

FLAME RETARDANTS

Used in furniture, baby products, electronics and building insulation in order to meet flammability standards.

Total number of chemicals from this class in our study: 15

Example chemicals: TCEP (tris (2-chloroethyl) phosphate); BEH-TEBP (a tetrabromophthalate)

FRAGRANCES

Used as scent in a wide variety of products including personal care products, cleaning products, perfumes, candles, and air fresheners.

Total number of chemicals from this class in our study: 1

Example chemical: HHCB (Galaxolide)

FLUORINATED CHEMICALS

Also known as PFCs or PFASs, these chemicals are used as stain and water repellant treatments for upholstery, carpets, clothes and shoes; in non-stick cookware; and to make food papers like pizza boxes and popcorn bags grease proof.

Total number of chemicals from this class in our study: 11

Example chemicals: PFOA (perfluorooctanoic acid); PFOS (perfluorooctane sulfonic acid)

- Consumer product chemicals in indoor dust: A quantitative meta-analysis of U.S. studies. Mitro, S.D. et al. Environmental Science & Technology. Article ASAP. DOI: 10.1021/acs.est.6b02023

8 principles of Healthy Homes

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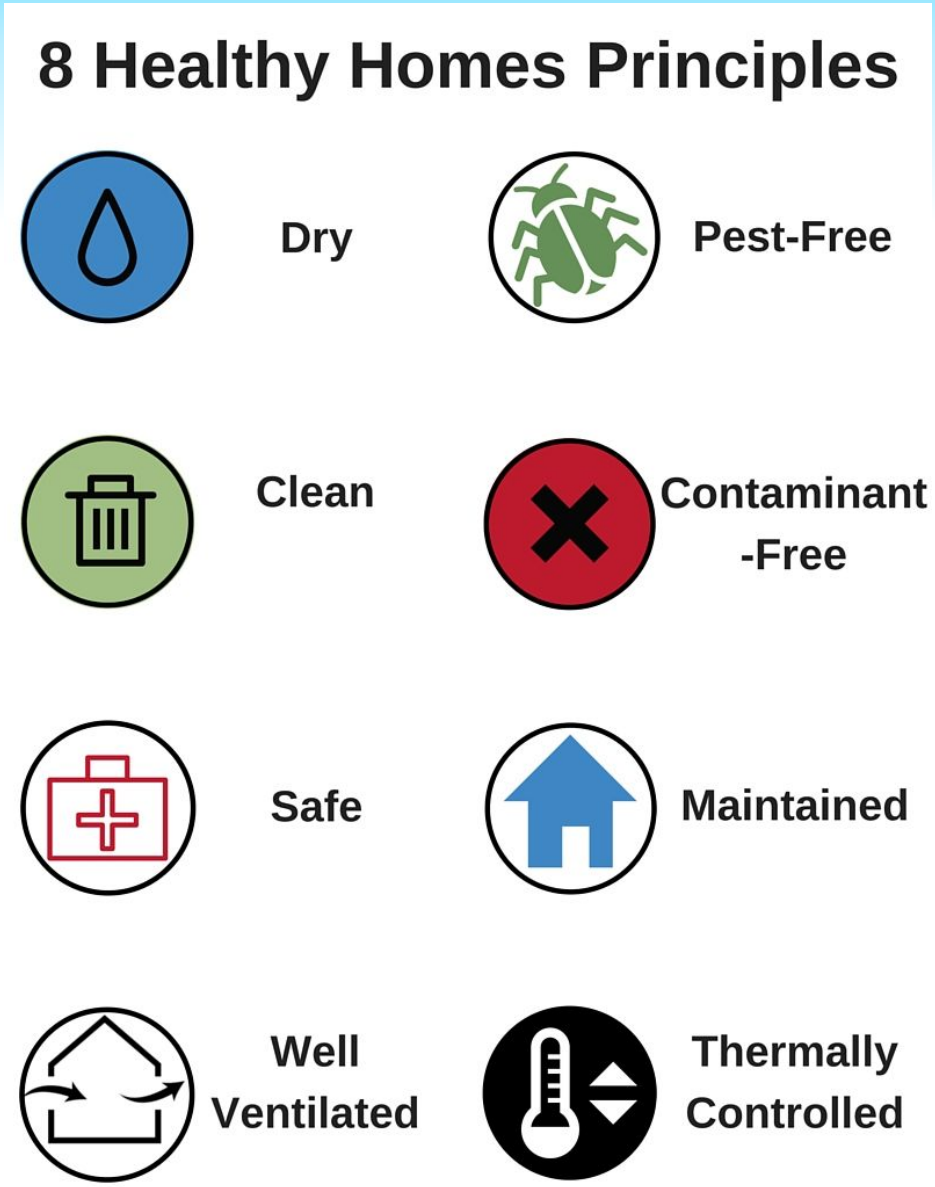
Principles of healthy housing



1. Keep it dry

Image: *www.fda.gov*

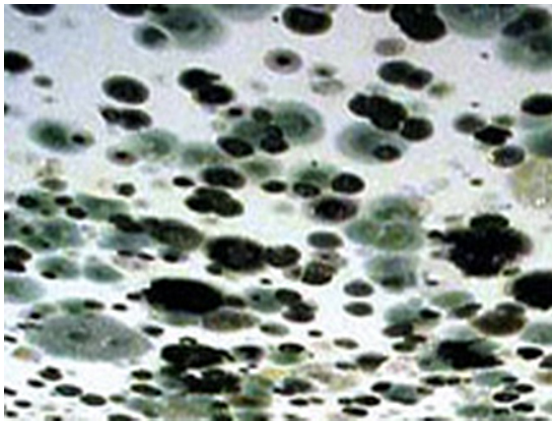


Image: *www.cdc.gov*

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2. Keep it clean

Image: *www.cdc.gov*

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3. Keep it safe

Image: *www.usfa.fema.gov*

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4. Keep it well-ventilated

Image: *www.usfa.fema.gov*

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Q:

How is your home ventilated?

What about this room?

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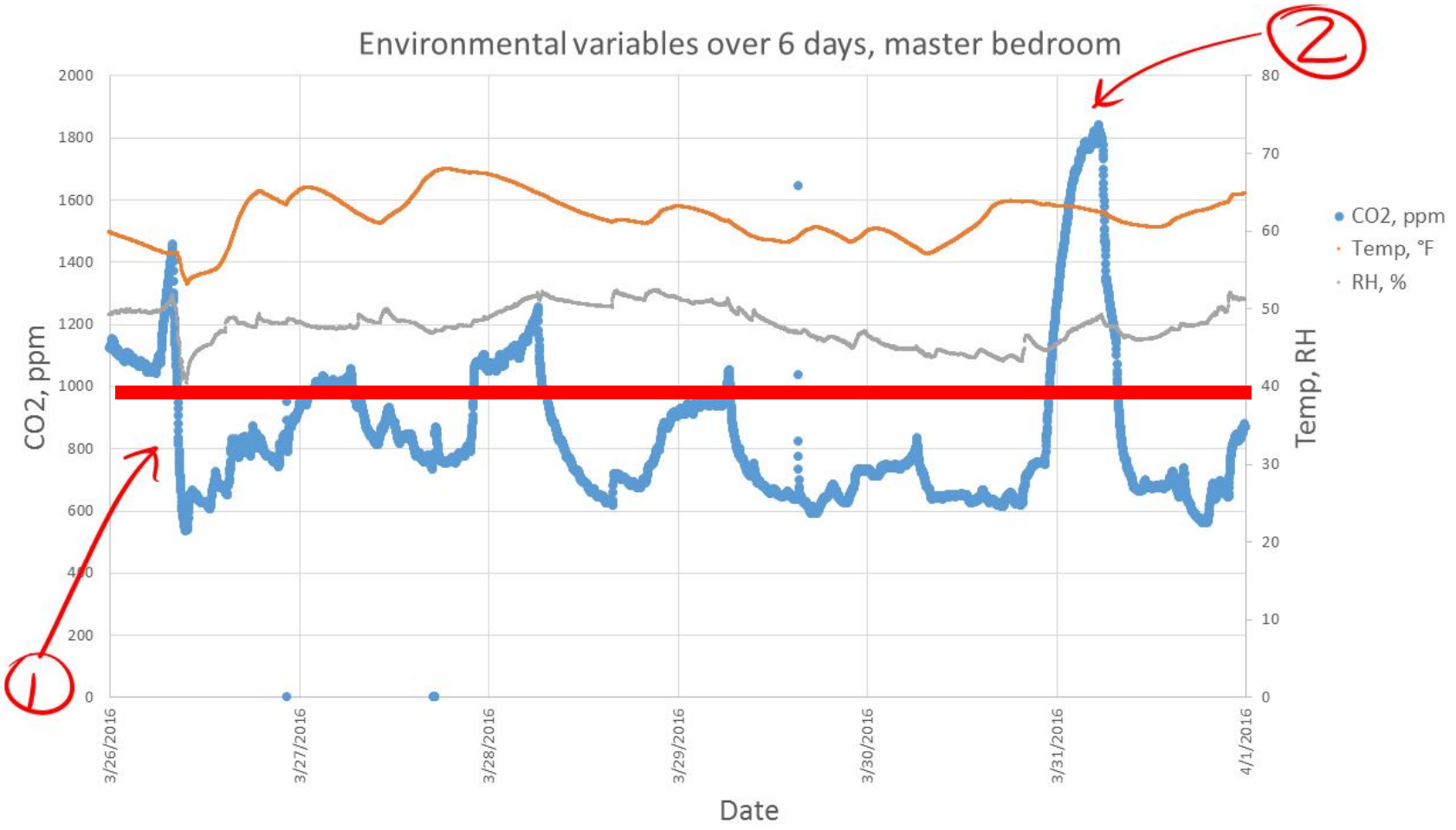
CO2 in my bedroom



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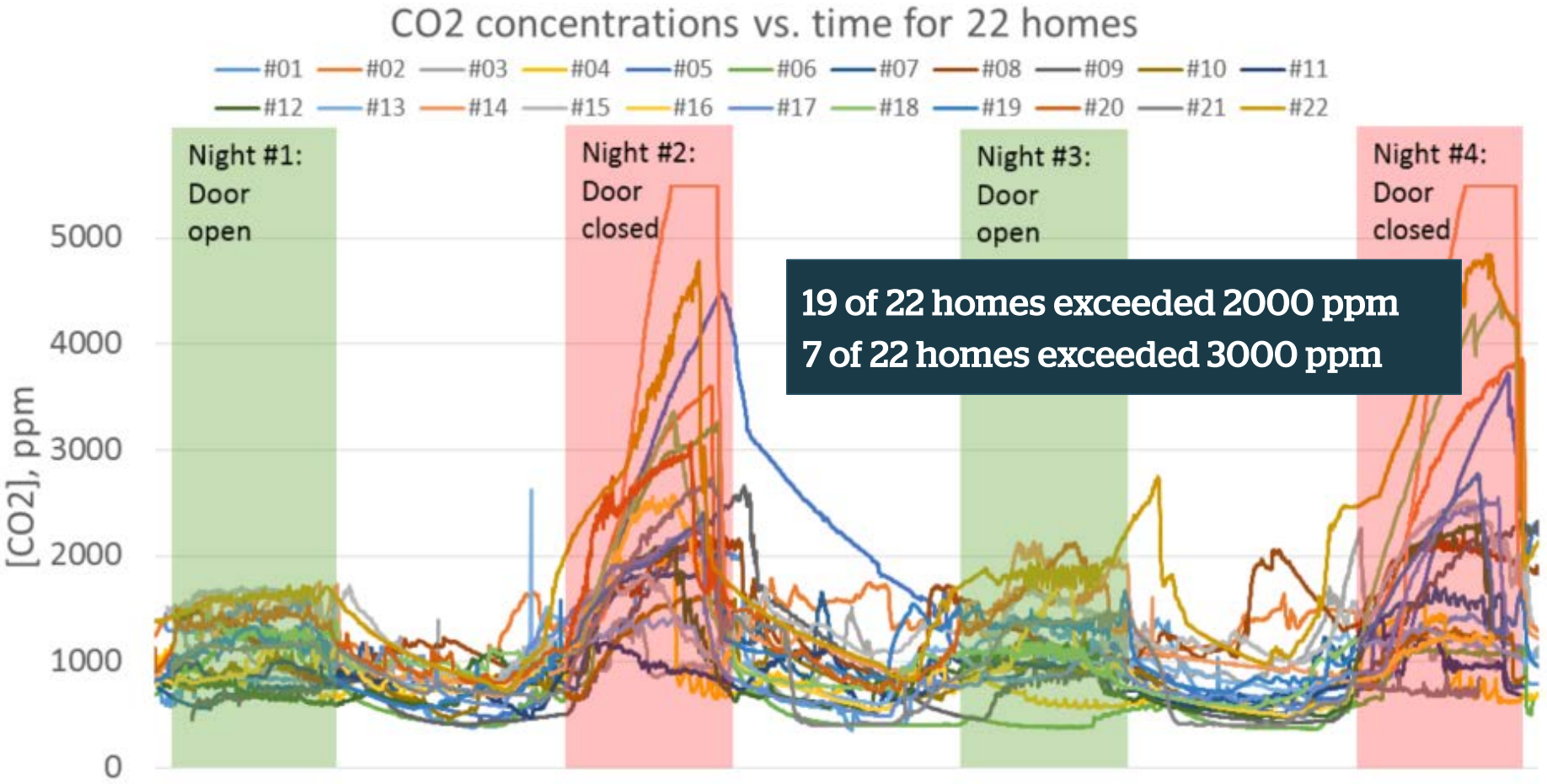
Whole-house ventilation

(more than just bath fans!)



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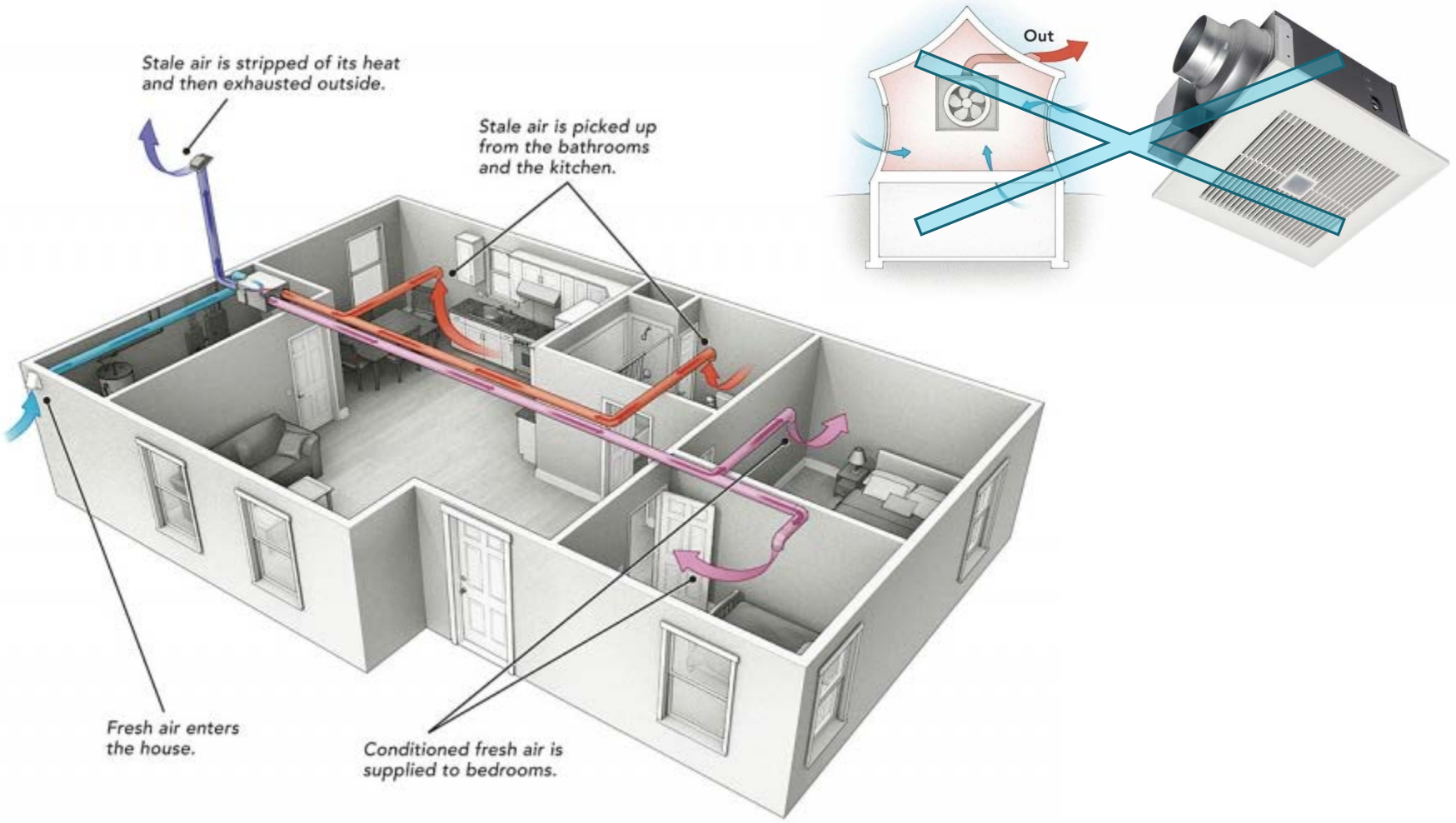
Ventilation done well



Images: www.greenbuildingadvisor.com/articles/dept/green-building-blog/breathe-easy-balanced-ventilation

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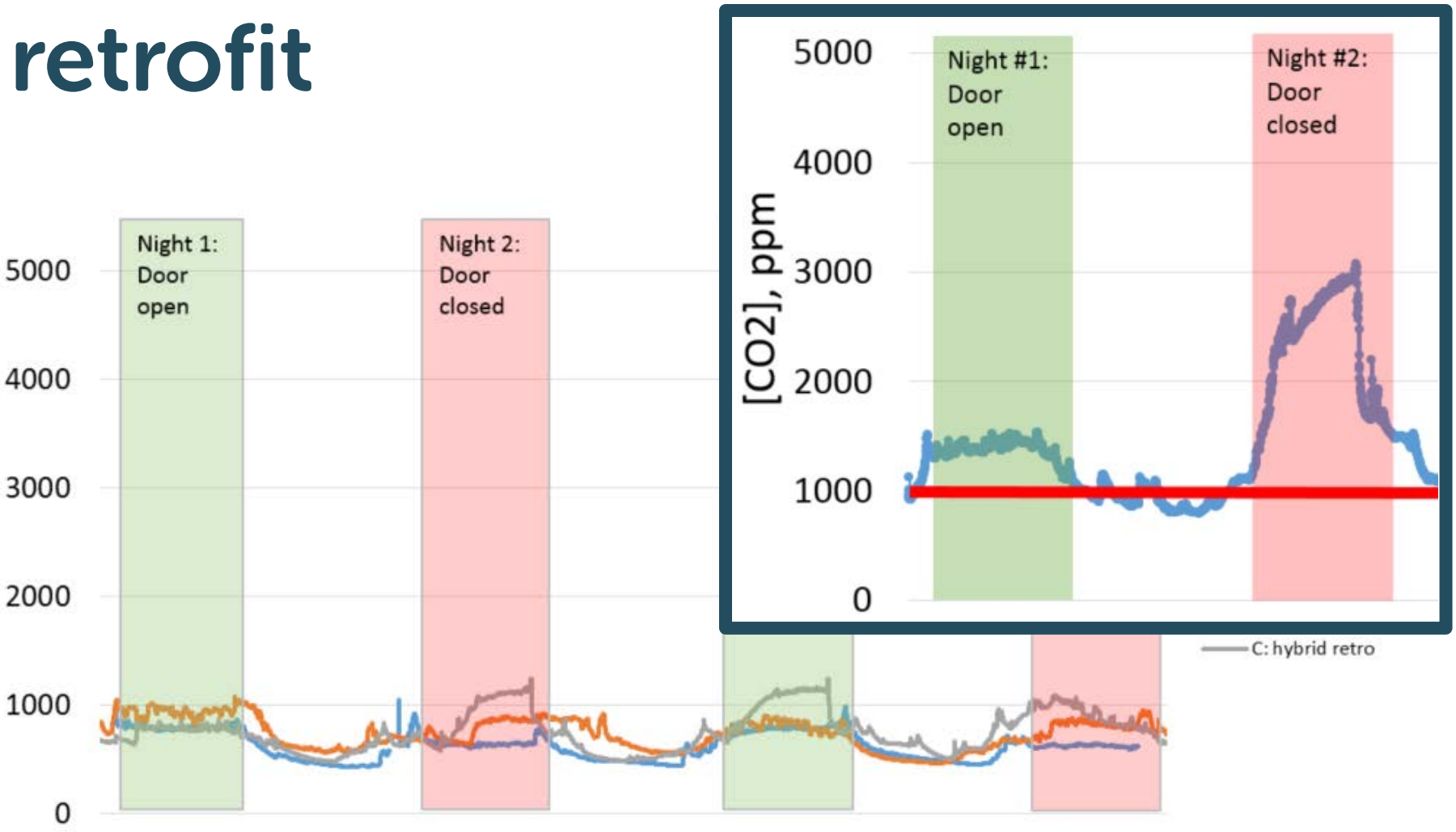
Insulation and ventilation retrofit



*House C: Door closed on night 3, open on night 4

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5. Keep it pest-free

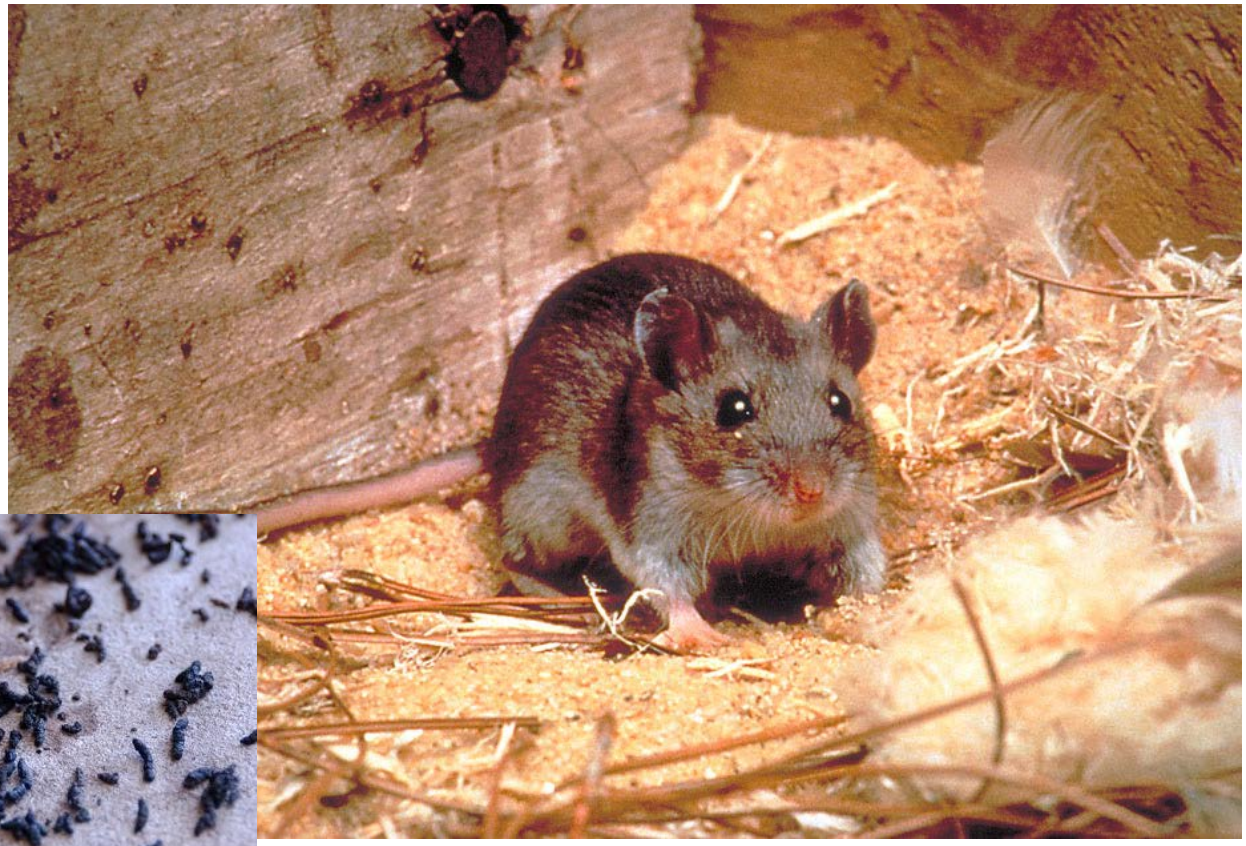

Image: *www.cdc.gov*

Image: *www.epa.gov*

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6. Keep it contaminant-free

Image: *www.cdc.gov*

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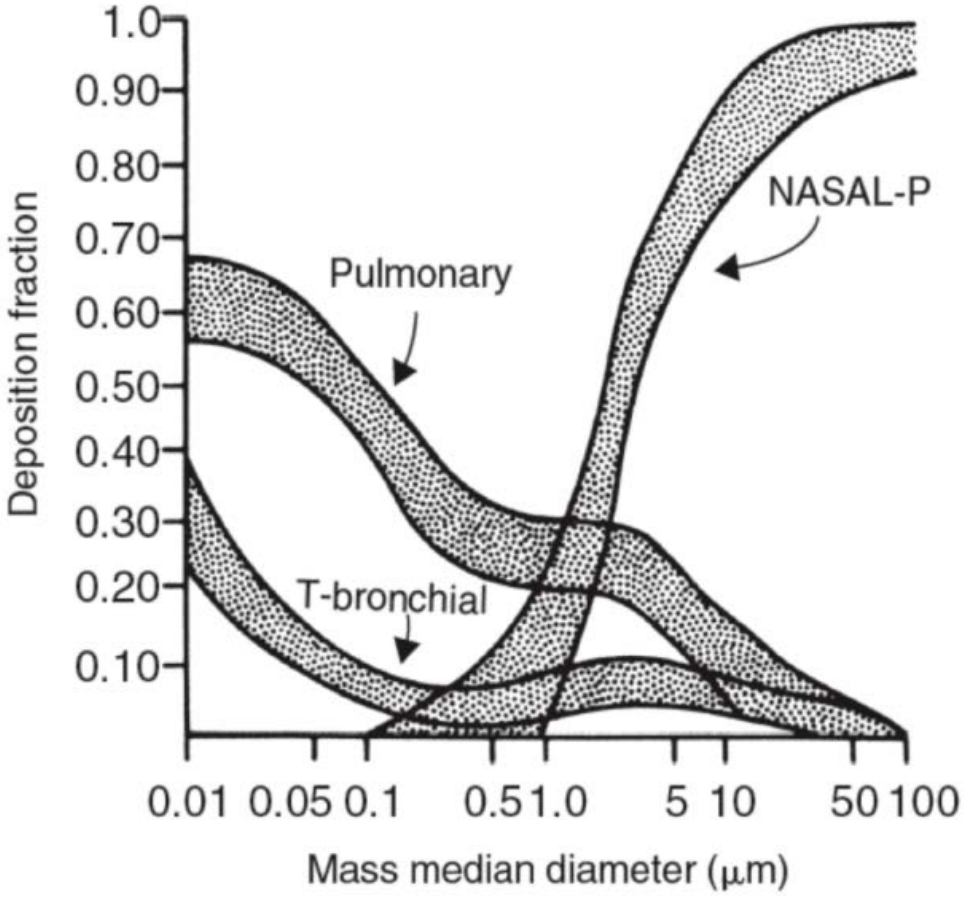
7. Keep it well-maintained

Image: *www.energy.gov*

Image: *www.energy.gov*

Image: *www.usfa.fema.gov*

Human filters



Task Group on Lung Dynamics (1996). *Health Physics.* 12: 173.

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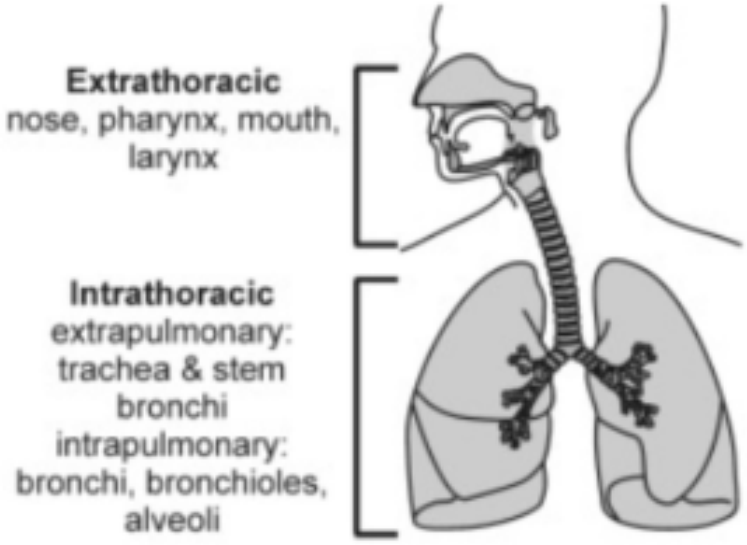
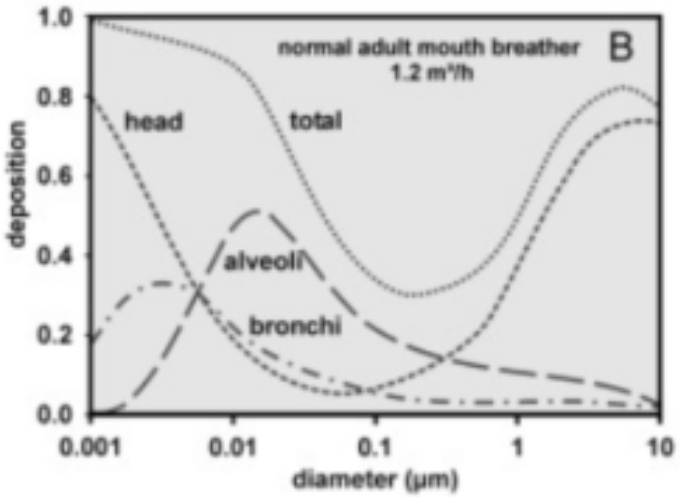
Human filters, cont.





Geiser and Kreyling, *Deposition and biokinetics of inhaled nanoparticles*, 2010, DOI: 10.1186/1743-8977-7-2

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Store-bought filters (cheaper)

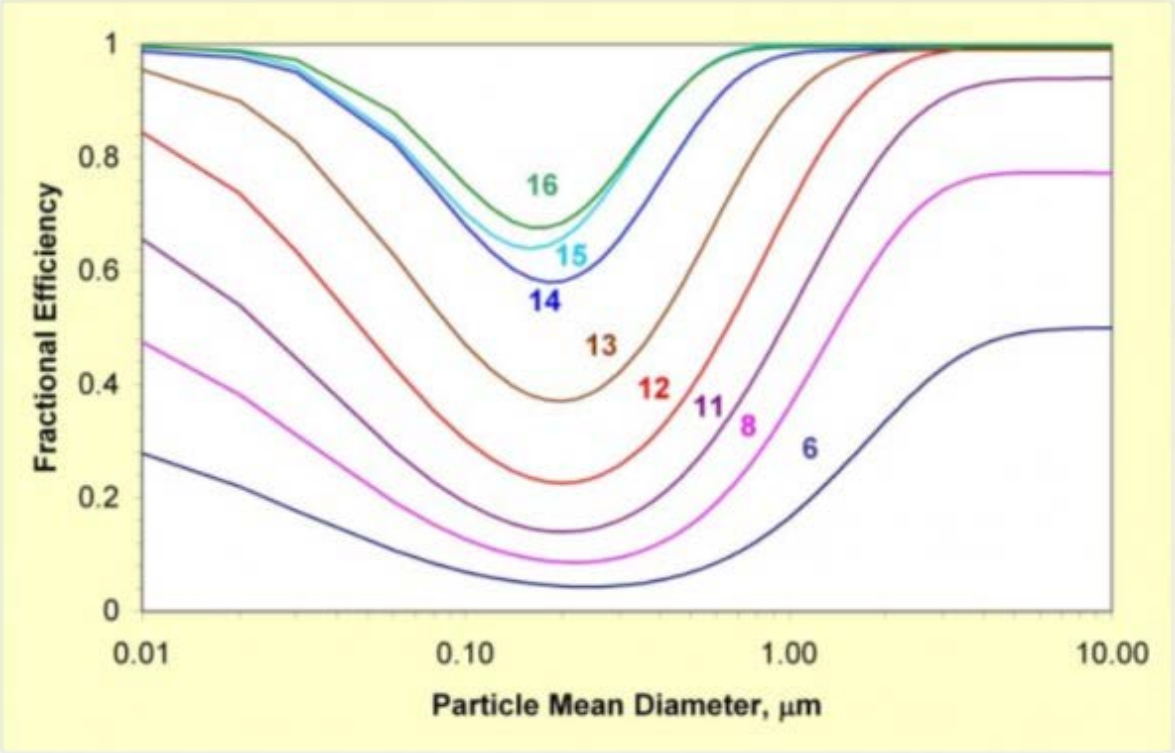

Figure 4 Composite of all MERV filter models, based on initial conditions.

MERV Filter Models, National Air Filtration Association, https://www.nafahq.org/merv-filter-models/

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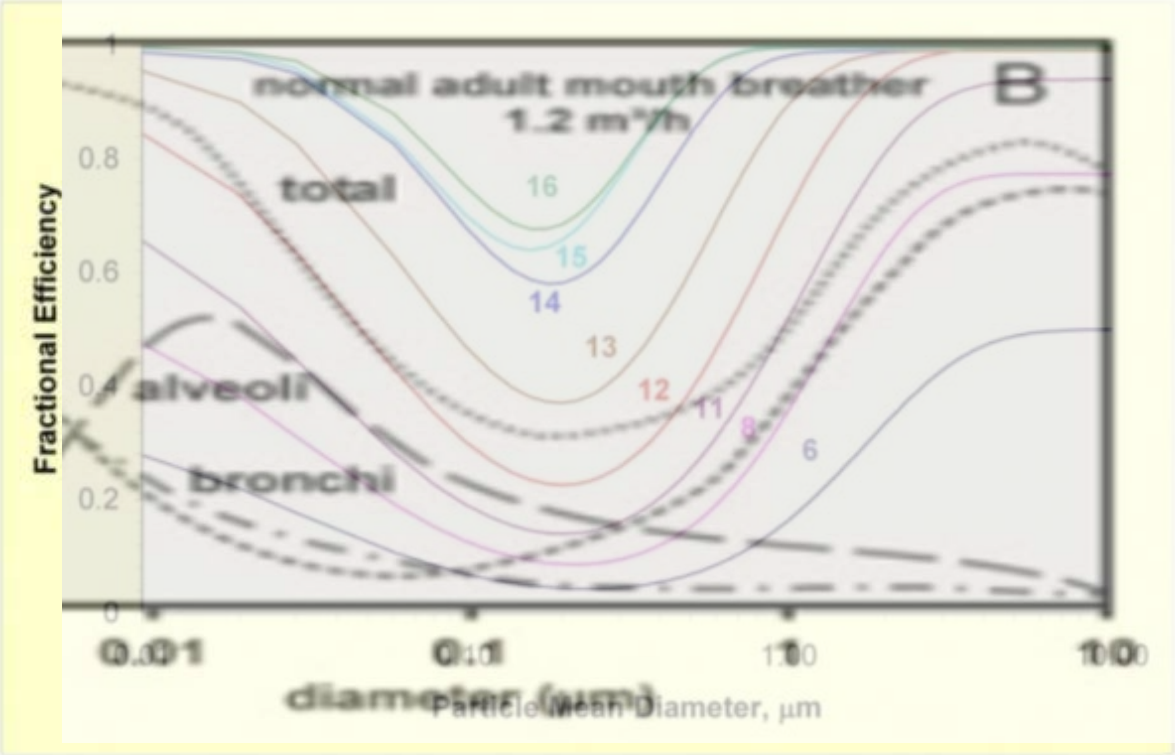
Human vs. store-bought



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8. Keep it thermally controlled

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8 Healthy Homes Principles

Dry

Pest-Free

Clean

Contaminant-Free

Safe

Maintained

Well Ventilated

Thermally Controlled

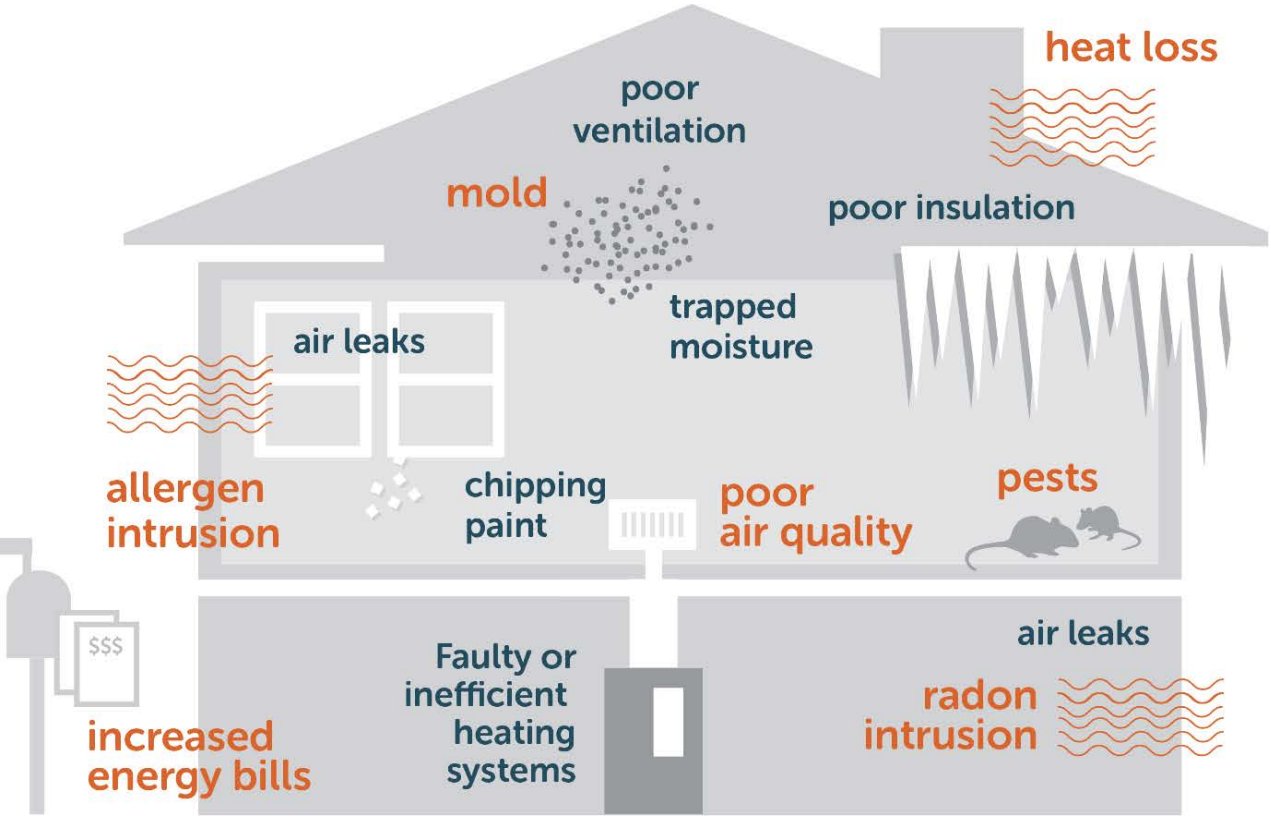
Principles:

U.S. Department of Housing and Urban Development

Graphic:

airmid healthgroup

Efficiency + Health:



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Materials and design

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Material priorities

1. Surfaces and finishes that you (or your food) interact with routinely (touch / inhale)
2. Surfaces and finishes that surround you and that you interact with occasionally
3. “Behind the walls”
3. What you bring into your home
4. Design smartly and thoughtfully
5. Fresh air system (balanced ventilation)

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Design strategies

Big, **common** items to avoid where possible

- Attached/tuck-under garage
- Wall-to-wall carpeting
- Basements (especially finished spaces) prone to mold/moisture problems, or stored chemicals
- High temp/humidity indoor conditions (accelerates off-gassing)

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Design strategies

No combustion equipment if you can swing it

- If you can't, sealed combustion only
- Avoid solid fuel combustion, especially in living areas (particulates, incinerated dust)

Design for easy-to-clean surfaces and spaces to avoid allergens, mold, and particulates from pests, dust/dust mites, mold

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A question we're asked...

Tips & Tools | Questions & Answers

Q: Should I use spray polyurethane foam insulation?

A: Because spray polyurethane foam insulation is activated and cures on site, it should always be installed by a qualified professional. Some occupants may be sensitive (or could become sensitized) to certain components of spray polyurethane foam insulation, either during application or afterwards. Prior to application, talk to your contractor or medical professional, and research the various insulation products available to determine what is appropriate for you, your home, and your specific project. If you choose to have spray polyurethane foam insulation applied in your home, talk to your contractor about how long you should be out of your home during and after application (usually 24-72 hours).

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Would you roast a marshmallow over it?

Pile #1:

- 2x6 cutoffs
- Mineral wool / fiberglass / straw
- Hardwood flooring
- Solid wood cabinets
- Quartz countertop

Pile #2:

- Green treated wood
- Blueboard / pinkboard / spray foam
- Laminate flooring
- Particle board cabinets
- Plastic laminate countertop

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Resources for materials

- Handout
- Green Building Advisor, http://www.greenbuildingadvisor.com/
- BuildingGreen, https://www.buildinggreen.com/
- Environmental Working Group (esp. Healthy Living: Home Guide), http://www.ewg.org/healthyhomeguide/
- Healthy Building Network (esp. Homefree: Products pages), https://homefree.healthybuilding.net/products

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The link between homes and health

"The connection between health and dwelling is one of the most important that exists."

Florence Nightingale

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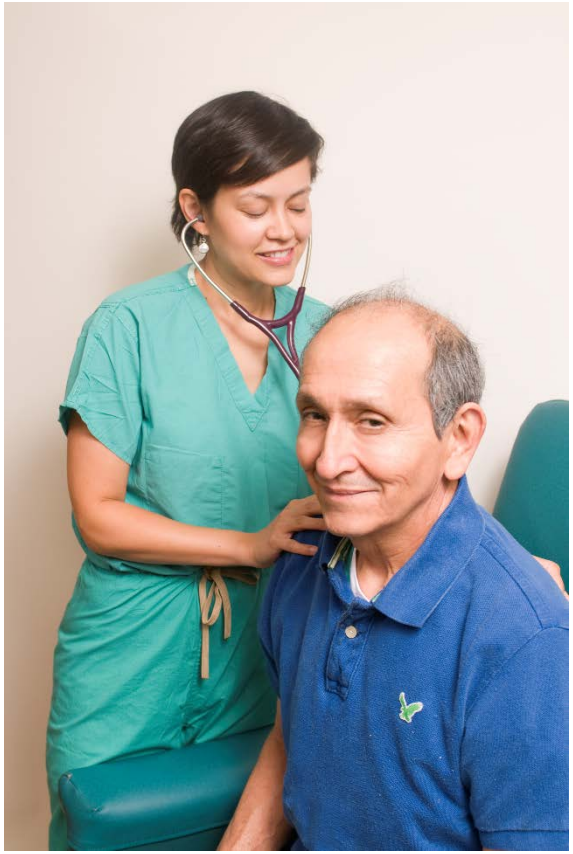
Who's most at risk?

- Children
- Seniors
- Low-income families



Images: *www.cdc.gov*

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Conditions and potential remedies

Presenting Health Condition	Source of Condition	Healthy Home Remedy
"Flu-like" symptoms, headache, dizziness, weakness/fatigue	Carbon monoxide from combustion equipment/wood stoves	Equipment repair, pressure balancing of home
Difficulty breathing, eye irritation, skin reaction, headache, nausea, nose and throat discomfort	Chemical/VOC exposure from cleaning supplies, building materials, candles, etc.	**Properly store household chemicals, remove/replace building materials, ventilation**
Joint, muscle and abdominal pain, nervous system and learning disorders, hypertension	Lead paint (pre-1978 homes), plumbing	**Lead abatement (encapsulation or removal)**
Allergies, asthma, sinus infection	Excessive relative humidity/moisture from condensation, plumbing leaks, poor site drainage	Air sealing, insulation, ventilation, repair leaks and remedy drainage problems
Allergies, asthma, chronic respiratory illness	Excessive dust, poor ventilation, old/dirty carpets in sleeping and living areas	Air sealing, ventilation, carpet removal
Bacterial and viral infections	Pests	**Seal leaks in building, improve insulation**
Respiratory disease, cancer	Radon and soil gases	**Air sealing, remediation**
Hypertension, respiratory and cardiovascular disease	Smoke and emissions from wood stoves and fireplaces	**Homeowner education, equipment repair/upgrade, ventilation**
Heat stroke, hypothermia, chronic chill, COPD, poor mental health	Poor insulation, drafts, faulty heating and cooling equipment	**Air sealing, improve insulation, equipment repair/upgrade**
Shortness of breath, chest pain, fatigue, persistent dry cough, enlarged fingertips	Friable asbestos from insulation or other building materials	Asbestos abatement (encapsulation or removal)

Pilots

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Healthy Homes Initiative

- **Beginning:** RRMC realized patients homes impacting health, could not address; directors meet at conference, hear needs/services; RRMC realizes healthy home=healthy patient (lower healthcare costs)
- **Program:** pilot with no goals; patients with asthma, COPD, accessibility, fall risk, general housing needs referred by RRMC staff; up to 120% AMI
- **Offering:** grant up to $6,000 with matching loan, in some cases 100% grant up to $6,000 (can be more if need)
- **Process:** referral form emailed, site visit, estimates, connect with contractors, project management
- **Tracking:** health conditions, housing needs, installed measures, costs/grants, reason for no service, impact on health after work

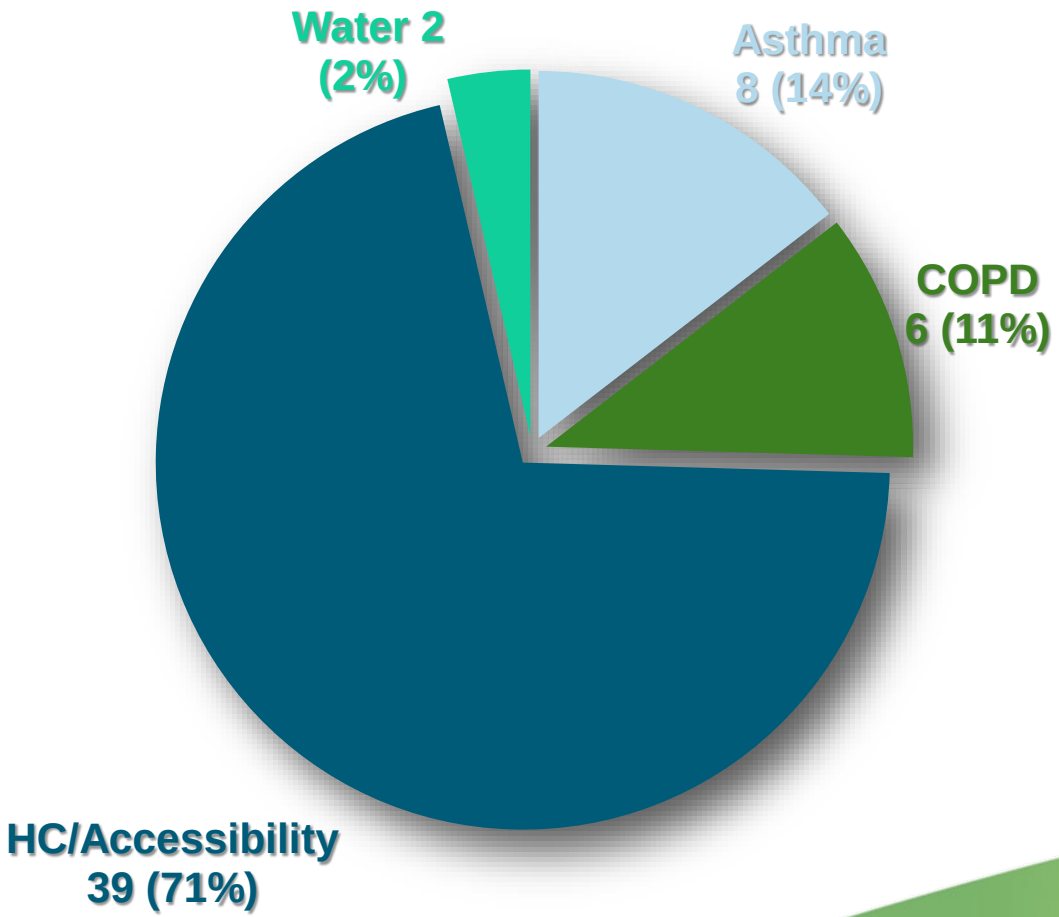
Healthy Homes Initiative

Pilot Program Launch:

- Energy auditors certified: BPI HHE
- Efficiency + Health Training and Falls Training: RRMC staff, contractors, NWWVT staff, agencies
- RRMC Presentations: case workers, pulmonology department, emergency department
- Engage RRMC staff for energy audits on their homes: BEST ADVOCATES
- Establish steering committee; check-in team meetings to gage success, discuss patients, issues

Healthy Homes Initiative

Referrals:



Asthma/COPD Repairs:

- Carpet removal
- IAQ improvements
- Moisture/mold mitigation
- Ventilation
- Weatherization
- Woodstove/pellet removal

Accessibility/Fall Risk Repairs:

- Grab bars
- HC showers, bathroom
- Reduce steps, flr transition
- Railings
- Ramps

Healthy Homes Initiative

Lessons Learned:

- Lengthy program launch
- Patients that rent, difficult to help
- Hard capturing and joining data
- Hand-holding intensive process
- Difficult to get attention of medical staff
- Language: medical vs. construction
- Incorrect info from medical staff to patients
- Hard to maintain communication, relay updates

HOPD: Health Outcomes Demonstration Project

Goal: Evaluating our partnership with medical providers and organizations whereby NWWVT staff take our Home Repair/HEAT Squad services to homes of patients/customers for recommendations to make health, safety, and efficiency upgrades to improve specific health outcomes. Measuring:

- Potential medical cost savings
- Changes in the health status of customers
- Benefits- comfort, security, energy savings; Satisfaction rates

RESULTS: To prove and quantify by data based evidence that partnering with housing organizations and investing medical dollars into preventative home improvements saves money for the health care system.

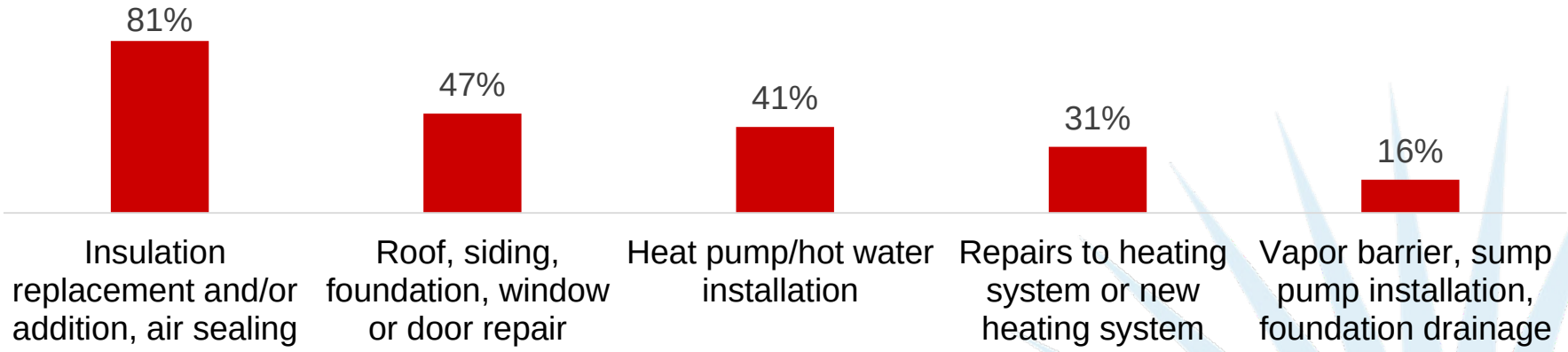
Survey: Round 1=109 customers before service, Round 2=42 of 109 customers after service (completed home repair/weatherization)

Participants: All incomes, majority low-to-mod income homeowners; Rutland County

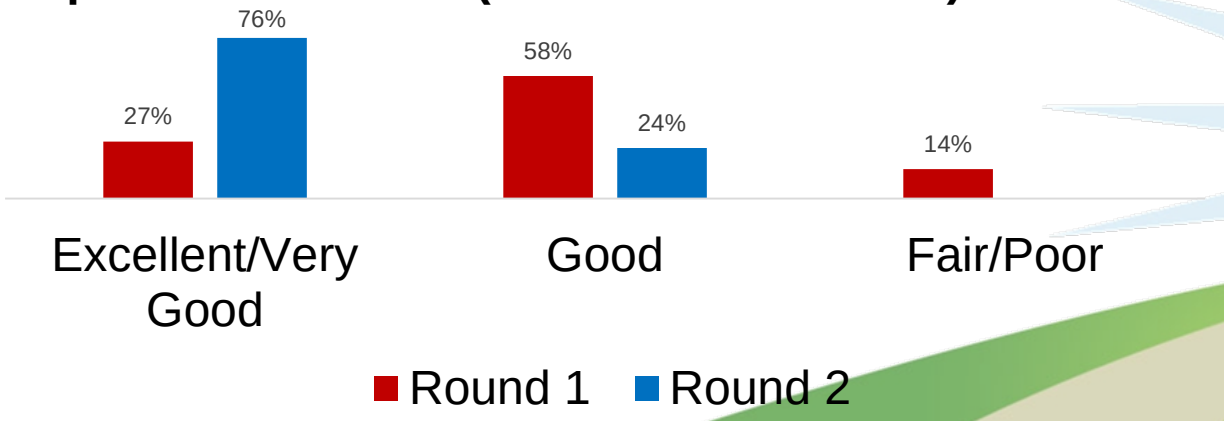
Project funded by Enterprise Community Partners and NeighborWorks America

HOPD: Key Findings from Surveys

1. Highest proportion of survey respondents had weatherization efficiency improvements to their homes since baseline (Fall 2017, Round 2).

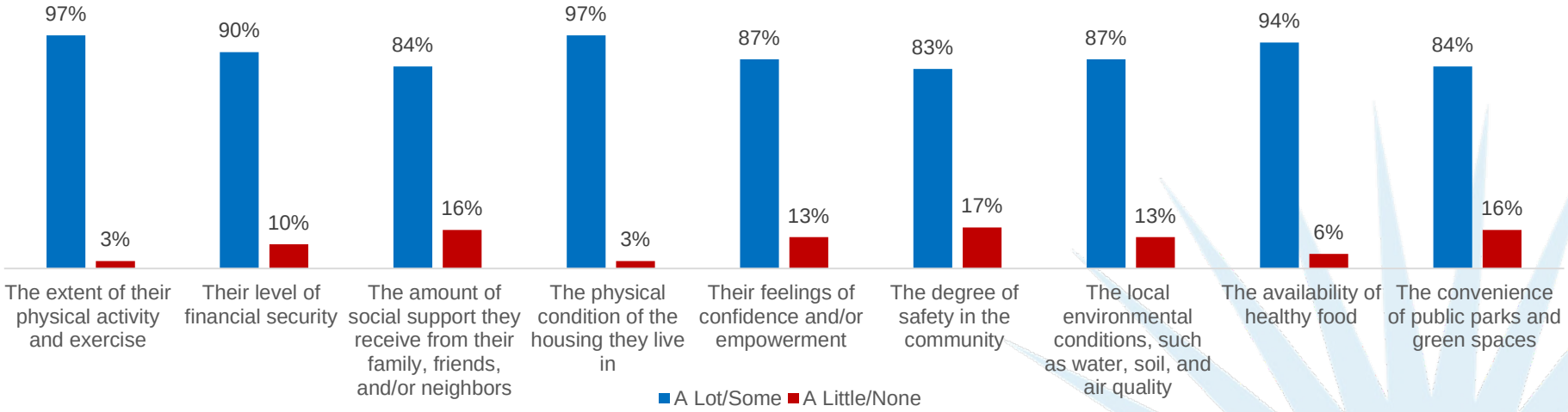


2. Home repairs/weatherization have improved the comfort of survey respondents' homes (Round 1 to Round 2).



HOPD: Key Findings from Surveys

3. Survey respondents have a good understanding of the social determinants of health; this remained consistent from Round 1 to Round 2.



4. Respondents from Round 2 reported some money saved on heating, cooling, and electrical costs after their home improvements and listed things they used the savings for:

- 25% reported savings $1-$250
- 25% reported savings $251-$500
- 25% reported savings $501-$750
- 18% reported savings $751-$1,000
- 7% reported savings $1,000+

Buy health insurance could not previously afford.

Make a doctor's appointment could not do before.

Paying off existing medical expenses.

Purchasing healthy foods could not afford before.

Three Key Takeaways:

1. Engage health professionals for energy efficiency on their own homes:

   BEST ADVOCATES FOR THE PROGRAM!!

2. Never guarantee that weatherization or home repair measures will cure patient condition, we are not healthcare professionals.

3. Make sure process is **Simple and Straight-forward** for health professionals and patients- dealing with many issues at the same time and need time to convert. Extra hand-holding.

Healthy Homes Vision and Goals

Through efficiency, Vermont homes are safe, affordable, comfortable, durable and resilient resulting in an improvement in population health and a reduction in greenhouse gases.

Goal 1: Provide **cost-effective services** that **improve health outcomes while reducing energy burden**.

Goal 2: **Increase impact through** strong, mutually beneficial healthy-home **partnerships**.

Goal 3: Be a **credible and valued leader** in the health/energy nexus.

Goal 4: Create a **clear policy advocacy and regulatory strategy** for healthy, affordable homes.

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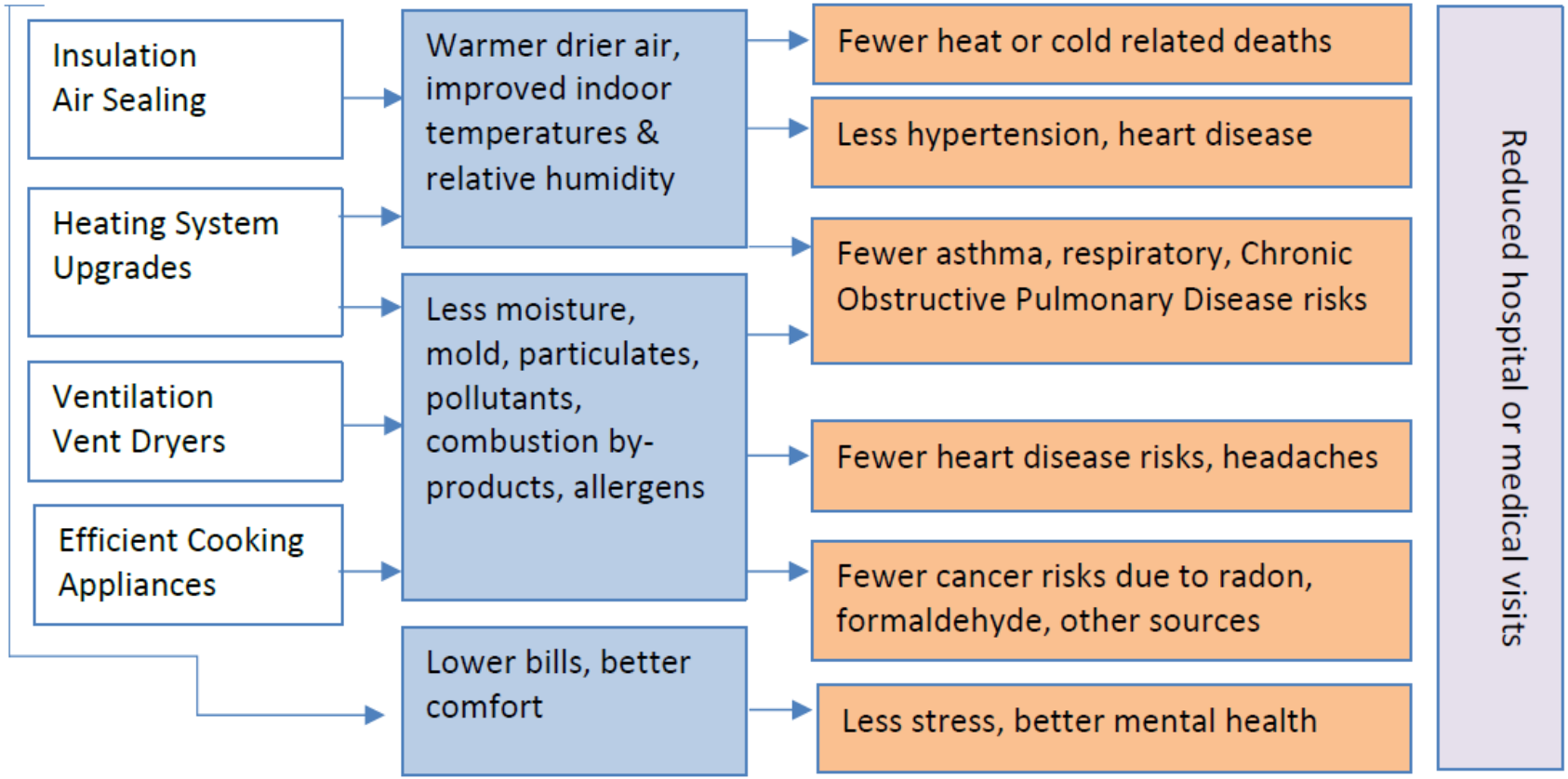
Health Benefits of Energy Efficiency

Figure ES1: Occupant Health and Indoor Environmental Benefits of Residential EE



Tohn, E., et. al. *Occupant Health Benefits of Residential Energy Efficiency.* 2016

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Reported Results

Table ES1: Occupant Health Benefits of Residential EE

Reduced Respiratory & Allergy Symptoms	Other Health Improvements	Reduced Emergency Dept. Visits or Hospitalizations	Indoor Environmental Conditions
Allergies	Headaches	Asthma	Moisture
*Asthma**	Hypertension	Other respiratory	Condensation
Colds	Thermal stress		VOCs
Sinusitis	Overall health		*Formaldehyde*
Throat irritation	Mental health		*Radon*
Wheeze			

Italics: some negative outcomes VOCs: Volatile Organic Compounds

* The majority of studies reported asthma improvements; one study documented mixed results

Tohn, E., et. al. *Occupant Health Benefits of Residential Energy Efficiency.* 2016

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Wx Health Impacts MA

Table E.1. Estimated MA Low-Income Household and Societal NEIs Per Weatherized Unit both With and Without Avoided Death Benefit—Annual per Unit

NEI Value	Annual Per Unit Benefit*				
	Household	Household W/O Avoided Death Benefit	Societal	Total	Total W/O Avoided Death Benefit
Tier 1					
Reduced asthma symptoms	**$9.99**	$9.99	$322.01	**$332.00**	$332.00
Reduced cold-related thermal stress	**$463.21**	$4.67	$33.73	**$496.94**	$38.40
Reduced heat-related thermal stress	**$145.93**	$8.28	$27.00	**$172.93**	$35.28
Fewer missed days at work	**$149.45**	$149.45	$37.36	**$186.81**	$186.81
Tier 2					
Reduced use of short-term, high-interest loans	**$4.72**	$4.72	$0	**$4.72**	$4.72
Reduced CO poisoning (5-year life)	**$36.98**	$0.25	$1.87	**$38.85**	$2.12
Tier 3					
Increased home productivity	**$37.75**	$37.75	$0	**$37.75**	$37.75
Reduced home fires	**$93.84**	$9.77	$17.87**	**$111.71**	$27.37**
Annual Total—per weatherized home	**$941.87**	**$224.88**	**$439.84**	**$1,381.71**	**$664.45**

*For CO poisoning, the annual NEI is to be applied over the 5-year life of the CO monitor. The remaining NEIs are to be applied annually over the life of the relevant measure (e.g., 20 years for weatherization).
**For home fires, the avoided injuries and deaths to firefighters are categorized as a societal benefit.

Tonn, B., et. al. *Low –Income Single-Family Health- and Safety-Related Non-Energy impacts Study.* 2016

Wx Health Impacts VT

The estimated 10-year economic benefit per household is nearly three times greater than the initial expense.

Benefit category	Primary beneficiary	First-year benefit	10-year benefit
Thermal and electric energy cost savings	Household	$1,174	$11,740
Reduced impacts of asthma, cold, and heat*	Household	$276	$2,762
Reduced fine particulate emissions	Public	$1,026	$10,255
Total	**Household + public**	**$2,476**	**$24,757**

**More benefits are expected but could not be quantified, such as better mental and social health, fewer accidental injuries, and increased productivity.*

Wx improves the home

- Reduced energy bills
- Improved temperature control
- Improved indoor air quality
- Enhanced safety
- Reduced humidity
- Reduced mold
- Reduced pest intrusion

VT Dept. of Health, *Weatherization + Health: Health and Climate Change Co-Benefits of Home Weatherization in Vermont.* 2018

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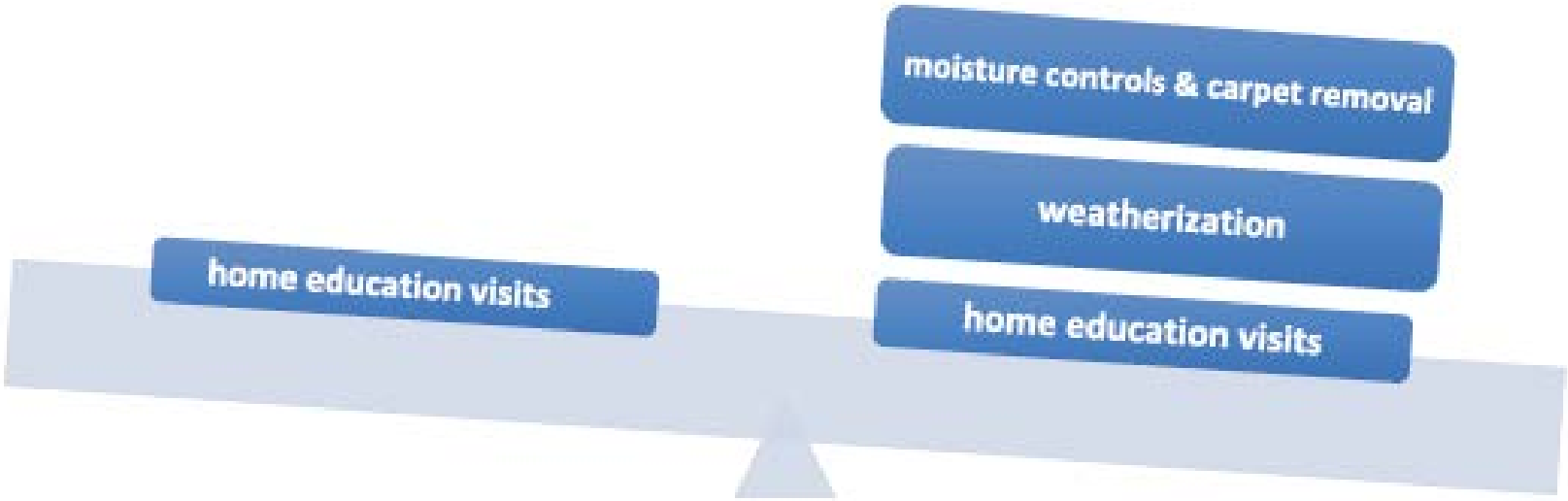
Wx + Health - Washington

- 23% less uncontrolled asthma when Wx plus health added to in-home asthma education services



Breysse, J., et. al. *Effect of Weatherization Combined with Community Health Worker In-Home Education on Asthma Control.* 2014

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Massachusetts

Those with Asthma + COPD…

Baseline	COPD No	COPD Yes
	Mean	Mean
Emergency room visits	0.39	0.93
Doctor visits**	0.36	1.42
Hospitalizations	0.29	0.56
Times on antibiotics for chest problems*	0.47	1.30
Symptoms* (lower is better)	49.49	60.81
Activity* (lower is better)	74.70	84.58
Impact (lower is better)	52.25	56.22
ACT score (higher is better)	14.14	13.67
PSS-4 score (lower is better)	7.78	8.00
GERD**	2.47	5.37
Several days/wk or more	Percent	Percent
Episodes of wheezing	32.76	40.74
Shortness of breath*	54.24	81.48
Cough	69.49	77.78
Phlegm	38.98	62.96
3+ Respiratory attacks*	15.52	37.04
	n=59	n=27

Were less healthy at baseline,

*Difference is Significant at $p<0.05$

**Difference is Significant at $p<0.01$

Turcotte, D., et. al. *home Interventions for Older Adults with Asthma.* 2018

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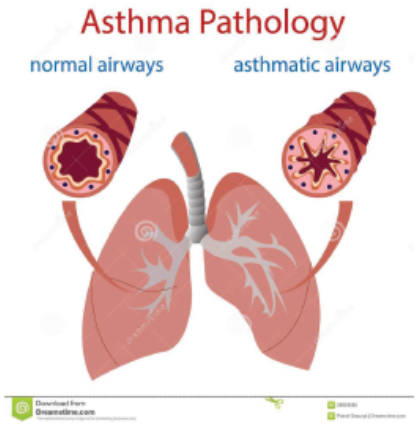
Massachusetts

but improved more after the intervention.

*Change from baseline to follow up is significant at p<0.05

**Difference is Significant at p<0.05

***Difference is Significant at p<0.01



Change	COPD No	COPD Yes
	Mean	Mean
Emergency room visits**	0	-0.69
Doctor visits***	-0.12	-1.28*
Hospitalizations	-0.1	-0.31
Times on antibiotics for chest problems	-0.12	-0.84
Symptoms (lower is better)	-10.13*	-16.98*
Activity (lower is better)	-4.56	-6.36
Impact (lower is better)	-12.69*	-16.44*
ACT score (higher is better)	2.64*	1.76*
PSS-4 score (lower is better)	0	0.52
GERD	-0.42	-1.36
Several days/wk or more	Percent	Percent
Episodes of wheezing	-9.16	-20.74
Shortness of breath	-17.88	-41.48*
Cough	-33.69*	-21.78
Phlegm	-6.84	-14.96
3+ respiratory attacks	-13.56*	-16.21
	n=59	n=27

Turcotte, D., et. al. *home Interventions for Older Adults with Asthma.* 2018

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OneCareVermont

Prevalence of COPD and Asthma in the OneCare Vermont Attributed

Payer	COPD			Asthma			Total Attributed Population		
	Adults Age 19+	Children Age 0-18	Total	Adults Age 19+	Children Age 0-18	Total	Adults	Children	Total
Medicaid	630 5%	14 0.10%	644 2%	1,533 11%	1,433 10%	2,966 10%	14,022	14,571	28,593
Medicare	4,538 12%	-	4,538 12%	2,966 8%	-	2,966 8%	37,996	-	37,996
BCBS	261 1%	-	261 1%	1,055 4%	208 5%	1,263 4%	26,110	4,072	30,182
Total	5,429 7%	14 0%	5,443 6%	5,554 7%	1,641 9%	7,195 7%	78,128	18,643	96,771

COPD & Asthma are defined using The Johns Hopkins ACG software. Johns Hopkins uses Expanded Diagnosis Clusters (EDC) to assign a diagnosis found in claims or encounter data to one of the 282 EDCs that are clinically similar. EDCs are used to describe the prevalence of specific diseases within a single population, compare disease distributions and aid in disease management.

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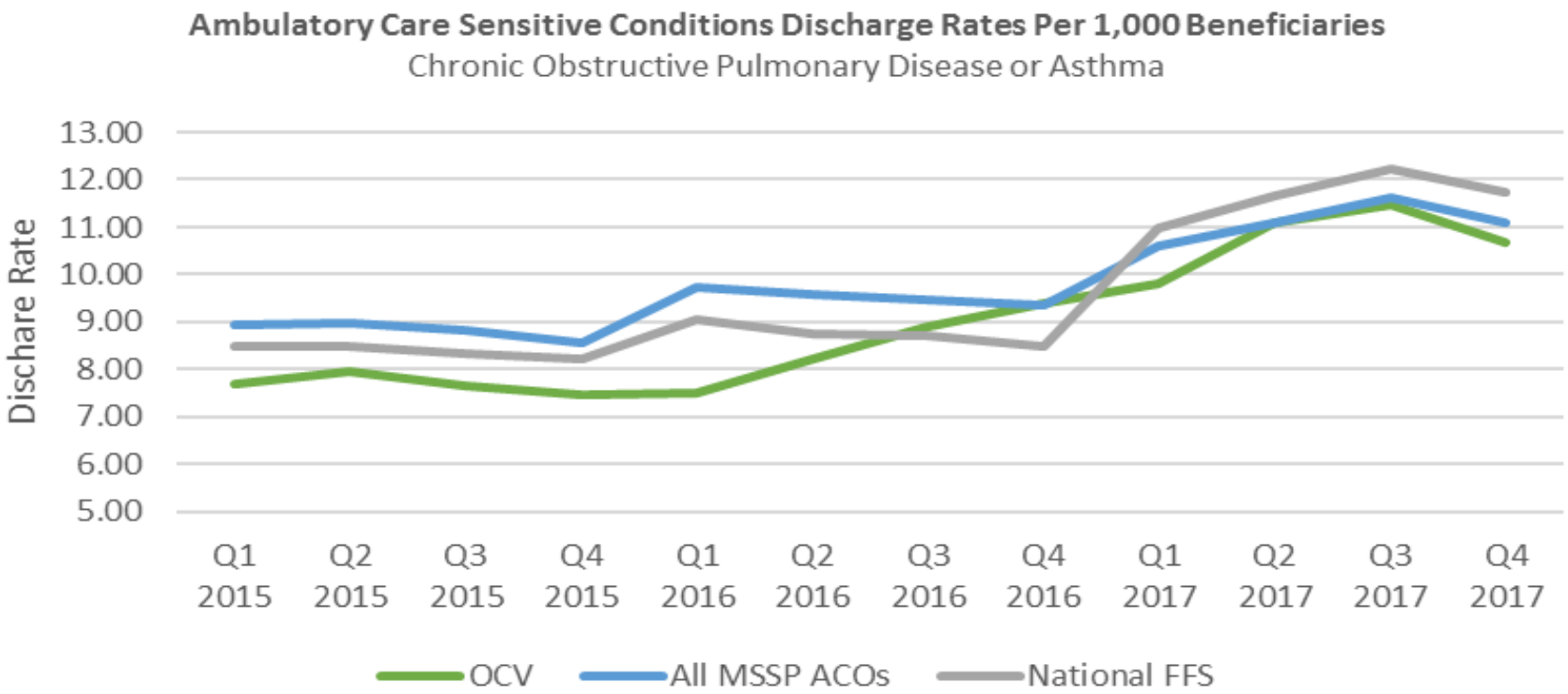
Medicare Ambulatory Care Sensitive Conditions

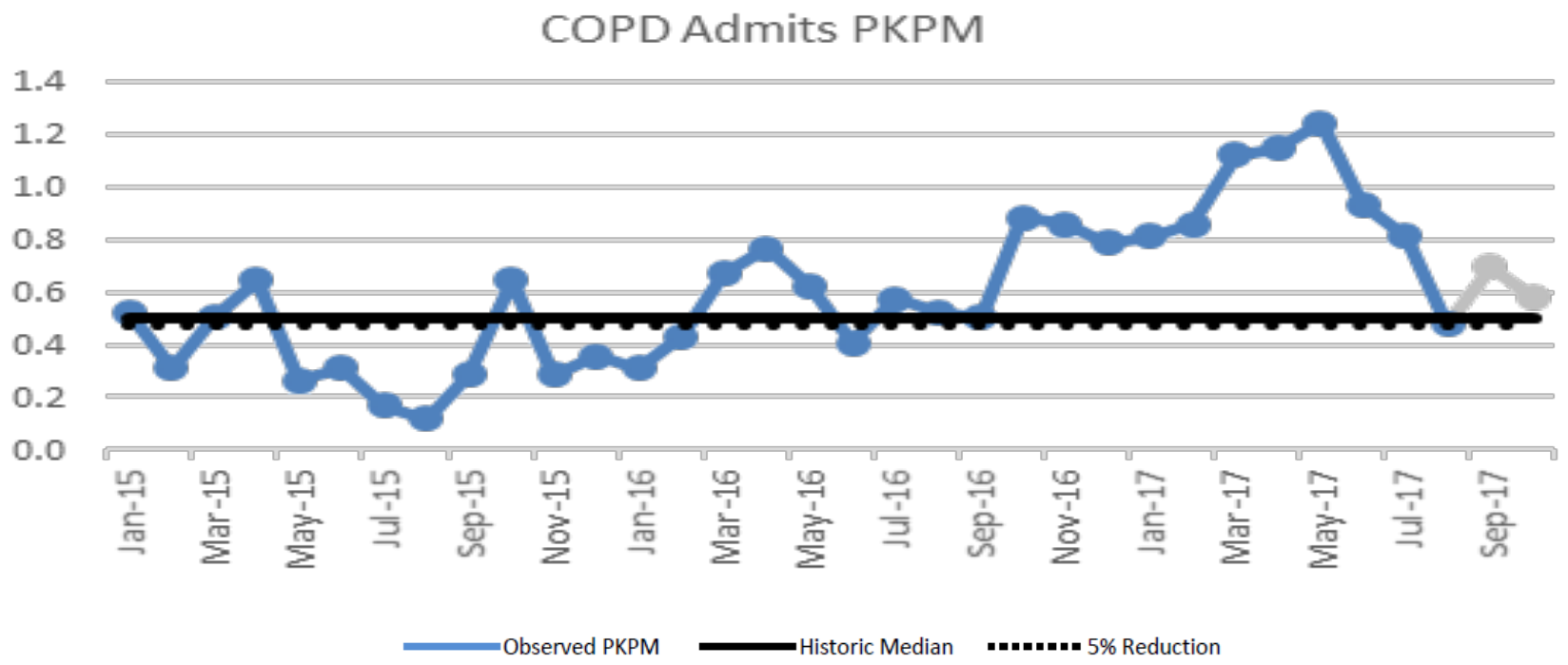


Data provided by CMS from Quarterly Aggregate Expenditure/Utilization Report Medicare Shared Savings Program
National FFS – National Fee For Service Benchmark
All MSSP ACOS – Currently active MSSP ACOs

OneCareVermont

Clinical & Quality Advisory Committee Initiatives

Medicare Goal: Reduce ambulatory sensitive conditions admissions/readmissions by 5%



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COPD Admissions: Admissions with a principal diagnosis of chronic obstructive pulmonary disease (COPD) (excluding acute bronchitis), admissions with a principal diagnosis of asthma, or admissions with a principal diagnosis of acute bronchitis AND a secondary diagnosis for COPD (excluding acute bronchitis) for members age 40 and older, excluding obstetric admissions, transfers from other institutions and any admission with a discharge diagnosis of cystic fibrosis and anomalies of the respiratory system.

What impact can VT have on population health through healthy housing?

HH Pilot Design

- 10 homes
- High ED/hospital users with COPD and/or uncontrolled asthma
- Self-managed care, basic supplies, HH assessment and coaching, and Wx + Health retrofit
- Pre and post IAQ, OAQ, health and energy monitoring
  - PM 2.5, CO2, NO2, radon, RH, temp

Choosing Health
NORTHEASTERN VERMONT REGIONAL HOSPITAL

VERMONT'S WEATHERIZATION PROGRAM

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HH Pilot Lessons

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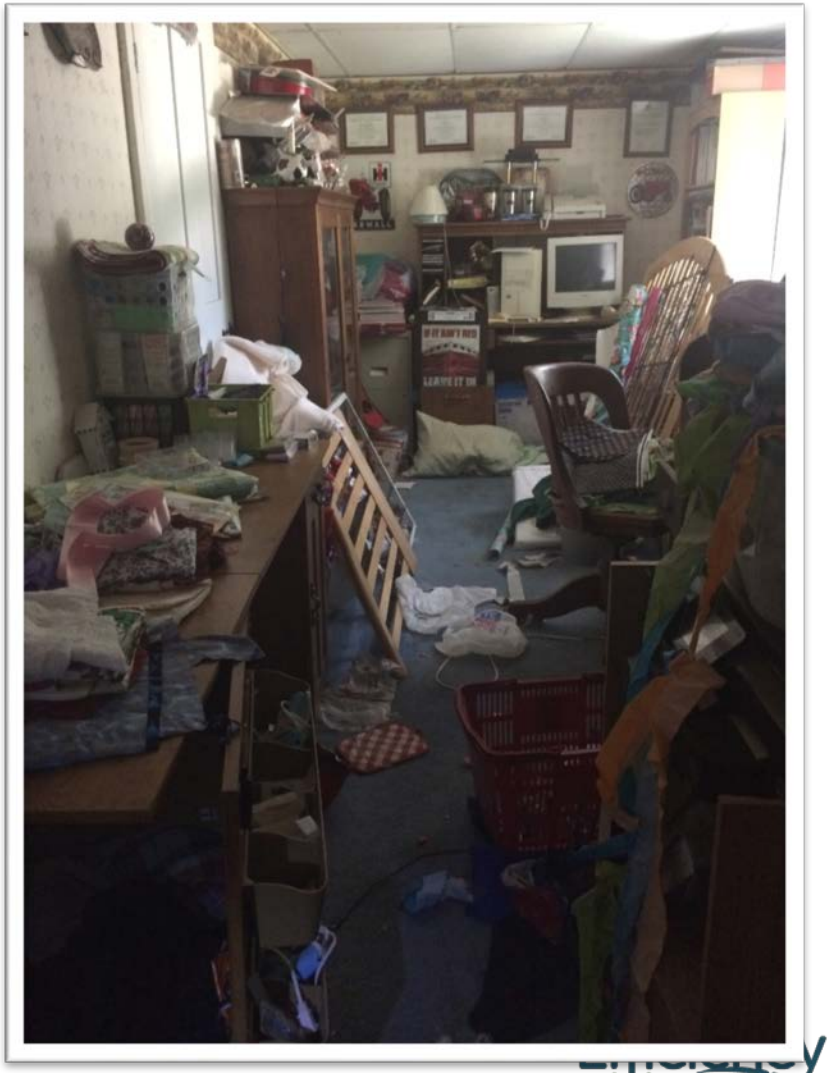
HH Pilot Lessons



Vermont

HH Pilot Lessons

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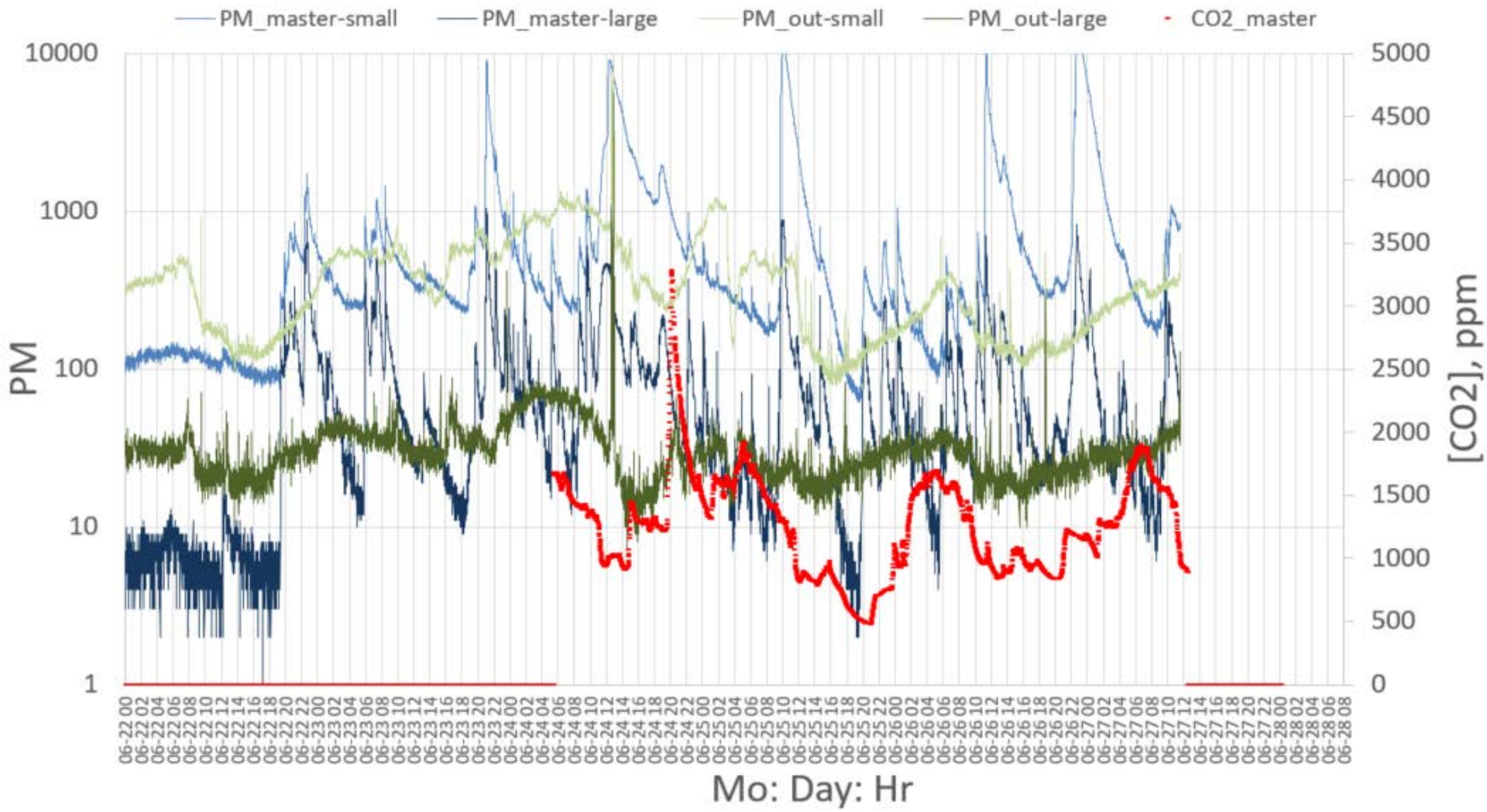
HH Pilot: Before



HH Interventions

- Self-managed care coaching
- Thermal shell
- Moisture management
- Heating systems
- Combustion safety
- Advanced ventilation
- Basic supplies and cleaning coaching
- Trash hauling

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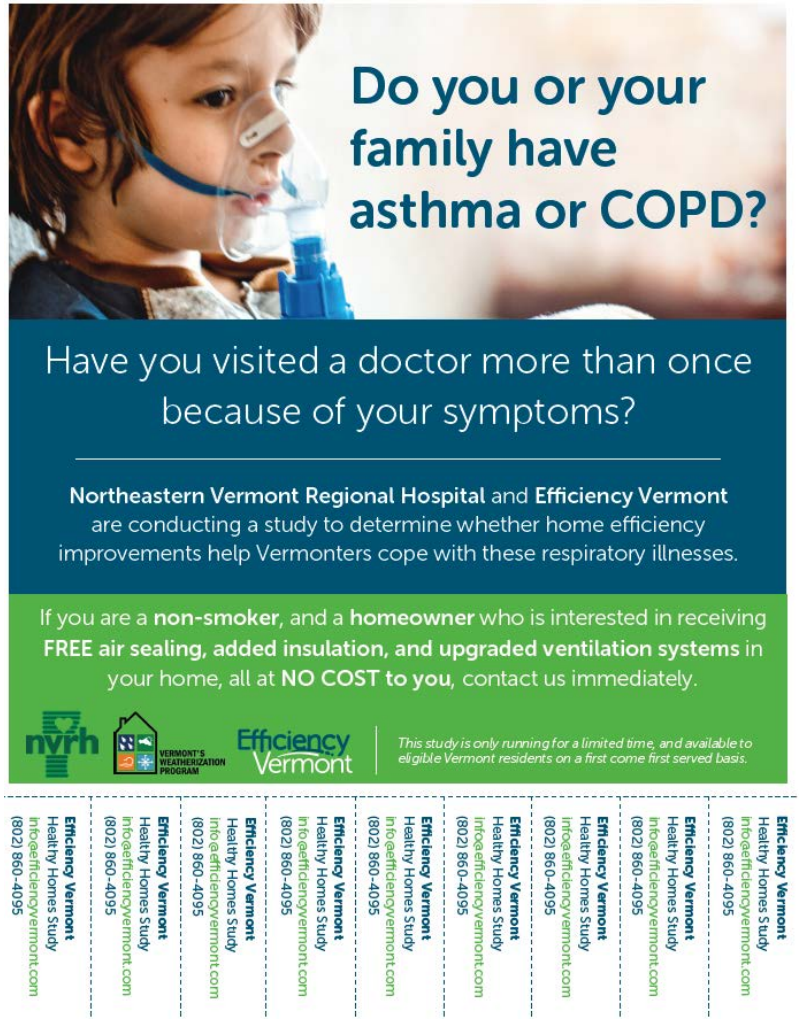
HH Lessons Learned

- Customer acquisition and readiness
- Customer expectations & long-term supplies
- Resource braiding
- Scopes of work
- Overall timeline
- Mission-driven partners – AMAZING!



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Efficiency Vermont resources

- Phone **consultations**
- **Public talks**
- Healthy Homes Evaluator **training** for contractors
- **Rebates** on efficiency projects and products that can improve indoor environmental quality

HEAT SAVER LOAN

Efficiency Excellence Network

Efficiency Vermont

Efficiency Vermont

2019 HH Pilot Work

- NVRH /NETO continued
- Springfield / SEVCA
  - 10 home - asthma
- UVM MC CHT / VDH / CV OEO
  - 20 homes – injury prevention
- UVM MC PP Pilot
  - 3-4 homes cystic fibrosis (pending approval and funding)

Springfield Hospital
SPRINGFIELD MEDICAL CARE SYSTEMS
Where People Come First

THE University of Vermont MEDICAL CENTER

VERMONT'S WEATHERIZATION PROGRAM

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Sustainable Funding

- Quantifying health savings
- Braiding resources
- Rx for home assessments and improvement funding

VERMONT
DEPARTMENT OF HEALTH

Efficiency Vermont

Acknowledgements

In addition to the afore mentioned partners…

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Three3

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An Affiliate of Rutland Regional Health Services

NeighborWorks® OF WESTERN VERMONT

CET CENTER FOR ECOTECHNOLOGY

ROCIS

WEATHERIZATION PLUS HEALTH

NEW YORK STATE OF OPPORTUNITY. NYSERDA

BERKELEY LAB

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Integrating health into your business

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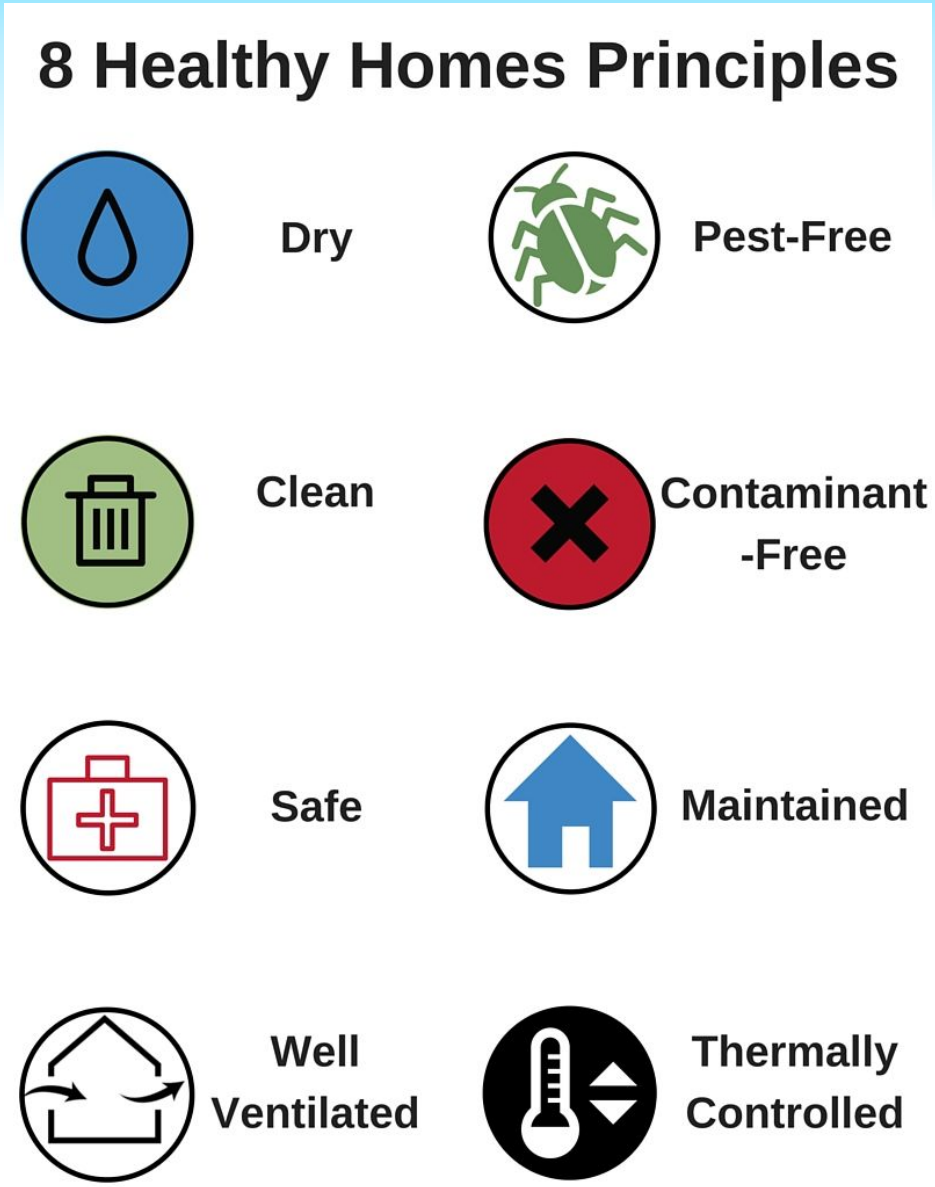
Principles of healthy housing



Healthy Homes Playbook

- What HH is and is not at EVT
- Key Partners and Stakeholders
- EVT HH Service Offerings Processes and Procedures
  - EVT direct and EVT supported via EEN
- Supplemental Info

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Insert Participant activity

Discussion:

- Are your customers mentioning health today?
- What do you do now related to health?
- What's working (talking points, work scopes, implementation, etc.)?
- What hasn't worked, or has backfired?

Principles: U.S. Department of Housing and Urban Development

Graphic: airmid healthgroup

Q:

What are 2-3 things you plan to do differently in your own home or workplace?

(Take two minutes to brainstorm with the person next to you)

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Additional Resources

- Vermont Required Lead-Safe Practices for Contractors
- American Housing Survey (AHS)
- BPI Technical Standards for the Building Analyst Professional: BPI Standards
- BPI Healthy Home Evaluator Candidate Handbook
- US Environmental Protection Agency Healthy Indoor Environment Protocols for Home Energy Upgrades
- US Department of Health and Human Services and US Department of Housing and Urban Development Healthy Housing Reference Manual
- US Department of Health and Human Services and US Department of Housing and Urban Development Healthy Housing Inspection Manual
- US Department of Housing and Urban Development Office of Healthy Homes and Lead Hazard Control The Healthy Homes Program Guidance Manual
- Institute of Medicine, *Clearing the Air: Asthma and Indoor Air Exposures.* Washington, DC: The National Academies Press. 2000. https://doi.org/10.17226/9610.
- Institute of Medicine. 2004. Damp Indoor Spaces and Health. Washington, DC: The National Academies Press. https://doi.org/10.17226/11011.
- Kanchongkittiphon, Watcharoot et al. "Indoor environmental exposures and exacerbation of asthma: an update to the 2000 review by the Institute of Medicine" *Environmental health perspectives* vol. 123,1 (2014): 6-20.

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Equipment Displayed

- Foobot
- uHoo
- AirVisual Pro
- Dylos DC 1700
- GreenEye
- 1% CO2 Meter Data Logger
- Hobo RH/Temp

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Thank you!

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