

# *Our Homes Suck! And, That's Why Our Kids Have Sinus Problems*

Raising the Bar in Home Performance Contracting

Larry Zarker

BPI

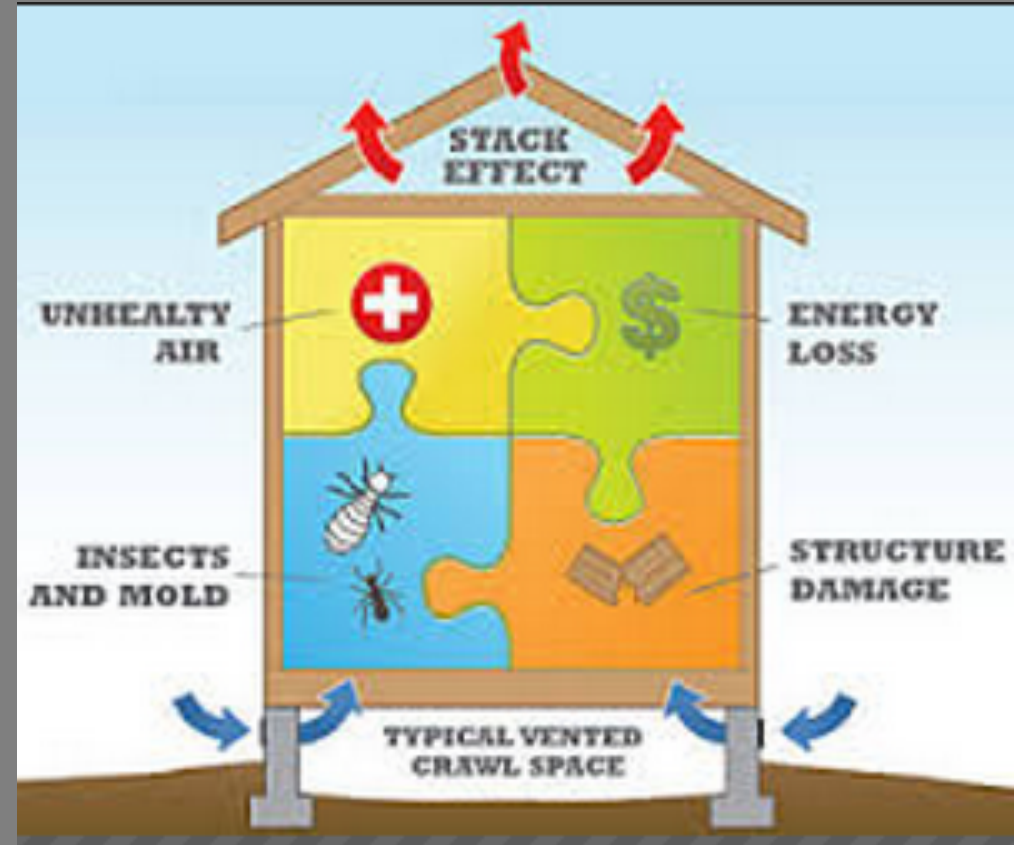
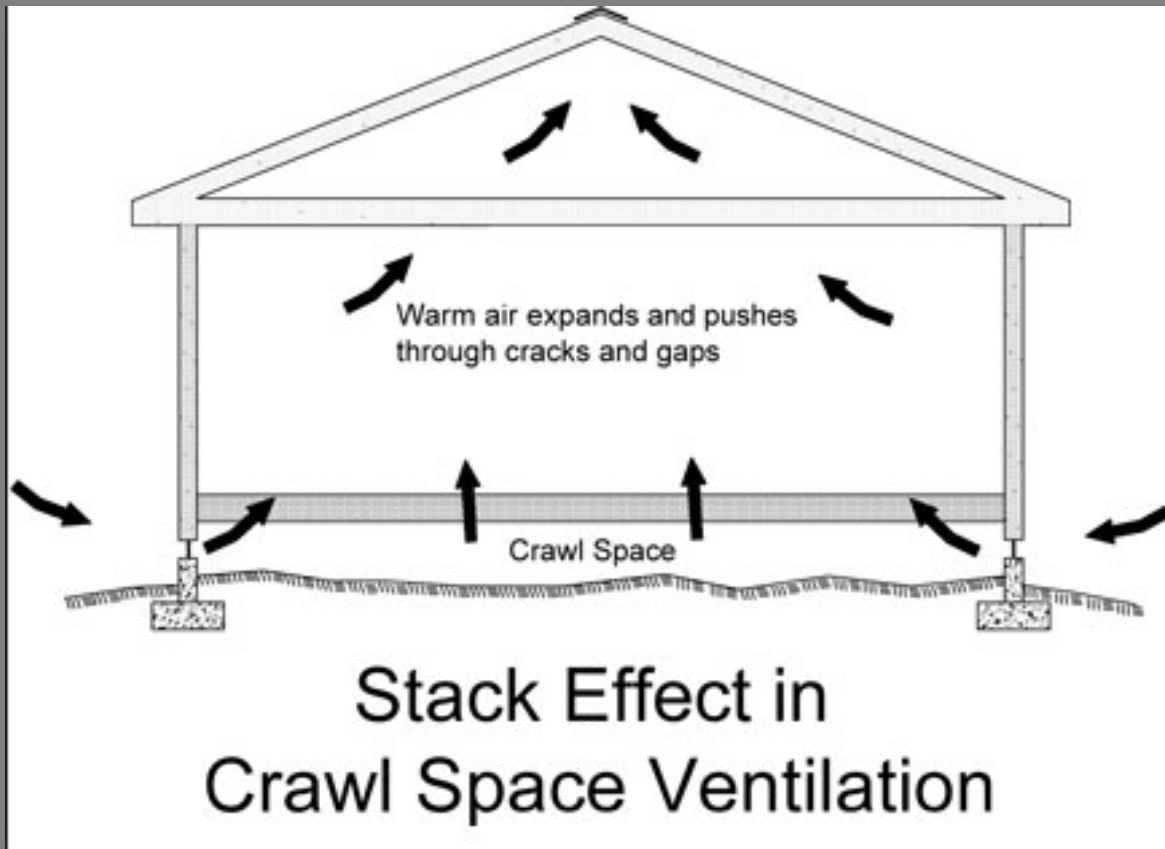
[LZarker@bpi.org](mailto:LZarker@bpi.org)



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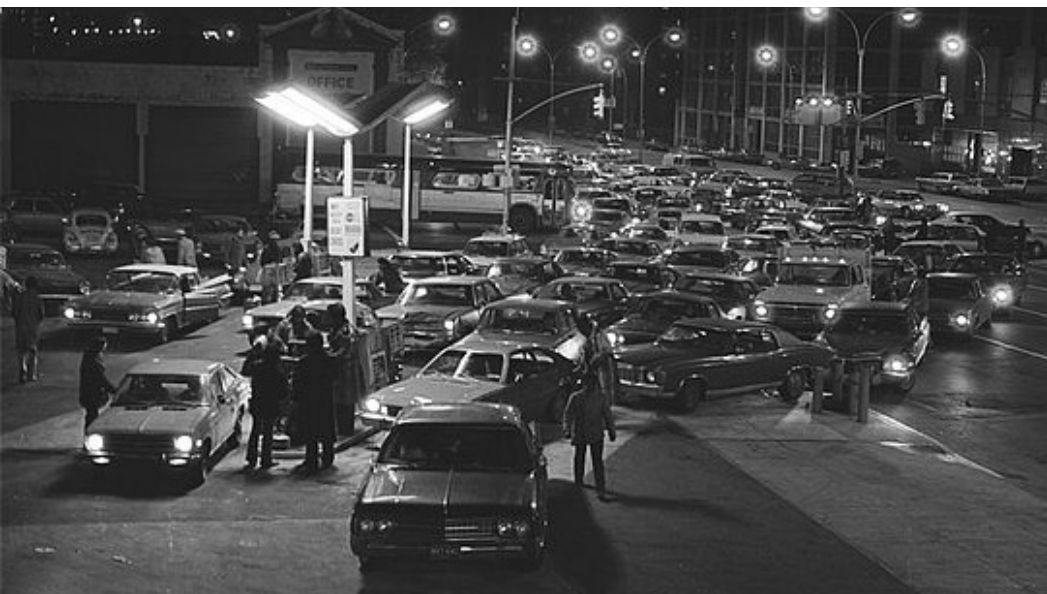
# Why Our Homes “Suck”: Stack Effect



# Need for Home Performance Contracting

About a **one-third** of 80 million owner-occupied homes are now at least **45 years old** and an additional third are **between 25 and 45 years old** meaning that a large majority of our homes were built before modern energy codes and are drafty, uncomfortable and expensive to operate.





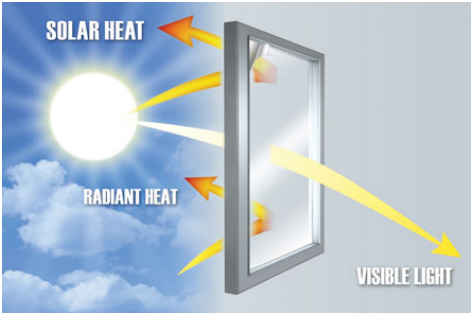
# State and Utility Energy Efficiency Programs Were Born



**Get In Line Now For Your Energy Cash Incentives**

If you have energy reduction goals, let French Gerleman help you secure funding from your local electric utility while cash incentives are still available.

 LIGHTING  CLEAN ENERGY



# But, With Incentives Comes Regulation

**Cost Effectiveness  
Tests Were  
Developed to  
Govern What  
Measures Meet  
Payback  
Requirements**



**Or, the utilities  
are allowed to  
introduce what  
we call deemed or  
I call “dreamed”  
savings rebate  
programs.**

**Alphabet Soup of Cost-Effectiveness Tests**



# Drivers for Home Performance Contracting?

- Dust and Allergies
- Drafts and Comfort
- **High Utility Bills?**
- Asthma and Sinusitis
- Moisture and Mold
- Climate Change
- Energy Independence



# Here are the Real Drivers for Homeowners

- **Dust and Allergies**
- **Drafts and Comfort**
- High Utility Bills
- **Asthma and Sinusitis**
- **Moisture and Mold**
- Climate Change
- Energy Independence







Let's meet...

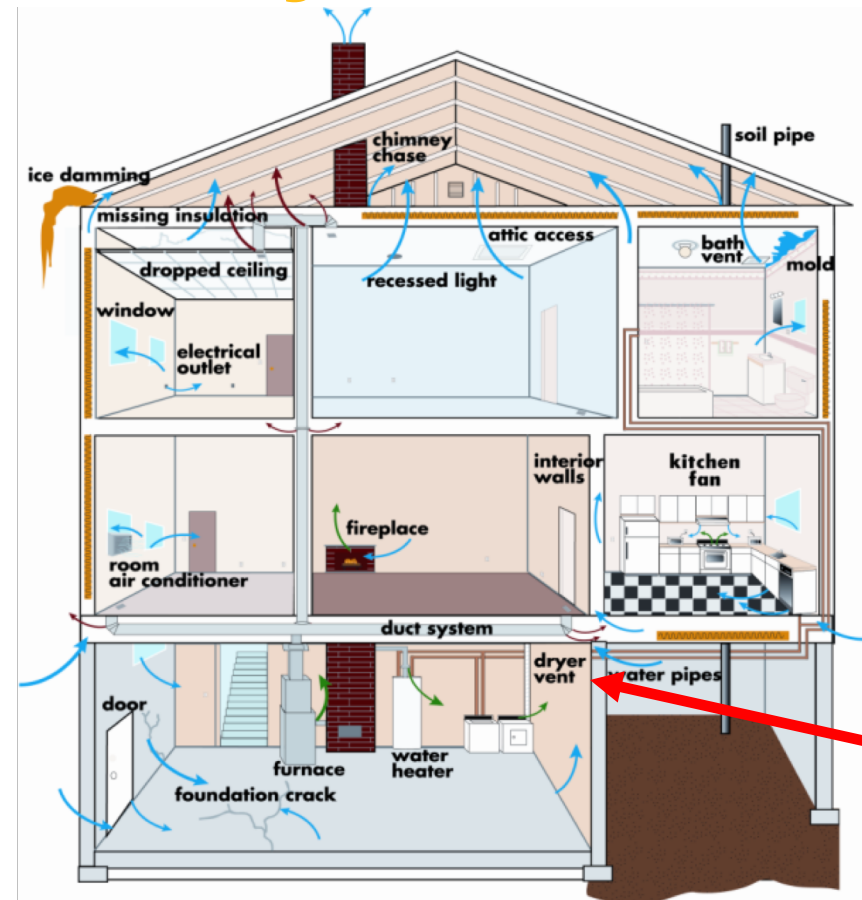
*The NEBS*

# So, what are *Non-Energy* Benefits?



# Typical home...full of systems...

- Drainage system
- Foundation system
- Flooring system
- Wall system
- Ceiling system
- Roof system
- Heating system
- Air conditioning system
- Ventilation & IAQ systems
- Moisture control systems
- Distribution system
- Exhaust systems
- Plumbing systems in/out
- Electric, Appliance & Lighting systems
- Energy management system



Key Question: Do you know where your fresh air comes from?





ADVANCED ENERGY









**Photo courtesy of Stephen L. Smith**





**Disconnected  
return duct**

**Dead possum**

Photo courtesy of Stefan Peter-Contesse





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Helping you become healthy, comfortable and efficient at home

[bpihomeowner.org/blog](http://bpihomeowner.org/blog)



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HOME PERFORMANCE

WHY BPI GOLDSTAR

CASE STUDIES

RESOURCES

**BLOG**

# I Was the Cobbler Whose Kids Had No Shoes

June 22, 2017

**But that house was over 100 years old...**

One day, I was told why my athletic teenage children suffered from sinusitis in the Fall, then a colleague was in our basement one day and asked, "Is it always this wet in your basement?" We lived at the bottom of two hills. "Only when it rains," I said. He said that we could be experiencing problems related to mold and that I should take steps to dry out my basement.



Water damage in the basement.

I was like the cobbler whose children had no shoes. I had been in building research all of my adult life and grew up in a home building family. But, I didn't start to notice how the health of the house affects the health of the occupants until after that conversation. We lived in a 1912 home in the Maryland suburbs. Old homes are great;

Ready to make your home  
more comfortable and  
efficient?

[FIND A CONTRACTOR](#)

Does your home live up to the  
Home Performance challenge?



***Then we bought a house that was just 30 years old. What could possibly go wrong?***



# See Anything Wrong With This Built-in Bookcase?





Remove Trim



Expose the Drywall



Expose Batts



Expose Framing



Remove Bookcase



Heat Pump  
Slab Sloped  
Toward Corner



Water Test for  
Confirmation



Seepage After  
3" Rain Deluge

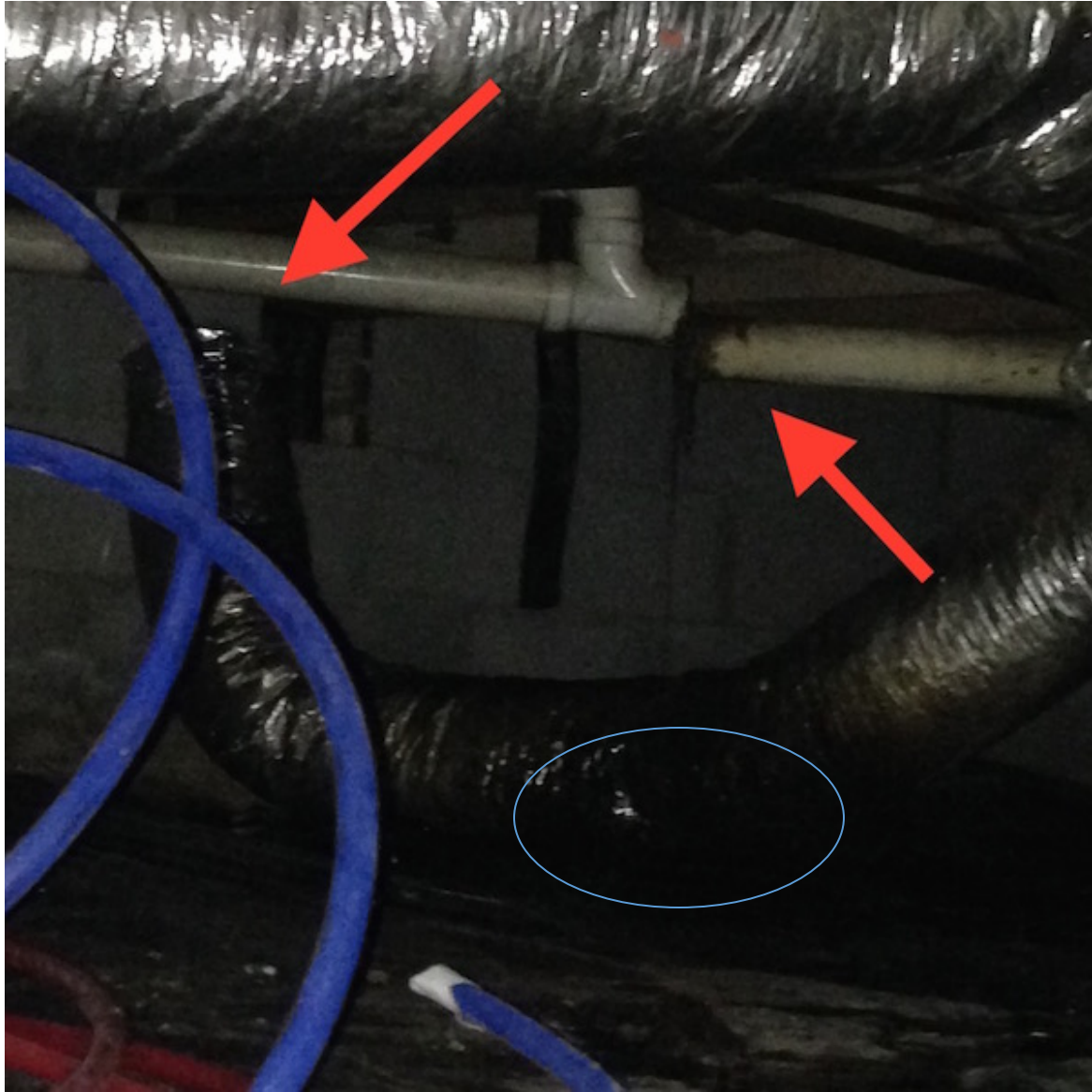


# What happens when you: *Cool a Bonus Room with Crawl Space Air?*



Photos courtesy of Chris Myers of  
E3 Innovate LLC





Photos courtesy of Chris Myers of  
E3 Innovate LLC





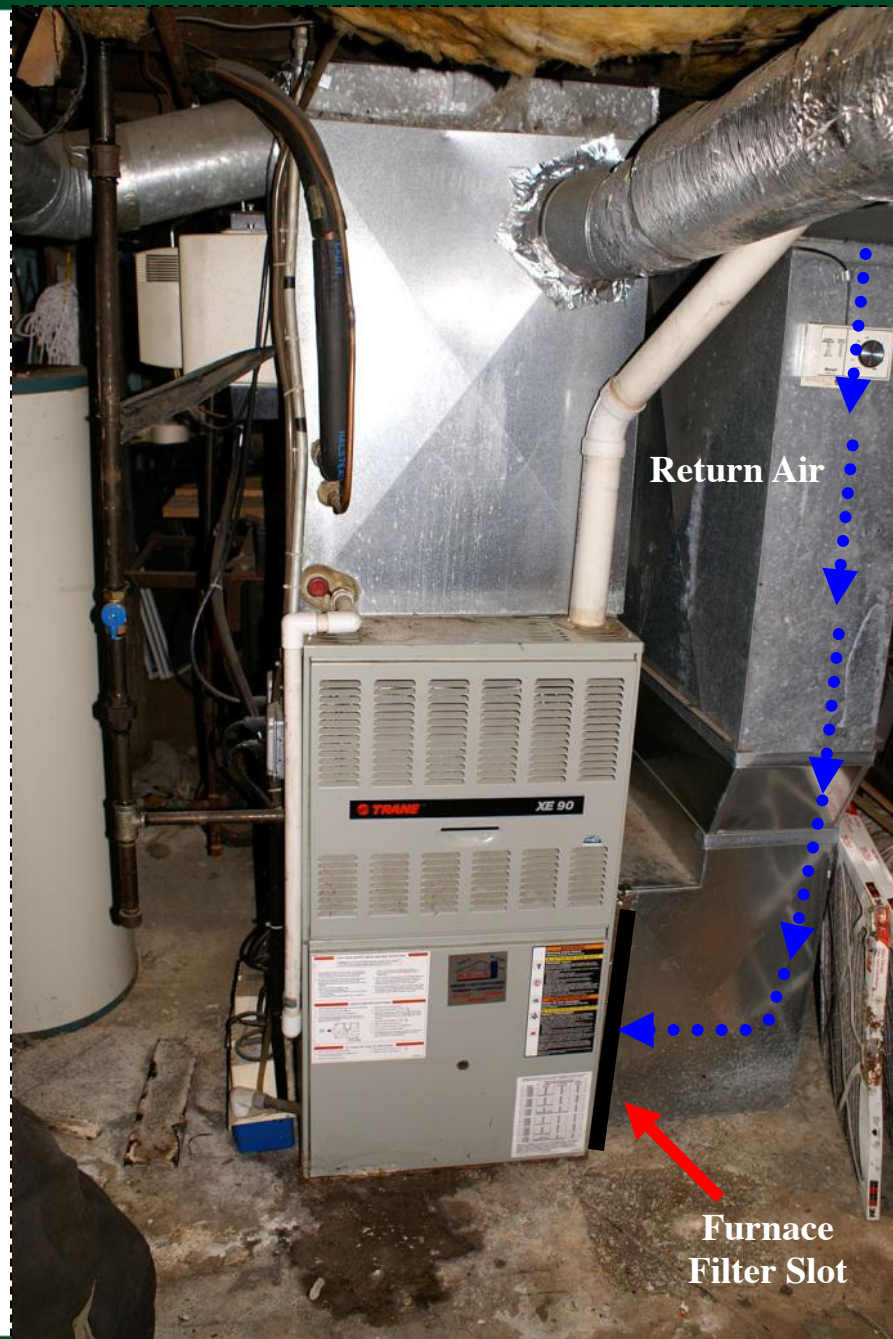


Photo courtesy of Peter Troast  
of Energy Circle









Return Air

Furnace  
Filter Slot











# Dust Mites: Serious Allergens in Your Home

FEBRUARY 22, 2010 | [AQASERVICES](#), [TIPS & TROUBLESHOOTING](#) | [AIR QUALITY PROBLEMS](#), [DUST MITES](#), [HEALTH HAZARD](#), [INDOOR AIR POLLUTANTS](#), [RESPIRATORY PROBLEMS](#)



Dust mites scavenging a bed sheet for dead skin (magnified 500 x) TIME

Dust Mite Video:

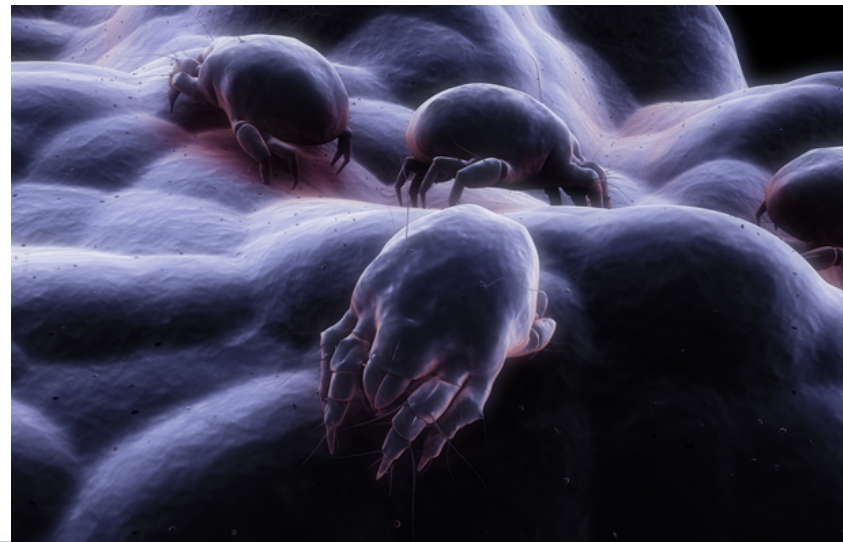
[http://health.thefuntimesguide.com/2010/09/dust\\_mite\\_allergy.php](http://health.thefuntimesguide.com/2010/09/dust_mite_allergy.php)

**Caption:**

*Dust mites scavenging a bed sheet for dead skin.*

*“Dust mites are known to cause asthma to develop in people.”*

**Kevin Kennedy, Children’s Mercy Hospital, Kansas City, MO**





# The Invasion of the Sugar Ants: They Contaminate Your Food and Spread Salmonella



# A Growing Asthma Epidemic in the U.S.

Of the **21.8 million** people reported to have asthma in the U.S., approximately **4.6 million** cases are estimated to be attributable to dampness and mold exposure in the home.

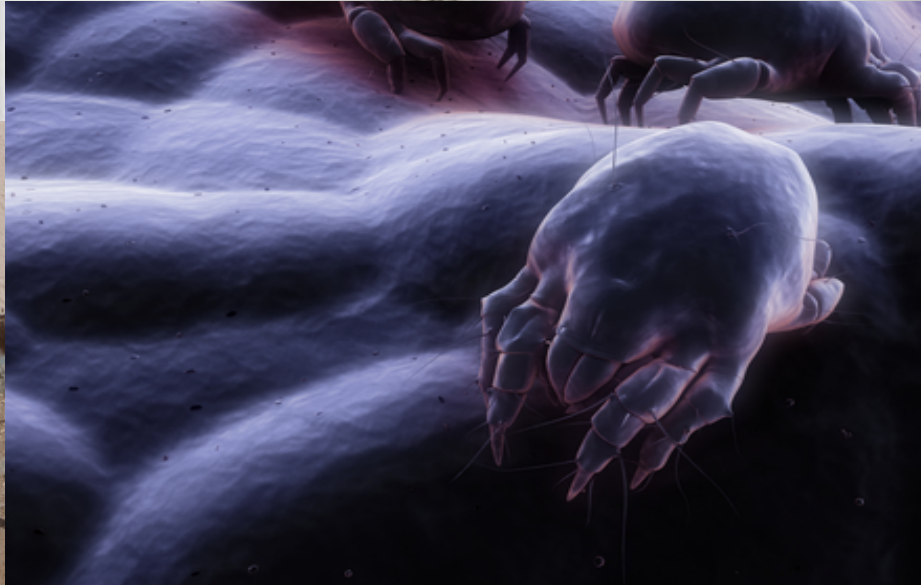


## Dust Mites: Serious Allergens in Your Home

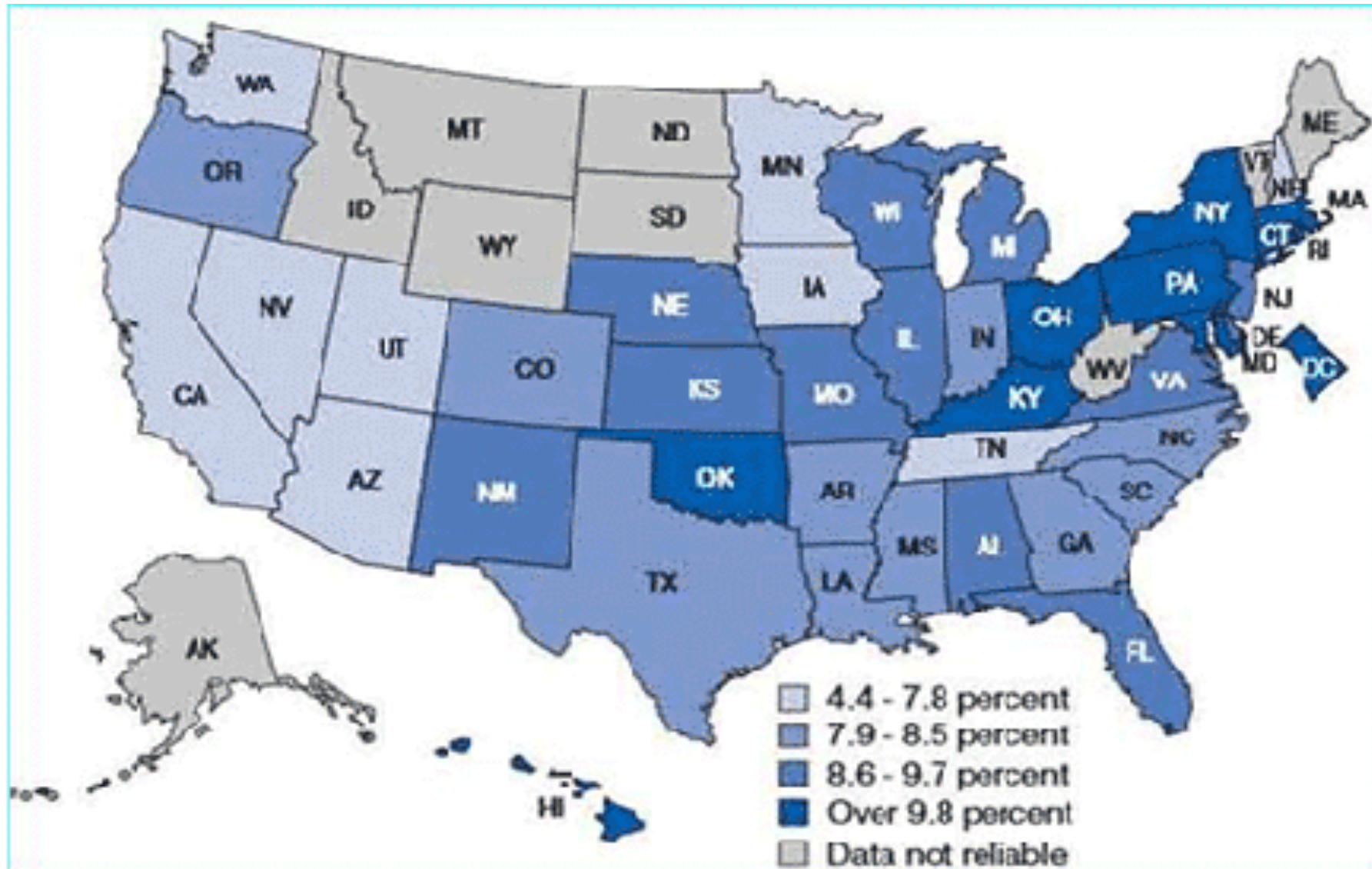
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Dust mites scavenging



# Asthma Prevalence Intensity in Children (0-17)




# Tragedy of Lead


**Prevent Childhood Lead Poisoning**

## The Impact

**535,000**  
U. S. children ages 1 to 5 years have blood lead levels high enough to damage their health.





**24 million**  
homes in the U.S. contain deteriorated lead-based paint and elevated levels of lead-contaminated house dust.



**4 million** of these are home to young children.

It can cost **\$5,600** in medical and special education costs for each seriously lead-poisoned child.



 Visit [www.cdc.gov/nceh/lead](http://www.cdc.gov/nceh/lead) to learn more.



# Gas Leak Explosion Levels Home





# And, If Potty Training Isn't Hard Enough, Look What a Four Year Old Found in the Toilet!

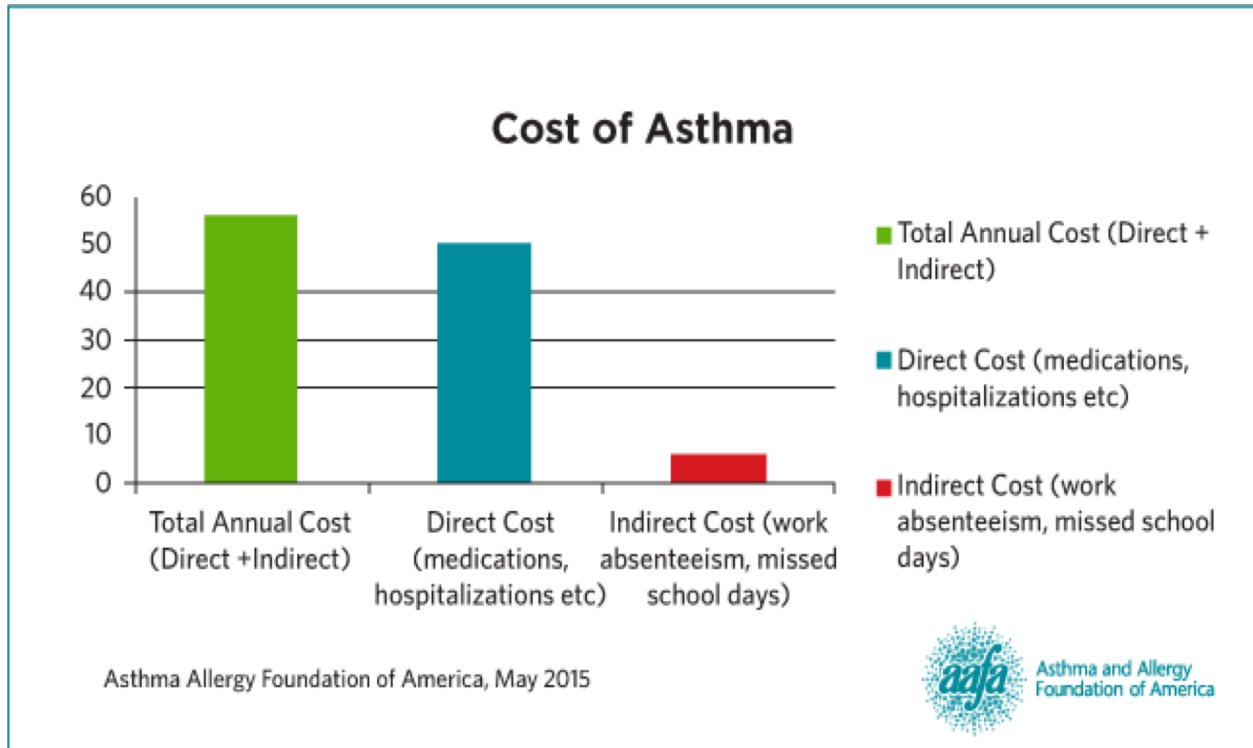


**A Diamondback Rattlesnake**

**24 Rattlers  
Were Found in  
and Around the  
House in Texas**



# What Does Asthma Cost in the U.S.?



- Researchers think the yearly cost of asthma in the United States is around **\$56 billion**.
- The direct costs make up almost **\$50.1 billion**. Hospital stays are the largest part of that cost.
- Indirect costs make up **\$5.9 billion**. This includes lost pay from sickness or death and lost work output from missed school or work days.
- In 2009, researchers found that the direct cost of asthma is about **\$3,259** per person each year.

# Powerful Case Studies

## Breathing Better



### Vilandre Case Study: Our home is making us sick

2000 Built, 2 Story, 1600 sq ft, Family of 4

#### Assessment

A homeowner requested a full home assessment of air quality and energy efficiency after feeling that her home was contributing to chronic illness in

her family of four. The family wanted to open their windows for fresh air, but couldn't because heavy smoke from a neighbor with wood burning stoves. The whole family was suffering from respiratory issues.



- **Asthma:** Two people were on medications, including a form of steroids. The other two family members were showing the beginning signs of asthma.
- **Allergies:** Family members would frequently wake with sneezing attacks in the middle of the night .
- **Dry throats & itchy eyes:** The family would wake in the morning with dry sore throats and scratchy eyes.



## Wearing a Coat in the House



### Tiedt Case Study: Wearing a Coat in the House

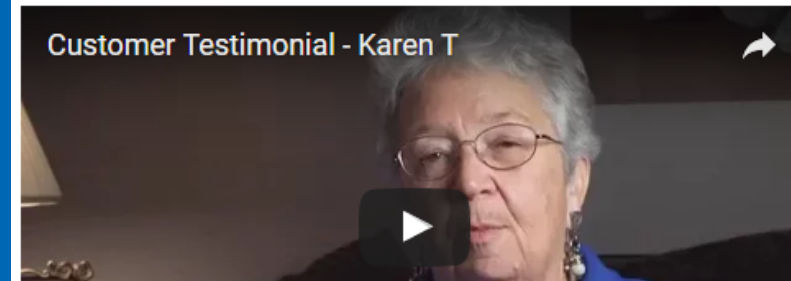


#### Assessment

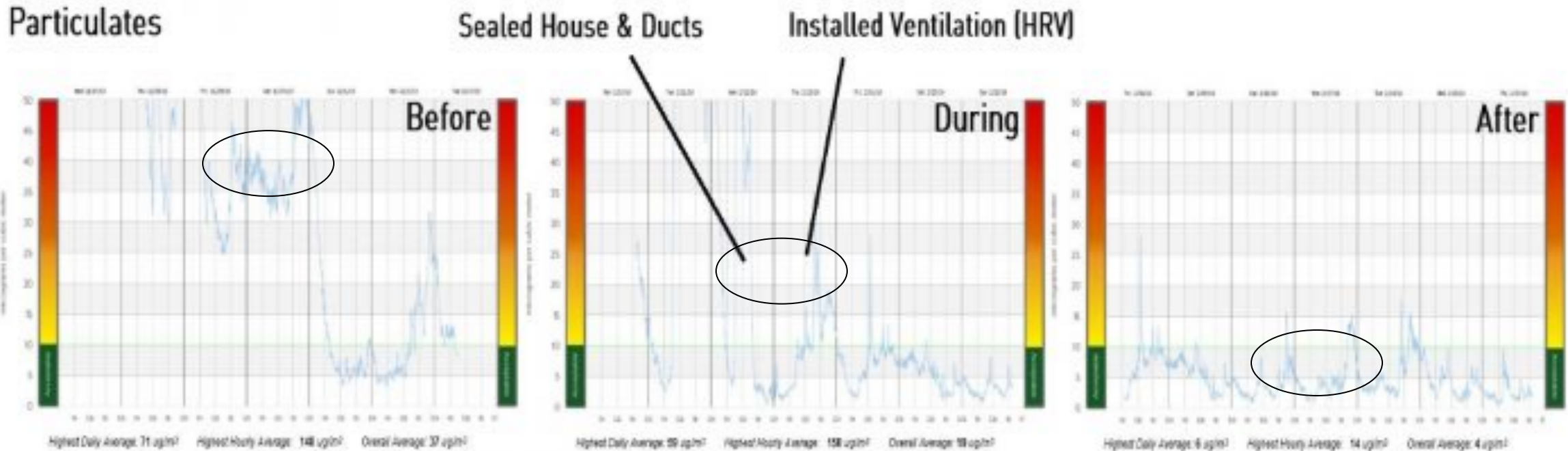
Karen Tiedt was cold in her own home and her energy bills were very high. When Karen invited friends over to eat or play cards, they would often be forced to keep their coats on inside the house. Karen's home relied on baseboard heaters, which are a very inefficient way to heat a home, and her utility bill was high.

Despite raising the baseboard heaters to the maximum settings, her home was drafty and cold. Then, one winter, the units stopped working altogether.

Karen called the team at Revival Energy.



# A “Two Inhaler” Family Case Study



Source: Revival Energy Group



# Frequently Asked Questions About Sinusitis & Mold

## There is mold in my house. Why am I the only one who is sick?

You probably have an allergy to mold. 16% of the population has a genetic trait that makes them highly susceptible to mold allergies. You may be the only one in your house hold that has the trait.

## I have been tested for mold allergies and my doctor has said that I do not have one. Could she be wrong?

There are two types of mold allergy tests: Immediate and Delayed. The Immediate Test is based on a reaction to a skin test or IgE antibody blood test for immediate reactions to mold. It is the test that most insurance companies will cover. The Delay Test requires a blood sample to be drawn and tested which is not frequently done for cost reasons.

People with Chronic Sinusitis more than 90% show a positive mold allergen result when using the IgG blood test. However, only 30% of the same population will show a positive result when using the Immediate Test.

## How do we know mold causes sickness?

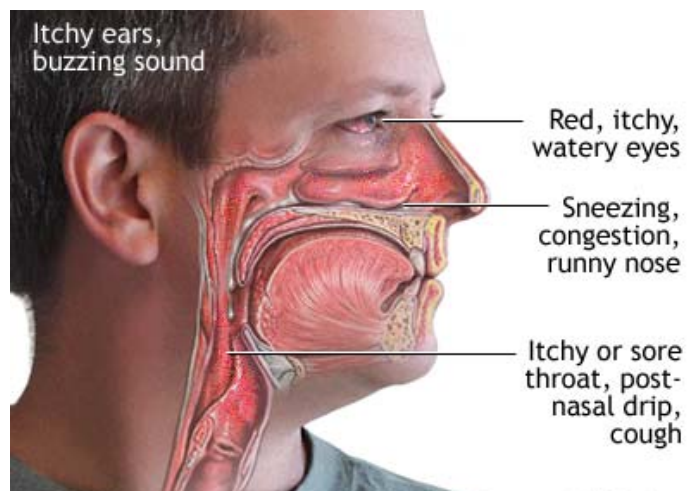
[Read the paper](#) from Mayo Clinic which states that 93% for chronic sinusitis is mold related.

## I have constant sinus problems. I also have joint pain and problems with my memory. Could these be caused by mold exposure?

Yes, many people notice an improvement in these conditions when they clear mold from their body and their environment.

## I live in house that is only a year old. Could there be mold in my home?

Yes. Many new houses sit in the rain during construction. To assure that your home is safe, test with mold plates. If you are not sick, mold counts of 0-4 are OK. However, if you do feel sick much of the time with fatigue and sinus symptoms, you will feel best when your indoor mold counts are 0-2 colonies.



## The Diagnosis and Incidence of Allergic Fungal Sinusitis

JENS U. PONIKAU, MD; DAVID A. SHERRIS, MD; EUGENE B. KERN, MD; HENRY A. HOMBURGER, MD; EVANGELOS FRIGAS, MD; THOMAS A. GAFFEY, MD; AND GLENN D. ROBERTS, PhD

- **Objective:** To reevaluate the current criteria for diagnosing allergic fungal sinusitis (AFS) and determine the incidence of AFS in patients with chronic rhinosinusitis (CRS).

- **Methods:** This prospective study evaluated the incidence of AFS in 210 consecutive patients with CRS with or without polyposis, of whom 101 were treated surgically. Collecting and culturing fungi from nasal mucus require special handling, and novel methods are described. Surgical specimen handling emphasizes histologic examination to visualize fungi and eosinophils in the mucin. The value of allergy testing in the diagnosis of AFS is examined.

- **Results:** Fungal cultures of nasal secretions were positive in 202 (96%) of 210 consecutive CRS patients. Allergic mucin was found in 97 (96%) of 101 consecutive surgical cases of CRS. Allergic fungal sinusitis was diagnosed in 94

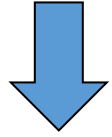
(93%) of 101 consecutive surgical cases with CRS, based on histopathologic findings and culture results. Immunoglobulin E-mediated hypersensitivity to fungal allergens was not evident in the majority of AFS patients.

- **Conclusion:** The data presented indicate that the diagnostic criteria for AFS are present in the majority of patients with CRS with or without polyposis. Since the presence of eosinophils in the allergic mucin, and not a type I hypersensitivity, is likely the common denominator in the pathophysiology of AFS, we propose a change in terminology from AFS to eosinophilic fungal rhinosinusitis.

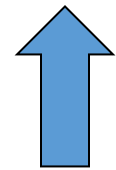
*Mayo Clin Proc.* 1999;74:877-884

AFS = allergic fungal sinusitis; CRS = chronic rhinosinusitis; CT = computed tomographic; IgE = immunoglobulin E; RAST = radioallergosorbent test

**Okay, so this probably isn't your house.**



**But, this probably is.**



**A 67% decline in emergency room visits due to energy retrofits!**

**Aetna: Savings of over \$800 for each asthma-related ER visit (\$8,800 for hospital stay).**



The screenshot shows a blog post on the smartplanet website. The header includes the smartplanet logo and social media icons for Twitter, Facebook, and YouTube. The navigation bar lists categories: Home, Business, Technology, and Innovation. A breadcrumb trail shows the path: Aerospace \ Architecture \ Cities \ Design \ Education \ Energy \ Finance \ Food \ Government \ Healthcare \ S. The article title is "Home energy retrofits reducing healthcare costs" by David Worthington, dated December 7, 2012. The main text discusses a pilot project by Wegowise and Green & Healthy Homes Initiative (GHHI) that resulted in a 67% decline in emergency room visits among residents. An image of a young child using an inhaler is included, with a caption stating that many asthma incidents in children are due to insufficient home weatherization. The article concludes by mentioning that Wegowise provides a web application for tracking utility data to identify energy-saving opportunities.

smartplanet

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## Home energy retrofits reducing healthcare costs

By David Worthington | December 7, 2012, 5:32 AM PST

Wegowise, a start-up that identifies energy efficient homes by analyzing utility data, has partnered with a national non-profit to upgrade low-income housing around Baltimore, Maryland. A recent pilot project produced an unforeseen result: emergency room visits among residents who were helped fell by 67 percent.

The Environmental Protection Agency says that buildings in the U.S. waste an average of 20 percent of the US\$400 billion plus that's spent on energy annually, but not every building owner has the same resources to eliminate waste. Homes that aren't sufficiently weatherized can be hazardous to health. [WegoWise](#) and Green & Healthy Homes Initiative (GHHI), a national non-profit, are partnering to help economically disadvantaged families fix weatherization issues that negatively impact their household budgets and lives.



Many incidents of asthma occurred with children and were attributed to insufficient home weatherization.

[WegoWise](#) provides a Web application to track and analyze utility data. Building owners would use its application to identify their most wasteful properties and greatest potential savings with upgrades. The entire process is automated by the application, which is available to anyone in the U.S. as a monthly subscription. [WegoWise](#) saved the GHHI from having to scour through spreadsheets to target homes that were in the greatest need of health and energy upgrades. 31 homes were selected for repairs.





## Case Study: Warm Up New Zealand: Heat Smart Programme

- established May 2009
- government initiative primarily aimed at saving energy
- with recognition that health improvements will also be significant
- \$347 million in government funding
- 4 year programme to provide subsidies for insulation - under floor and ceiling, other cost effective energy efficiency measures and a clean heating device
- two levels of funding – general income and Community Service Card Holders
- target 188,500 homes built pre 2000
- roughly 20-25% of all houses built pre 2000



## Health Benefit Studies on Retrofitted houses

- ② **Results of the studies undertaken so far:**
- ② admissions to hospitals for respiratory conditions drop by 43%
- ② days off school reduce by 23%
- ② days off work drop 39%
- ② identified the costs of certain diseases
- ② causal links between cold and damp housing and poor health
- ② psychological and stress benefits
- ② quantitative risks to respiratory health established
- ② calculated the percentage of health outcomes resulting from indoor dampness and mould - PAFs
  - 25-35% in general population
  - Maori and Pacific Island People up to 35%
- ② Over 90% of benefits are health



*So, is this your house?  
Or the house of one of  
your customers?*

*Or, is it more like this?*





# Healthy Home Evaluator (HHE) Credential



Help break the link  
between unhealthy housing  
and unhealthy families.

**[www.bpi.org/hhe](http://www.bpi.org/hhe)**

Created in partnership with the Green  
& Healthy Homes Initiative (GHHI)

# Scope of HHE Credential

- The *Healthy Home Evaluator* micro-credential builds upon the knowledge of the certified BPI Building Analyst, the BPI Energy Auditor, the BPI QC Inspector, or the Multi-family Building Analyst by establishing the competencies required to conduct an in-depth healthy home environmental risk assessment.
- The *Healthy Home Evaluator* assesses and characterizes home-based environmental health and safety hazards by integrating qualitative observations with quantitative diagnostics to determine and prioritize recommendations that address existing and potential hazards.
- The *Healthy Home Evaluator* communicates the identified risks and hazards to the occupant with the goal of improving health and quality of life.



# HHE Resources on [www.BPI.org/hhe](http://www.BPI.org/hhe)






**Healthy Home Evaluator**  
CERTIFICATION SCHEME HANDBOOK

Follow BPI     

SEARCH BPI  GO

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 [Download the HHE Certification Scheme Handbook](#)

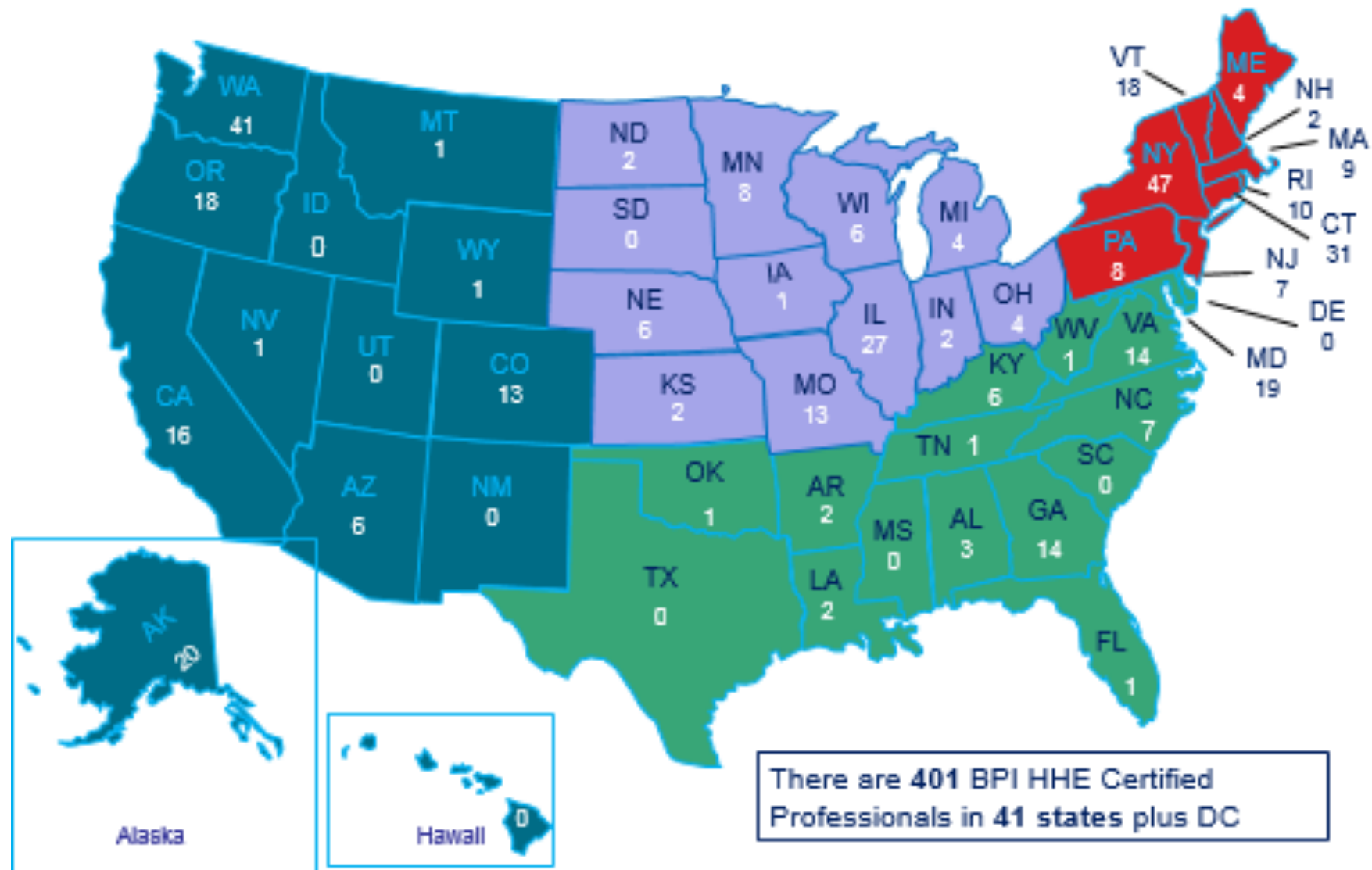


**Getting Started**

[View HHE resources](#)



# BPI HHE Certifications by State





## Assessing Home Environmental Health Risks

Home Visit from Community Health Worker and Healthy Home Evaluator	Community Health Worker	Healthy Home Evaluator*
<b>Asthma or Respiratory Home Triggers</b>		
Visual assessment: Moisture, pests, allergens, contaminants	✓	✓
Client engagement: tobacco smoke, allergens, pets, cleaning strategies, etc.	✓	✓
Full home moisture assessment: interior & exterior		✓
Heat/cooling system assessment & testing		✓
Ventilation assessment		✓
Assess thermal comfort: identify insulation & air sealing opportunities		✓
<i>Recommends healthy home improvements</i>		✓
<b>Contaminants - Respiratory or Other Risks</b>		
Carbon monoxide testing: heating systems and other potential CO exposure to residents		✓
Gas appliances testing		✓
Visual assessment: cleaning, painting, home products, etc.	✓	✓
<i>Recommend smoke and carbon monoxide alarms</i>	✓	✓
<i>Recommends healthier home products</i>	✓	✓
<b>Medication Compliance and Respiratory Status</b>		
Medication adherence (self-reported by patient)	✓	
Asthma control test (ACT) score: assess and document	✓	
Clinical referrals	✓	
Respiratory function testing	**	
<b>Injury Risks</b>		
Inadequate lighting in stairwells, hallways, porches, etc.	✓	✓
Trip and fall hazards: carpets, handrails, toilet height, etc.	✓	✓
<i>Recommends home upgrades and actions to reduce risks</i>	✓	✓

\*Maintains building assessor credential (BPI Building Analyst)

\*\* Depending on training and program design

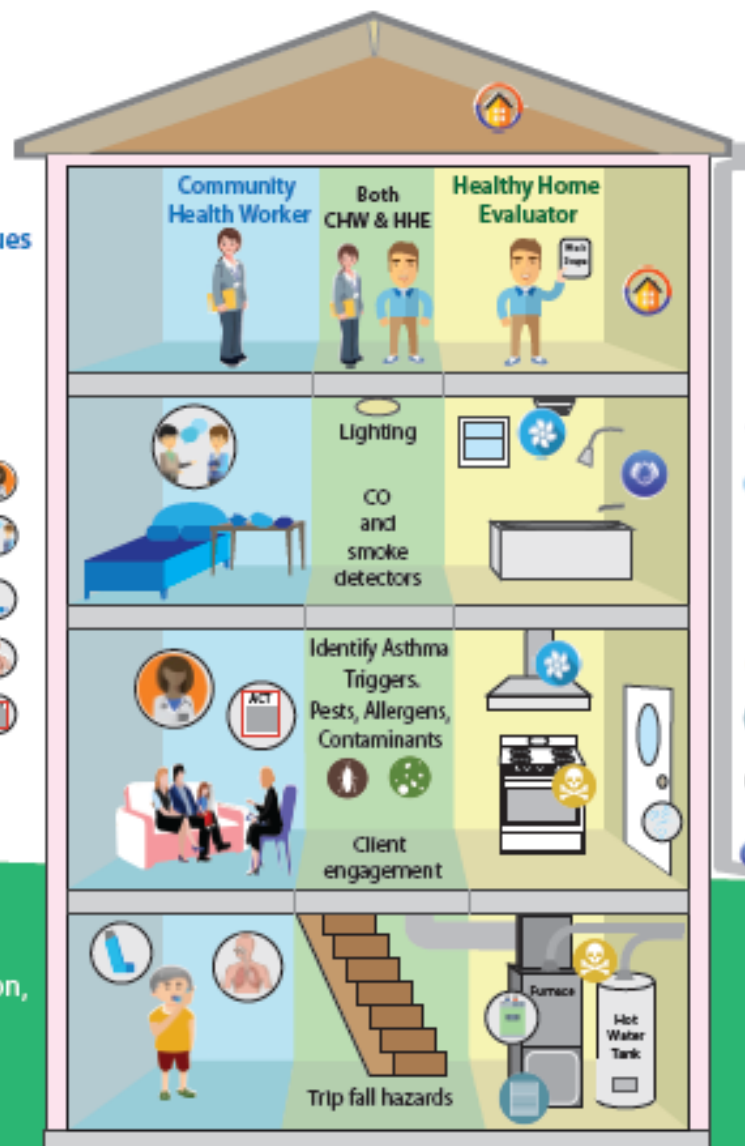
*Italics - Recommendation (rather than diagnosis/assessment)*

## Community Health Worker

Patient Coaching for Health Issues  
Medication Adherence

- Clinical referrals 
- Patient coaching 
- Medication adherence 
- Respiratory function testing 
- Asthma control test (ACT) 

CHWs having strong competency in client coaching related to medication, behavior change and environmental home health risks



## Healthy Home Evaluator\*


\*maintains Building Assessor Credential

Diagnostics to Create Work Scope for Home Improvements

-  Thermal comfort evaluation
-  Ventilation testing
-  Whole house moisture assessment
-  Air leakage & contaminant pathways
-  Carbon monoxide testing
-  Filtration evaluation
-  Heating /cooling system testing



HHEs are skilled at testing and evaluating the building conditions and recommending repairs.

# Announcing...



Building Performance Institute, Inc.

... section on Home Energy Score  
Expanded section on Renewables  
Also available in Spanish



**Building Science Principles Reference Guide**  
Second Edition



Building Performance Institute, Inc.

... section on Home Energy Score  
Expanded section on Renewables  
Also available in Spanish



**Healthy Housing Principles Reference Guide**  
First Edition



# Healthy Home Working Group



Asthma and Allergy  
Foundation of America



# Who we are

---



- Patient organization dedicated to helping those with allergies and asthma



- Medical professional association representing allergists and immunologists nationwide



- Oldest national lung health organization representing millions through research and programs



- Certified asthma educators focused on evidence based interventions



- Patient organization focused on identifying effective environmental interventions



- Healthy home advisors for public health agencies and in-home evaluation experts.



- Educational platform for home environmental management

**Objective:** *All patients with an asthma action plan will have a tailored environmental control plan based ideally on a home assessment.*





SM

## Discussions? Questions? Ideas?

**Larry Zarker, CEO**

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