



# Healthy Housing and Asthma

## The Comprehensive Healthy Homes Model and Innovative Best Practices

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**Green & Healthy Homes initiative**

**June 15, 2023 / Michigan Asthma Partnership Forum**



# Today's topics

1. The concept of a Healthy Home
2. The “house as a system”
3. GHHI Comprehensive Assessment/Intervention Model
4. The 8 principles of healthy housing
5. Healthy Homes and Asthma

# The burden of unhealthy and energy inefficient homes



30M families live in unhealthy homes



Homes with environmental hazards are making their residents sick

14.4M missed days of school each year



Asthma is the top reason students miss school

14.2M missed days of work each year



Collateral burden of sick children is missed days of work for parents and caretakers

\$51B+ spent on asthma



\$31B+ spent on slip & fall injuries



\$43B+ spent on lead poisoning



Over \$100B in taxpayer funding is spent each year to address the impact of these hazards

Low-income families spend 20% of monthly income on energy costs



VS.

3.5% in other households

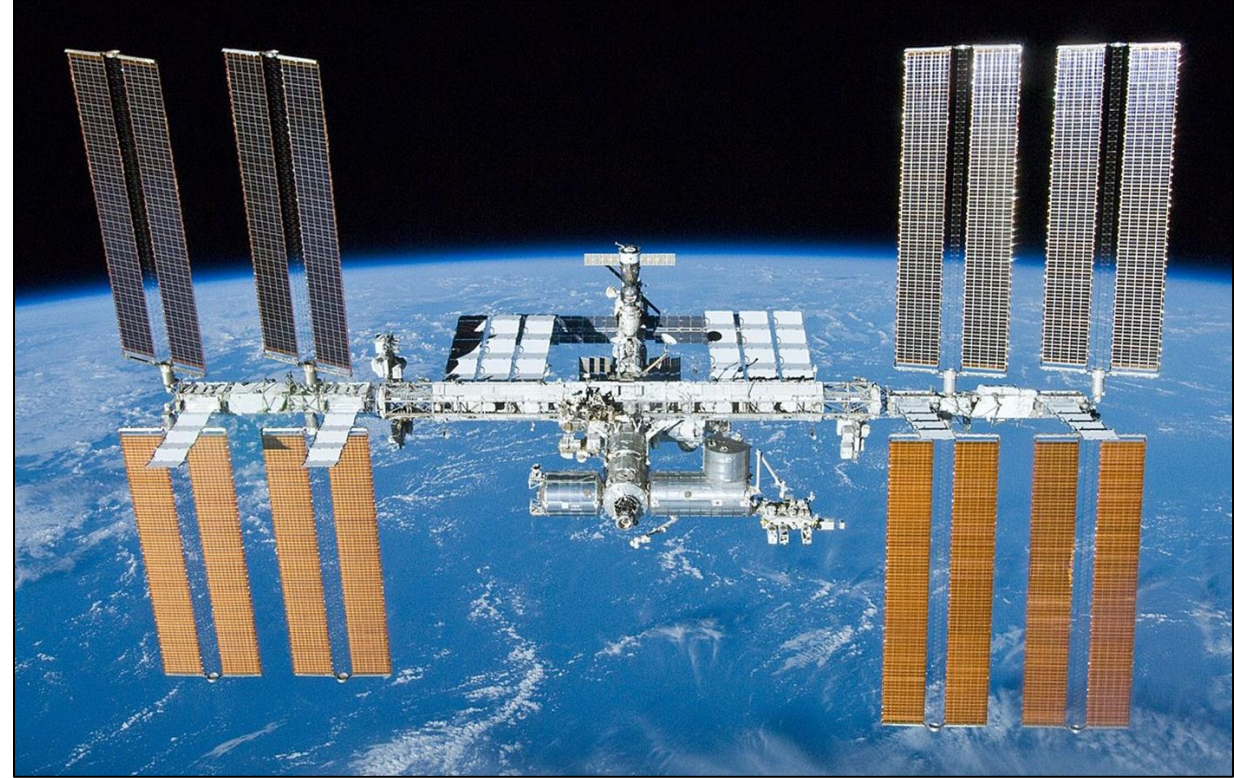
# The 8 Elements of a Healthy Home - Principles & the Healthy Homes Rating System (HHRs) 29 Hazards



8 Principles of Healthy Housing	29 HHRs Hazards
1. Keep it Dry	Dampness & Mold Growth;
2. Well Ventilated	Excess Cold; Excess Heat;
3. Contaminant Free	Water Supply; Asbestos; Biocides; Carbon Monoxide; Lead-based Paint; Radon; Uncombusted Fuel; Volatile Organic Compounds
4. Keep it Pest Free	Domestic Hygiene
5. Well Maintained	Lighting; Noise;
6. Keep it Safe	Falls in bath; Falls on stairs; Falls on level; Falls from windows; Electrical hazards; Fire hazards; Hot surfaces; Collisions and Entrapment; Explosions; Structural collapse; Ergonomics; Entry by intruders
7. Keep it Clean	Food Safety; Personal Hygiene; Crowding and Space
8. Make it Energy-Efficient	

# The typical home...Full of systems...

Home performance impacts the occupant's Health, Safety, and Comfort



- Foundation system
- Wall system
- Roof system
- Heating system

- Cooling system
- Ventilation system
- Flooring system
- Ceiling system

- Exhaust system
- Moisture control system
- Plumbing system
- Electric system, etc....





# Need to address the hazards comprehensively

**When systems are not working properly, bad things happen:**

1. Moisture / Mold growth
2. Structural hazards
3. Pest infestations
4. Lead-based chipping and peeling paint
5. VOCs and chemical exposures
6. Asbestos exposure
7. Injuries and accidents
8. Carbon Monoxide exposure
9. Fire and electrical hazards
10. Radon exposure

**The Key is Integration:**

Comprehensive Assessments, Education, and Interventions





# **GHHI Comprehensive Assessment and Intervention Model**



# What is the whole-house strategy?

**Comprehensive and integrated home-based, multi-hazards, multi-component client education, home assessment, and house modifications**

In order to address:

- Lead-based paint hazards
- Asthma triggers (Mold, pests, VOCs, etc.)
- Injury hazards (Falls, fire, poisoning, etc.)
- Radon and asbestos hazards
- Energy efficiency/weatherization issues

**All conducted by cross-trained assessors, educators, and crews to address housing issues holistically.**







# Step 1 - Hazard recognition

1. Fundamental step in hazard control
2. Hazards Recognition requires:
  - Understanding the **mechanisms of generation** and release of the agents. (i.e., nature, source)
  - Knowledge on the conditions for **exposure** and possible associated **health effects**.
3. Essential to establish **priorities for action** and to select appropriate **control strategies**.

## Steps in Hazard Control

Hazard  
Recognition



Hazard  
Prioritization



Risk Mngt. Approach to  
Home Modifications



## Step 2 - Hazard Prioritization

### Linking deficiencies to hazards

1. Assessor identifies deficiencies throughout the home and connects them to hazards.
2. When an assessor finds a hazard, two key judgements are applied:
  - What is the likelihood of a dangerous occurrence as a result of this hazard and
  - If there is such an occurrence, what would be the likely severity of the outcome

Deficiency → Hazard → Likelihood → Outcome



## Step 3 - Severity of outcomes from hazard exposure

Classification	Potential Outcomes
<b>Extreme</b>	Death, lung cancer, coma, major burn injuries, etc.
<b>Severe</b>	Asthma, lead poisoning, loss of a hand or foot, serious fractures, heart attack, etc.
<b>Serious</b>	Eye disorders, sleep disturbance, mild heart attack, concussion, etc.
<b>Moderate</b>	Severe discomfort, occasional mild pneumonia, broken finger, severe bruising to body, regular serious coughs or colds, etc.

**Deficiency** ➔ **Hazard** ➔ **Likelihood** ➔ **Outcome**



Mold hazards

Moisture

Dryer vent

Asthma, infections, toxicity

Irritant, asthma trigger, moisture

Mold

Poor IAQ

No air filtration

Radiator

Asthma, infections, toxicity

Irritant, asthma trigger, moisture

Mold

Asthma, respiratory illness

Injury hazard, asthma trigger

VOC, Fire hazard

Asthma, cardiopulmonary disease

Irritant, asthma trigger, moisture

Particulate matter

Asbestosis, mesothelioma, cancer

Lung lesions

Asbestos







# Step 4 - Health & safety risk management process

## Hazard evaluation and analysis

1. Identification of Hazards

2. Health & Safety Risk Assessment

3. Obtain enough details to justify prioritization

4. Prioritization of Health & Safety Risks

Resources

## Risk management strategies

### Goals:

1. Eliminate
2. Mitigate
3. Accept
4. Avoid
5. Transfer or share



# GHHI Model: Comprehensive, integrated home-based, multi-hazards, multi-component interventions





# Healthy Homes and Asthma



# Common Asthma Triggers

Things in your home environment that cause asthma episodes or attacks.

Housing related

1. Moisture & Mold
2. Dust Mites
3. Cockroaches
4. Mice and Rats
5. Combustion By-products

In-between

6. Chemical Odors
7. Dust accumulation

Behavior related

8. Tobacco Smoke
9. Dogs & cats







# 1<sup>st</sup> Element – Keep it dry



Sources: HUD and CDC

1. Moisture in houses provide a nurturing environment for mites, roaches, rodents, and molds, all of which are **associated with asthma**.
2. High levels of moisture within the house envelope leads poor indoor air quality and can trigger **asthma symptoms**.
3. **Goal** - Water (in any of it forms) is not inside the house envelope, either by entering through roof leaks, improper drainage around the foundation, or through the interior plumbing.

# Areas where you would find moisture issues

1. **Bathroom** – Around fixtures (e.g., shower, tub, sink) and on the walls, ceiling or floor.
2. **Kitchen** – Leaky fixtures, drainpipes, appliances, human activities.
3. **Basements** – Wet or damp basements and crawl spaces (e.g., foundation walls, dirt floors, around windows/doors, appliances).
4. **Attics** – Leaky roofs, moisture from below, plumbing defects (e.g., sprinklers).
5. **Whole house** – Broken windows, window AC units, around exterior doors, leaky pipes, condensation from occupant activities.



Poor draining from appliances



Leaky water lines



Damaged windows



## Health outcomes associated to moisture

Health outcomes	High moisture
<b>1. Worsening of the indoor air quality</b>	<ul style="list-style-type: none"><li>• Associated with increased incidence of respiratory disease.</li><li>• Increases levels of mold and dust mites. <b>All known to be asthma triggers.</b></li><li>• Promotes off gassing of VOCs from housing components.</li></ul>
<b>2. Pest infestations</b>	<ul style="list-style-type: none"><li>• Creates environment favorable to bacteria, dust mites, cockroach, and rodents.</li></ul>
<b>3. Physical injury</b>	<ul style="list-style-type: none"><li>• Causes structural damaged, rusted metal and other degradation that can lead to injuries.</li></ul>
<b>4. Slip &amp; falls</b>	<ul style="list-style-type: none"><li>• Condensation makes surfaces slippery potentially resulting on trip and falls hazards.</li></ul>
<b>5. Lead poisoning</b>	<ul style="list-style-type: none"><li>• Blistering paint leading to peeling, chipping, and cracking paint in pre-1978 homes causing lead-based paint hazards.</li></ul>





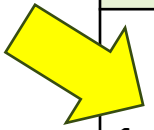


## Moisture issues: Mold growth

- Responsible for allergies, infections, and toxic effects.
- In nature, functions in the degradation of biological (organic) matter.
- Needs a carbon source to grow. (Building materials)
- Excess moisture causes mold growth indoors.



## Health outcomes associated to mold

Types	Description
 1. Asthma, allergic reactions	<ul style="list-style-type: none"><li>• <b>Mold produces allergens and irritants</b></li><li>• Enough evidence of an association between indoor fungal exposure and exacerbation of asthma in sensitized children.</li><li>• <b>Non-specific irritation in the airways</b></li></ul>
2. Infections	<ul style="list-style-type: none"><li>• Inflammatory condition caused by a fungus.</li><li>• Some kinds of fungal infections are lung infections (histoplasmosis), athlete's foot, fingernail infections, etc.</li></ul>
3. Toxic reactions, mycotoxins	<ul style="list-style-type: none"><li>• Attached to mold spores. Toxic effect causing tissue damage.</li></ul>





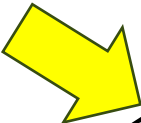


...Comes in different shapes, on different surfaces





# Moisture problems: Dust mites

- 
1. Major contributor of allergens (asthma triggers) in the house dust
  2. Microscopic insects, 200 to 500  $\mu\text{m}$  in size.
  3. Fecal pellets - diameter of 10–40  $\mu\text{m}$
  4. Live in everyone's house: beds, stuffed furniture, carpets, etc.
  5. Depend on water in ambient air
  6. Thriving at  $> 50\%$  RH and 65-80° F





## Sources of moisture

# Roof deficiencies







No-slope gutter



Short downspout



Separated downspout



Clogged gutter

## Sources of moisture

### Deficient gutters, downspouts, and soil gradient



Negative soil gradient

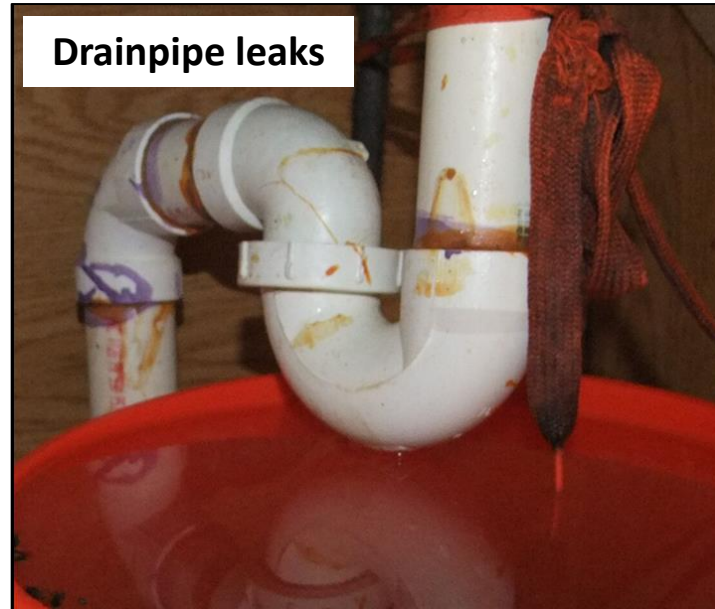




# Signs of moisture from condensation



Sources of moisture  
**Plumbing leaks  
and draining  
issues**





# Sources of moisture

## Water vapor from combustion



Flame roll-out



Detached sections of flue



Space heater: one gallon of moisture per gallon of fuel



Flue not sealed to chimney



# Sources of water vapor: People, pets, and plants

# Strategies and measures for moisture & mold control

Asthma Trigger	Strategies	Housing Measures
<p><b>Keep out water</b></p> <p><b>Mold</b></p> <p><b>Remove water vapor</b></p>	1. Bulk Water Management	<ul style="list-style-type: none"> <li>• <b>Gutter &amp; downspout repair (extensions) or replacement</b> \$</li> <li>• Sump pumps repair (check valve, drain) or replacement \$\$</li> <li>• Increase soil gradient (6" slope per 6' distance) \$\$\$</li> <li>• Roof repairs/replacement \$\$\$\$</li> </ul>
	2. Repairs/Replacement/Maintain House Components, appliances	<ul style="list-style-type: none"> <li>• <b>General repairs: Plumbing, cooling appliances, DWH</b> \$</li> <li>• Replace broken or damaged window/door \$\$</li> </ul>
	3. Water-proofing	<ul style="list-style-type: none"> <li>• Sealing penetrations in foundation and gaps around windows and doors (Caulking, weather-strip) \$</li> <li>• <b>Repairing structural water leaks</b> \$\$</li> <li>• Install vapor barrier (6 mil poly) \$\$\$</li> </ul>
	4. <b>Remediation (Remove mold)</b>	<ul style="list-style-type: none"> <li>• <b>Prof. mold remediation</b> (&gt; 10 ft<sup>2</sup>) (pre/post sampling) \$\$\$\$</li> </ul>
	5. Environmental Control: Increased Venting	<ul style="list-style-type: none"> <li>• <b>Vent clothes dryer to the outside.</b> \$</li> <li>• <b>Vent combustion appliances to the outside.</b> \$\$</li> <li>• <b>Exhaust fans in bathrooms &amp; kitchen</b> (to the outside) \$\$\$</li> </ul>
	6. Environmental Control: Reduce/Maintain Rel. Humidity	<ul style="list-style-type: none"> <li>• <b>Reduce indoor humidity: Install air conditioners and/or self draining dehumidifiers</b> (help keep the RH level &lt; 50%) \$</li> </ul>
	7. Environmental Control: Dust Particles Control	<ul style="list-style-type: none"> <li>• HEPA vacuum, indoor allergen reduction, air filtration, captures up to 99.97% of particles &gt;0.3 μm \$</li> <li>• <b>Remove carpets with polished flooring (Laminated flooring, wood, tile) (Steam cleaning?)</b> \$\$</li> </ul>





## 2<sup>nd</sup> Element – Keep it well-ventilated



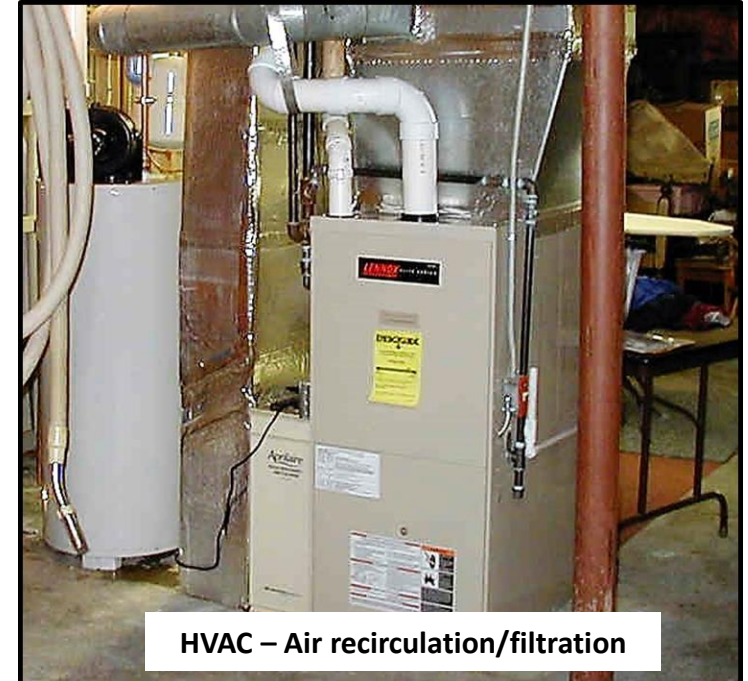
Sources: HUD and CDC

1. Poor ventilation accounts for higher rates of respiratory irritation and illness in housing.
2. We spend 70 – 80% of the time indoors, being exposed to 2-5x higher conc. of pollutants than the outdoors. (USEPA)
3. Studies show that increasing the fresh air supply in a home improves respiratory health.
4. Ventilate to supply fresh air to reduce concentration of contaminants in the home.



# What is ventilation?

1. Replacement/exchange of stale inside air with fresh outside air.
2. Dilutes or remove contaminants reducing their harmful effects.
3. Improves and maintains respiratory health in the home.
4. Two types of ventilation: Mechanical vs. natural
5. Mechanical ventilation: Whole-house vs. spot ventilation



HVAC – Air recirculation/filtration



Spot ventilation/Exhaust fan

# Sources of indoor air pollutants

- 1. Combustion appliances:** Combustion appliances not properly maintained or poorly vented to outside.
- 2. Consumer products:** from cleaning products, off-gassing from plastics and construction materials, tobacco smoke
- 3. High moisture:** Water Intrusion, plumbing leaks, human activities, etc.
- 4. Cooking process:** Burning of organic matter during cooking during high-temp. activities (i.e., formaldehyde, acrolein, and Polycyclic aromatic hydrocarbons (PAHs))

Carbon monoxide + particulates



Volatile organic compounds



Formaldehyde + acrolein





# Health outcomes associated to poor IAQ

Hazards/Sources	Health outcomes
1. Carbon Monoxide (CO) (Combustion)	<ul style="list-style-type: none"> <li>• Chronic/acute health outcomes</li> <li>• Fatigue, headaches, dizziness</li> <li>• CO poisoning</li> </ul>
2. Nitrogen Dioxide (NO <sub>2</sub> ) (Combustion)	<ul style="list-style-type: none"> <li>• <b>Asthma exacerbation</b> (Irritant)</li> <li>• Shortness of breath</li> </ul>
3. Particulate Matter (PM <sub>10</sub> , PM <sub>2.5</sub> ) (Combustion)	<ul style="list-style-type: none"> <li>• Chronic/acute health outcomes</li> <li>• Irritation of airways, <b>asthma exacerbation</b></li> <li>• Cardiovascular and pulmonary diseases</li> </ul>
4. Moisture, mold (Human activities, leaks, etc.)	<ul style="list-style-type: none"> <li>• <b>Asthma exacerbation</b>, allergies</li> <li>• Toxic reactions</li> <li>• Infections</li> </ul>
6. VOCs (Consumer products, combustion, building materials, etc.)	<ul style="list-style-type: none"> <li>• Chronic/acute health outcomes</li> <li>• Increased risk of cancer</li> <li>• Eye, nose/throat irritation</li> <li>• <b>Asthma exacerbation</b></li> </ul>
5. Radon (Natural decay of uranium)	<ul style="list-style-type: none"> <li>• Chronic health outcomes</li> <li>• Lung cancer (radioactive gas)</li> </ul>



CO + NO<sub>2</sub> + H<sub>2</sub>O + PM



Mold



Particulate matter - dust



**CO and smoke alarms**



**Kitchen exhaust fan**



**Air filters replacement**



**Bathroom exhaust**

## Priorities for the control of household pollutants

- CO and Smoke alarms
- Repair flues ( $\frac{1}{4}$ " rise per ft.)
- Repair/replace defective appliances
- Maintenance – Clean & tune, filtration
- Environmental source control:
  - Reduce temperature
  - Reduce humidity
  - Increase ventilation





## 3<sup>rd</sup> Element – Keep it contaminant-free



Sources: HUD and CDC

1. Chemical exposures include lead, radon, pesticides, volatile organic compounds, and environmental tobacco smoke.
2. Exposures to asbestos particles, radon gas, carbon monoxide, and secondhand tobacco smoke are far higher indoors than outside.



# Types of house contaminants

1. **Lead:** Water Intrusion, plumbing leaks, human activities, etc.
2. **Asbestos** - Inhalation of high levels of asbestos fibers  
Particles present during renovation and demolition of buildings or building products
3. **Radon** - Colorless, odorless, invisible radioactive gas produced by natural decay of uranium in the ground, getting into the air.
4. **VOCs:** Emissions from cleaning products, paints, pesticides, off-gassing from plastics and construction materials, etc.





## Strategies and measures for the control of VOCs

Hazard	Strategies	Housing Measures
<b>VOCs</b>	1. Source control	<ul style="list-style-type: none"><li>• Remove unused chemicals from the home,</li><li>• Use alternative products or products with low VOCs emissions.</li><li>• Allow products to off-gas (i.e., before bringing in)</li></ul>
	2. Increased ventilation	<ul style="list-style-type: none"><li>• Increase ventilation rate - Increasing overall home air exchange rate; diluting effect of VOCs by increasing amount of “fresh air.”</li></ul>
	3. Environmental control	<ul style="list-style-type: none"><li>• Keep temperature and relative humidity as low as comfortably possible - as they go up so does the amount of chemical released.</li></ul>



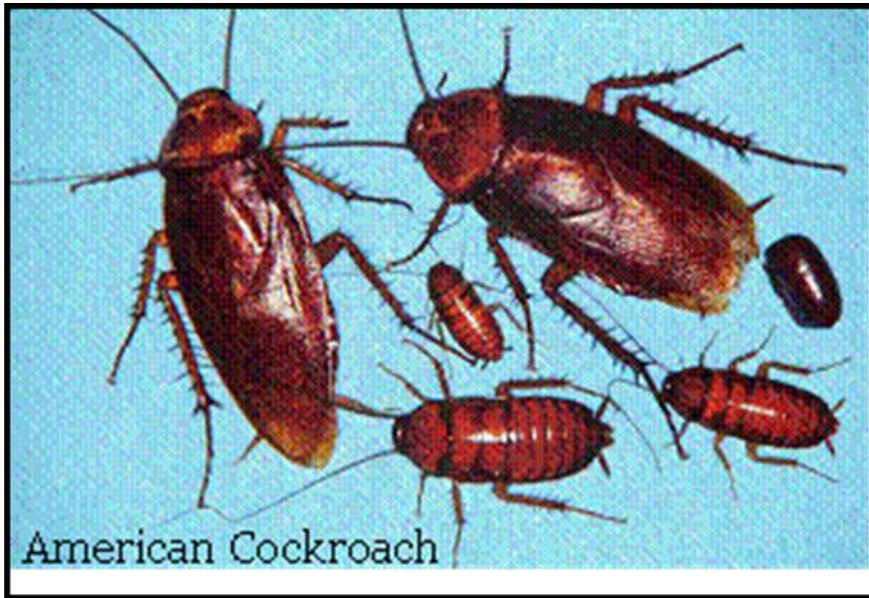
## 4<sup>th</sup> Element – Keep it pest-free



Sources: HUD and CDC

1. There is a causal relationship between exposure to mice and cockroaches and asthma episodes in children;
2. **Goals #1** - Reduces cockroach, mouse, and rat infestations that can trigger **asthma episodes** and other health problems
3. **Goals #2** - Reduces inappropriate treatment for pest infestations that can exacerbate health problems and respiratory illnesses.



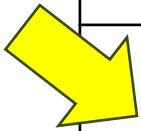


## Most common cockroaches found in the US homes

- **American** – Accidental, opportunistic infestation (i.e., changes in outside temp.)
- **Oriental** – Attracted by indoor moisture
- **German** – Depends on human poor sanitation practices
- **Brown-banded** – Depends on human poor sanitation practices



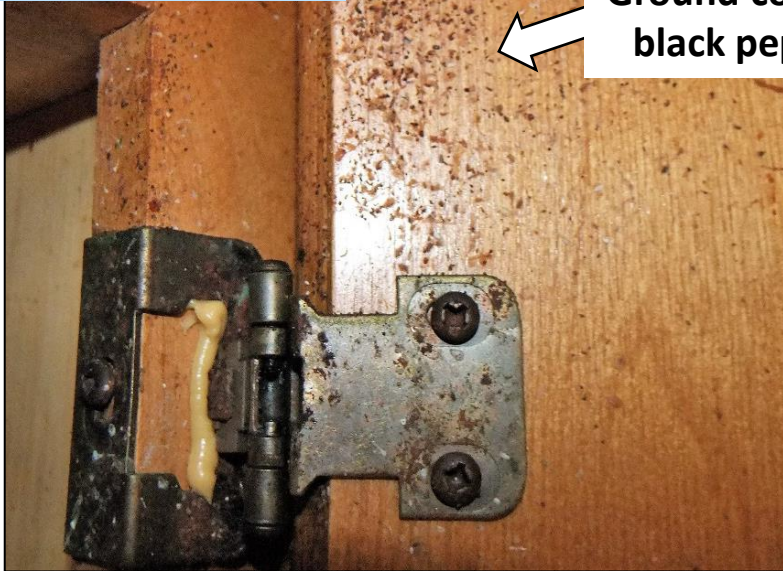
## Health outcomes from exposure to cockroaches

- |   |   |
|---|---|
| <ul style="list-style-type: none"><li>• <b>Mechanical vectors and reservoirs</b></li></ul>  | <ul style="list-style-type: none"><li>• Cockroaches are claimed to be mechanical transmitters of disease-causing microorganisms such as diarrhea, dysentery, typhoid fever and cholera viruses.</li></ul> |
| <ul style="list-style-type: none"><li>• <b>Human pathogens</b></li></ul>  | <ul style="list-style-type: none"><li>• Harboring and transmitting about 40 species of bacteria that cause gastroenteritis in man.</li></ul>  |
|   | <ul style="list-style-type: none"><li>• Intermediate hosts of pathogenic helminths, viruses, fungi, and protozoa.</li></ul>   |
|  <ul style="list-style-type: none"><li>• <b>Asthma</b></li></ul>                                    | <ul style="list-style-type: none"><li>• Cockroach allergens are involved in allergic processes such as asthma.</li></ul>  |
|   | <ul style="list-style-type: none"><li>• Saliva, feces and shed skin of cockroaches can trigger both asthma and allergic responses.</li></ul>  |
| <ul style="list-style-type: none"><li>• These facts are enough to justify the immediate control and eradication of these insects, constituting a threat to public health.</li></ul> |   |

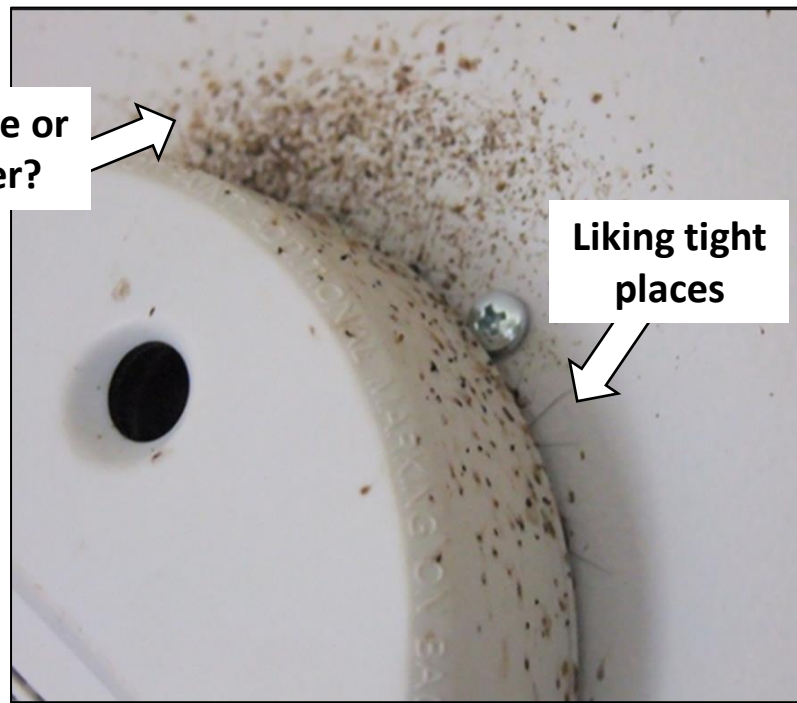
## How Cockroaches Can Make You Sick



## Cockroaches



Ground coffee or black pepper?



Liking tight places



Cockroach debris requires vacuuming

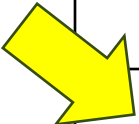
## Cockroach frass and asthma

- Cockroach poop, (“frass”) contains enough allergen to trigger many asthma attacks.
- 8 units allergen needed for an attack.
- Each pellet can contain 500 units of the allergen: enough to trigger over 50 attacks!
- **More cockroaches = More allergen**
- **Cockroach treatment requires follow-up cleaning**

<http://extension.psu.edu/ipm/health/healthpests/asthma>



## Health outcomes from exposure to rodents

<ul style="list-style-type: none"><li>• <b>Human pathogens</b></li></ul>	<ul style="list-style-type: none"><li>• Rodents can carry more than 200 human pathogens, including: Plague (bacteria, flea, rodent), Salmonellosis (bacteria, rodents droppings), Hantavirus (viruses, breathing rodent urine), etc.</li></ul>
 <ul style="list-style-type: none"><li>• <b>Asthma</b></li></ul>	<ul style="list-style-type: none"><li>• Rodents are associated with asthma or asthma symptoms.</li></ul>
<ul style="list-style-type: none"><li>• <b>Physical damage</b></li></ul>	<ul style="list-style-type: none"><li>• Rodents are destructive pests that can spread disease, contaminate food, and destroy property.</li></ul>





# Common signs of rodent infestation



Gnawing marks



Rub marks




All of them



Dead organisms

**Norway Rat**




*rounded ends*

Average Length: 3/4 inches

**Roof Rat**




*pointed ends*

Average Length 1/2 inches

**House Mouse**



*pointed ends*

Average Length 1/4 inches

**Fecal pellets**





# What is Integrated Pest Management (IPM)?

Integrated	Using multiple approaches that work together.
Pest	To address animals/plants having a harmful effect on humans, food or living conditions.
Management	Effective methods with the least possible harm to people, property, and the environment.





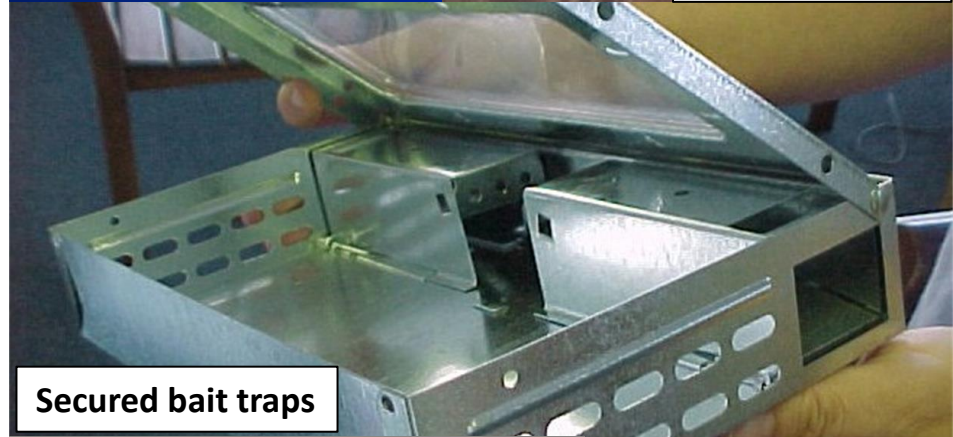
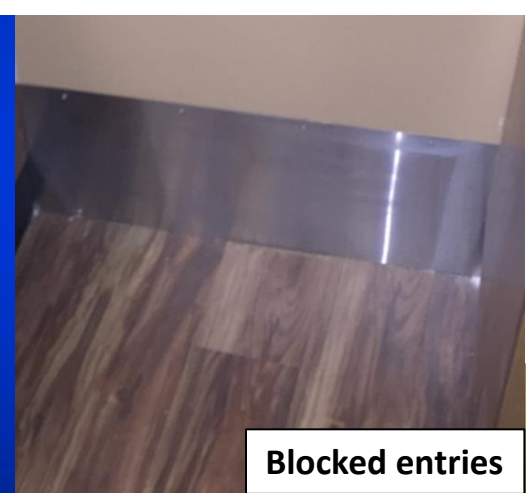
# Integrated Pest Management: Control measures

1. Keep pests out and with no place to hide	<ul style="list-style-type: none"><li>• Change surrounding landscape</li><li>• Block pest entries, passages, hiding places</li></ul>
2. Reduce food availability	<ul style="list-style-type: none"><li>• Practice proper food storage &amp; disposal</li><li>• No dirty dishes in the sink overnight</li><li>• Clean crumbs, grease, etc.</li></ul>
3. Knock down population	<ul style="list-style-type: none"><li>• Traps</li><li>• Insect growth regulators</li><li>• Appropriate pesticides <b>ONLY</b> when needed</li></ul>

Snap traps



Blocked entries



Secured bait traps



Glue traps



Targeted pesticide



## 5<sup>th</sup> Element – Keep it clean



1. Clean homes help reduce pest infestations and exposure to contaminants.
2. Control the source of dust and contaminants throughout the home, reducing exposure.

Sources: HUD and CDC



# Benefits of keeping a clean home

1. Eliminates food and water sources for pests
2. Prevents **asthma episodes** and exposure to contaminants that may lead to illnesses.
3. Prevents impact of biological contaminants on health such as sneezing, watery eyes, coughing, etc.
4. Controls the source of house dust and other contaminants in the home. (Reservoirs)



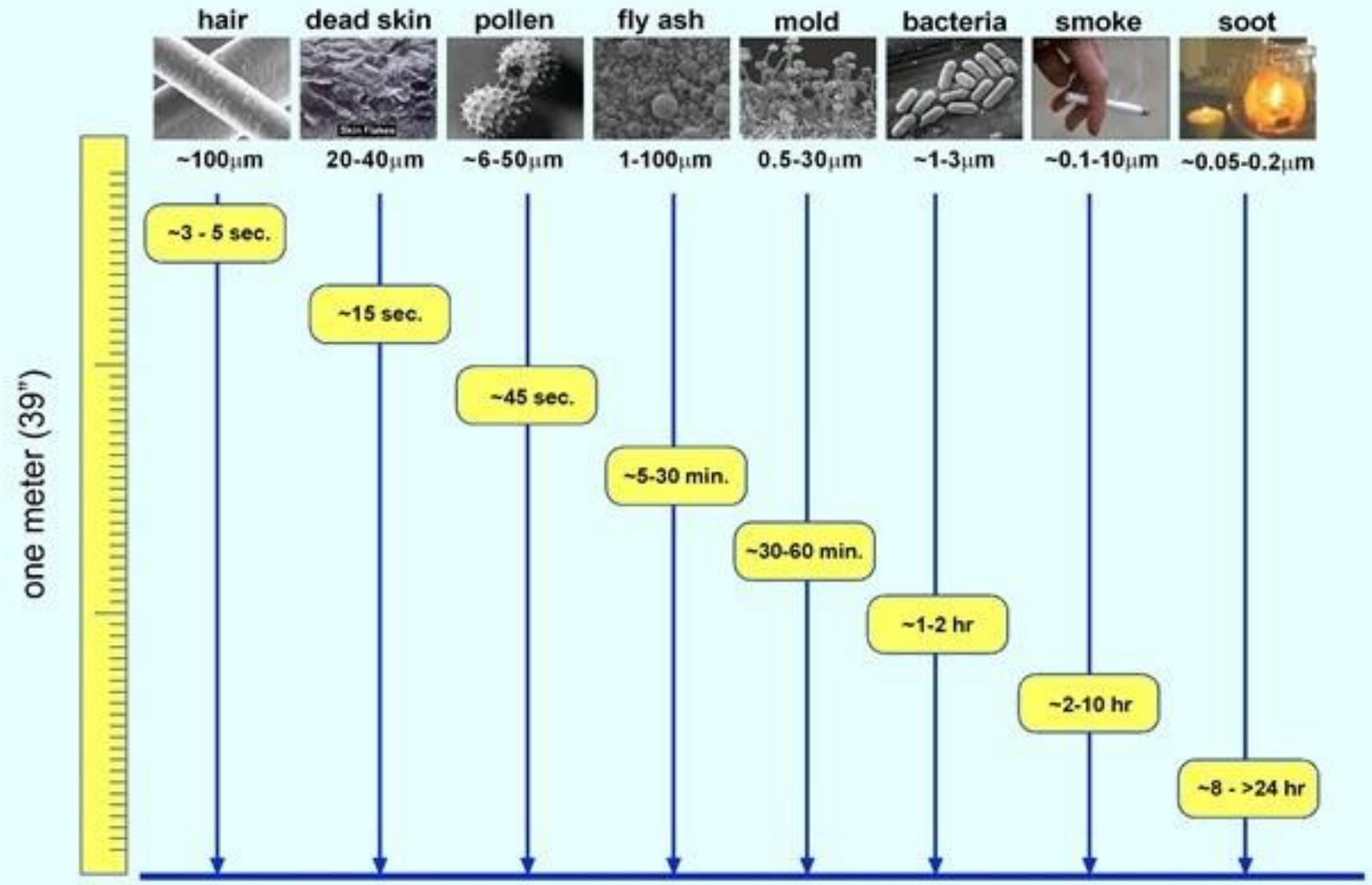
House dust



Poorly maintained carpet



# How long do particles stay in the air?



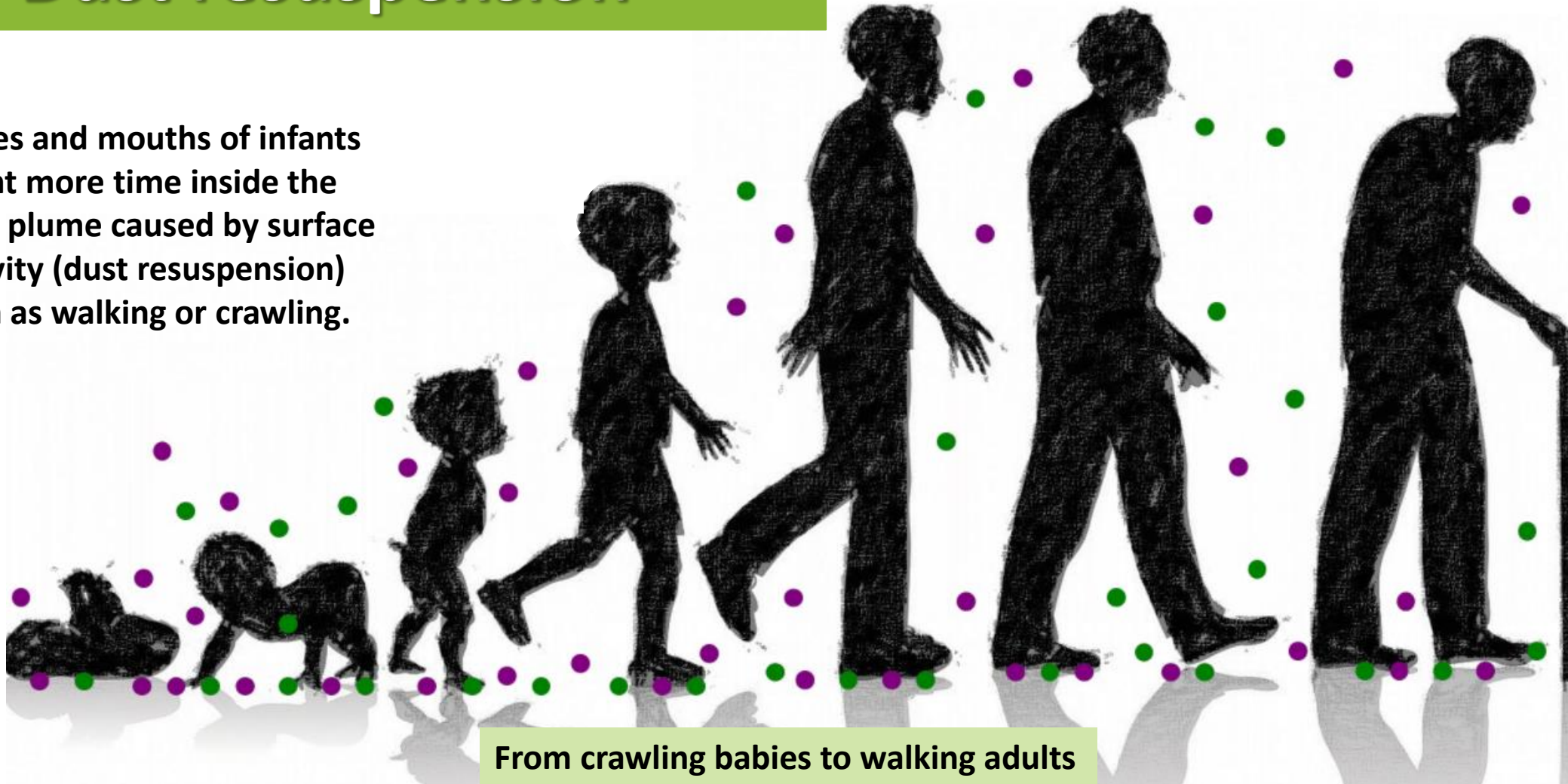
The approximate time it takes for these particles to settle one meter (39") in undisturbed air.  
3.28 ft.





# Dust resuspension

Noses and mouths of infants spent more time inside the dust plume caused by surface activity (dust resuspension) such as walking or crawling.



From crawling babies to walking adults



# Summary: Factors that can would reduce indoor health and safety issues and their impact on asthma

1. Increased training for home renovators, home assessors, home educators, and home occupants.
2. Proper maintenance of house components (i.e., All structure components deteriorate at different rates due to weathering or usage)
3. Increased awareness of performance deterioration of key appliances (i.e., Usage causes wear and tear of appliances)
4. Quality control reduces inadequate installation on housing components (i.e., By poorly trained installers)
5. Awareness of the effects that occupant's activities and behavior may have on the structure.
6. Increased awareness on latest information on housing hazards effects and control





# Healthy Housing and Asthma Innovative Best Practice Programs and Funding

**Michael McKnight**

**Senior Vice President of National Programs**

**Green & Healthy Homes initiative**

**June 15, 2023 / Michigan Asthma Partnership Forum**

# National Initiative for Asthma Reimbursement

With EPA funding, GHHI worked with partners nationally 2018-2021 to design programs and build capacity for delivering comprehensive asthma services that include control of environmental triggers.



**16**

Sites implementing comprehensive asthma programs

Services align with NAEPP guidelines and evidence-based recommendations.



**13**

Sites implementing environmental mgmt. measures

This includes assessment of the home environment, education about triggers, and in some cases, home repairs that address triggers.



**242**

Families served by partners

Number of families who received direct services from programs during the EPA engagement. **A total of 423 families will be served when all programs are completed.**



**\$5.14M**

Funding raised for asthma services

**\$1.24 million** for asthma services

**\$3.9 million** of leveraged funds

New funds secured via EPA to scale service delivery.



# MCO contracts that directly pay for asthma healthy homes services

## Direct Payment with Administrative Funds

MCO

Community-Based Organization (CBO)

### Maryland








- Wellpoint Maryland was interested in a contract with GHHI based on internal analysis of outcomes. Amerigroup had previously been a referral partner for several years. GHHI has been under contract since 2018.
- Amerigroup pays 75% of costs after first visit and 25% after month 5 of enrollment.
- Services covered: home education visits, supplies, home assessment, IPM.

### Michigan

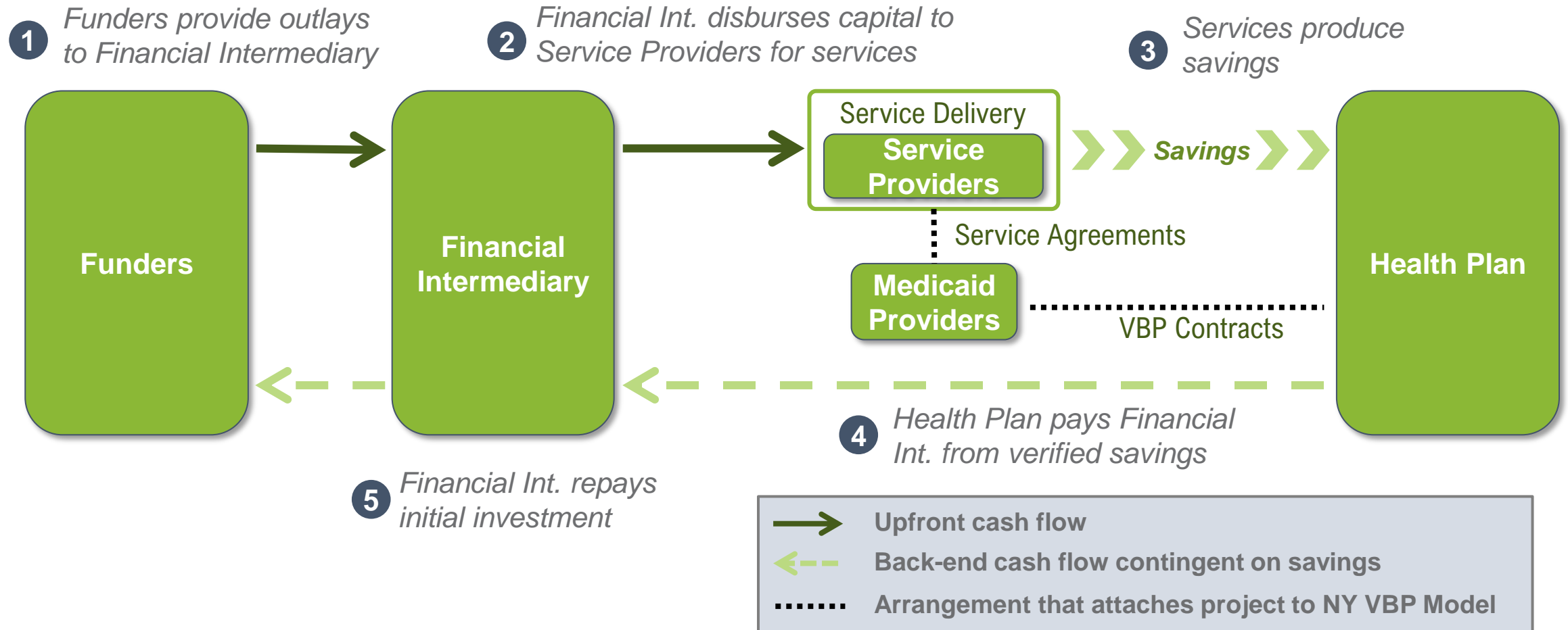
- Priority Health was able to utilize a contract with Healthy Homes Coalition of West Michigan to satisfy Michigan Medicaid's requirement of MCOs to address social determinants of health to receive the 1% premium withhold.
- Services covered: home assessment and home remediation of environmental asthma triggers.

**GHHI has developed similar models for partners in Massachusetts, Rhode Island, Tennessee, Texas, and Utah.**

# Value-Based Model / Public-Private \$4.75M Investment in New York City to Serve 850 Medicaid Members with Asthma

Partners	Roles	Description
	Referral provider and back-end payer	Bronx-based health plan founded in 1986. Affinity by Molina serves over 300k members in its lower NY 10-county service area.
 <span>Healthy has an address</span>	Lead social care and home visiting service provider	20yr-old social enterprise with expertise in home-based asthma interventions led by Community Health Workers in NYC.
	Home remediation provider	Expert in advancing energy-efficient housing to foster and maintain affordable, healthy housing and communities.
	Project manager and junior investor	Largest U.S. healthy homes nonprofit; leader in developing innovative models to sustainably address social determinants of health.
	Senior investor	One of the largest and oldest banks in the U.S.; involved in several outcomes-based financing projects
	Technical advisor	NYC Department of Health and Mental Hygiene will assist with code enforcement and coordinate with other local programs.
	Financial intermediary	National nonprofit and community-development finance institution dedicated to catalyzing excellence in primary care.

# NY Healthy Homes Collaborative - Funding Flow Diagram

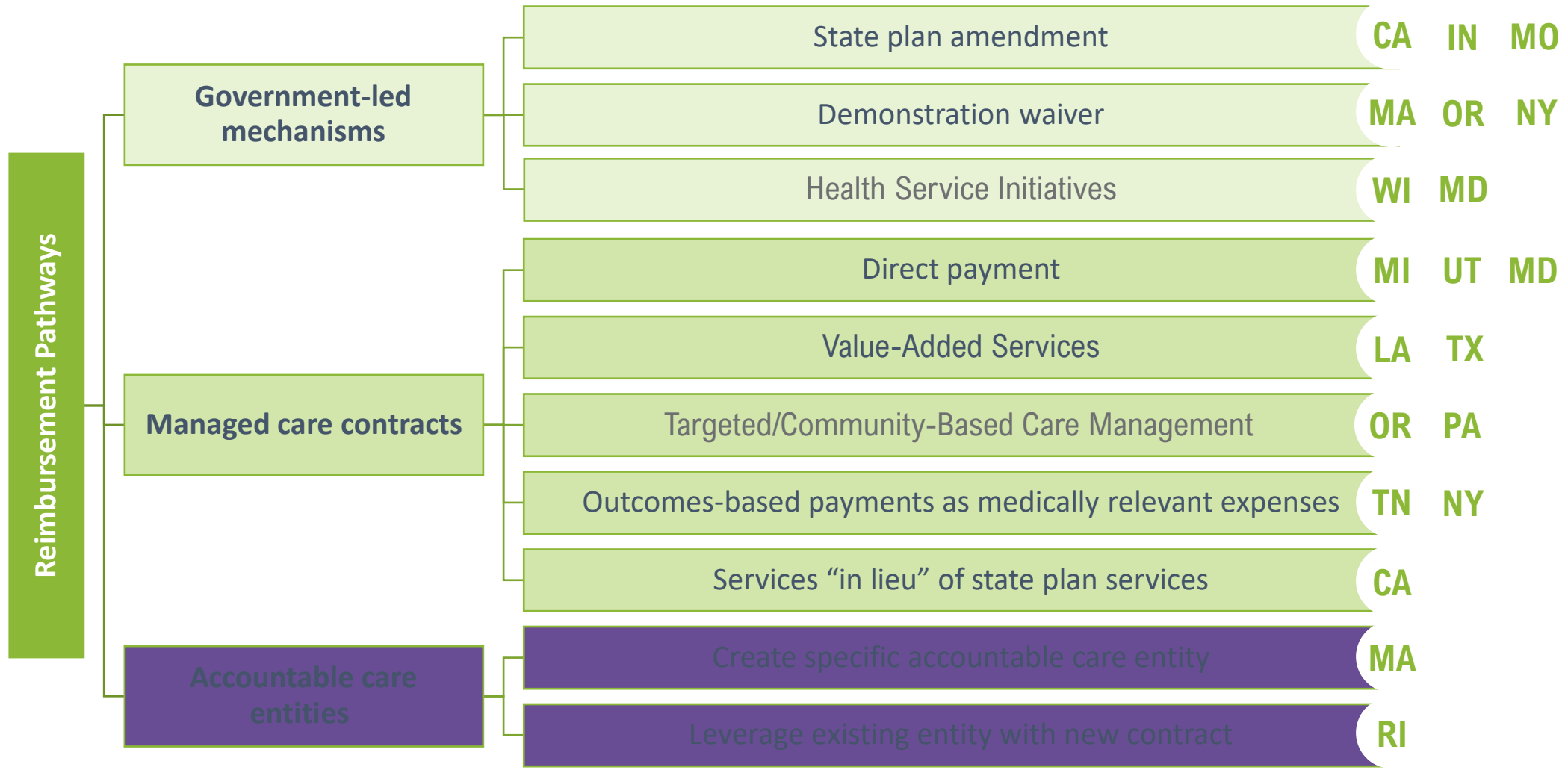






# Policy Levers to address SDOH through healthcare resources

# Reimbursement Models Across the Nation



# State Plan Amendments / Waivers / Value-Added Benefits

Policy Lever	Examples
<p><b>1115 Demonstration Waivers</b> – temporary (5-10yr) budget neutral payment and service delivery reforms within a state that can become permanent through SPAs if successful. See <a href="#">DSRIP waivers</a>.</p>	<p>Massachusetts, New York, Oregon</p>
<p><b>State Plan Amendments (SPAs)</b> – permanent CMS-approved changes to a state plan. See <a href="#">2014 preventive services rule change</a> and <a href="#">CHIP Health Services Initiative</a></p>	<p>Missouri, Indiana, California</p>
<p><b><a href="#">Community Care Coordination Services</a> &amp; <a href="#">Targeted Case Management</a></b> – some services could be covered sustainably through these authorities.</p>	<p>Pennsylvania, Oregon</p>
<p><b><a href="#">Value-added Services</a></b> – Additional services beyond covered benefits. Voluntarily provided by health plans. Can be counted as ‘medical’ spend for health plan but not included in premium.</p>	<p>Louisiana, Texas</p>

Potentially most sustainable options because payments for services do not negatively influence MLR or future capitation calculations



# CHIP Health Service Initiatives (HSI)

- HSIs must fit within the allowed administrative cap of CHIP for a state and leverages an enhanced FMAP.
- Can be used for a wide variety of services including asthma education, supplies, home visiting, environmental assessment, and environmental remediation.
- GHHI is part of Maryland's HSI which includes environmental case management for asthma, delivered by local health departments. **MD HSI budget is \$7.2M per year.**
- GHHI supported Wisconsin's 2021 expansion of its HSI for lead hazard control to become the first state HSI to also include **asthma in-home education, environmental assessments, and remediation of asthma triggers (up to \$5,000)**. GHHI is currently providing training for the new providers.

# In Lieu of Services (1115 Waiver)

- **“In lieu of” services** – State-approved services that health plans can offer as a medically appropriate and cost-effective substitutes for state plan benefits.
- See [California's updates](#) from 2021 designating healthy home remediation for asthma as “in lieu of” service.
  - Asthma remediation (up to \$7,500) as allowable ILOS for MCOs
  - Optional for health plans to utilize ILOS
- GHHI wrote [publication](#) in 2017 on using ILOS for asthma healthy homes services.
- GHHI wrote a [brief](#) on Medi-Cal’s ILOS for asthma in 2022
- [Texas](#) and other states are looking at ILOS for asthma services

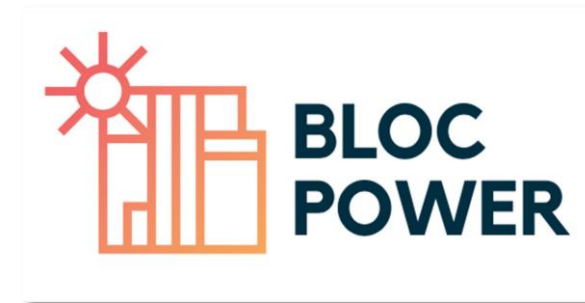
# Health Related Social Needs-HRSN (1115 Waiver)

- CMS approved [Massachusetts](#) and [Oregon](#) 1115 waivers in September 2022, both of which include non-medical services that address HRSN for Medicaid members.
- Allowable HRSN services include medically necessary supplies and home modifications:
  - Air conditioners
  - Humidifiers
  - Air filtration devices, HEPA filters
  - Vacuum cleaners
  - Pest management
  - Hypoallergenic mattress and pillow covers
  - Asthma remediation



## Electrification and asthma impacts

- BlocPower is a New York-based technology company that analyzes, finances and installs all-electric technologies in low- and moderate-income buildings.
- GHHI is supporting BlocPower by:
  - **Researching the health impacts** including asthma of residential electrification
  - **Calculating the value of healthcare savings** from residential electrification
  - **Strategizing how to braid** electrification retrofits with other healthy housing interventions (asthma, lead, etc.)
  - **Incorporating health data into BlocMaps**, a proprietary mapping software for municipalities, utilities, and business owners to identify buildings to retrofit



# Questions?

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