Our Homes Suck! And, That is Why Our Kids Have Sinus Problems

Raising the Bar in Home Performance Contracting

Larry Zarker
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LZarker@bpi.org

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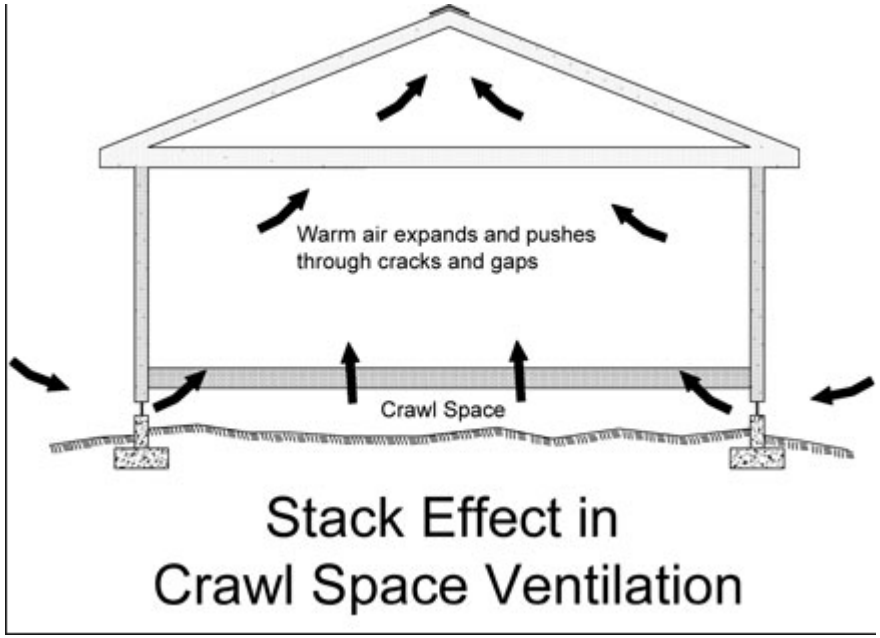
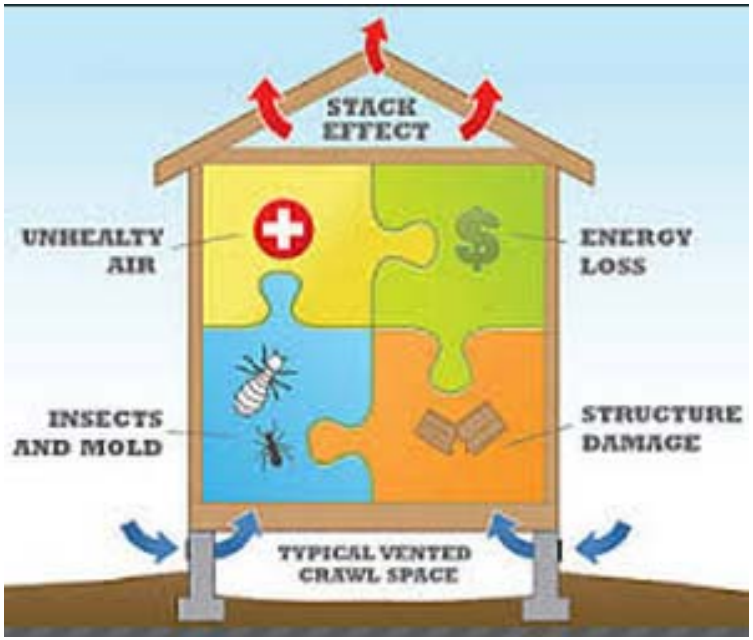
Why Our Homes "Suck": Stack Effect



Stack Effect in
Crawl Space Ventilation



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What Bugs You About Your Home?

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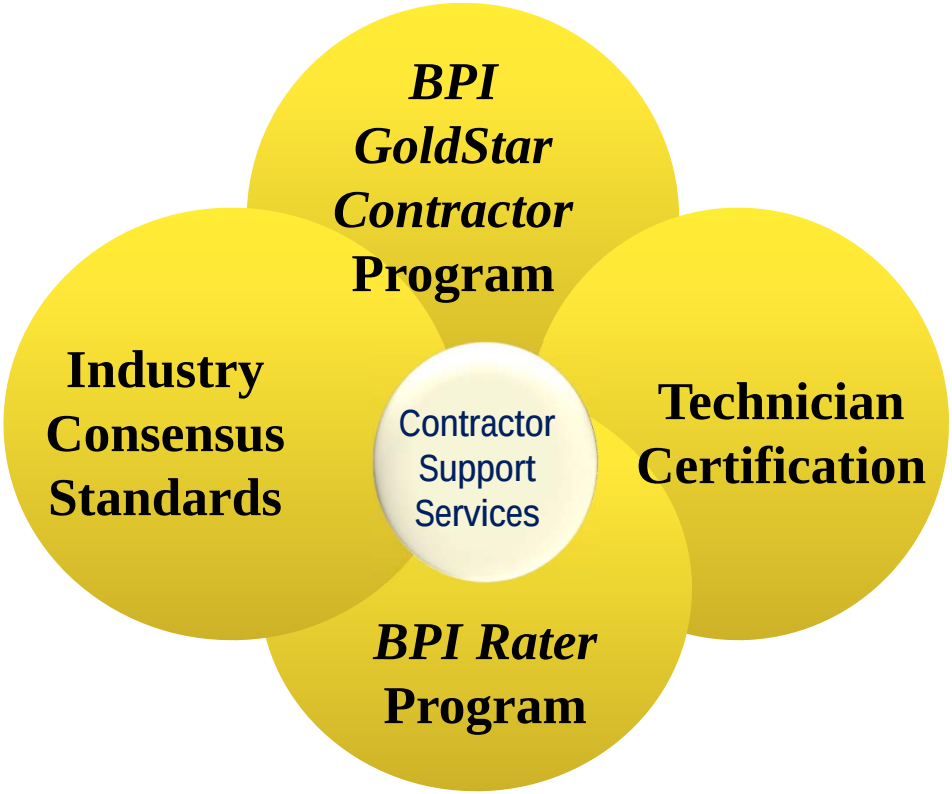
BPI's Scope of Services



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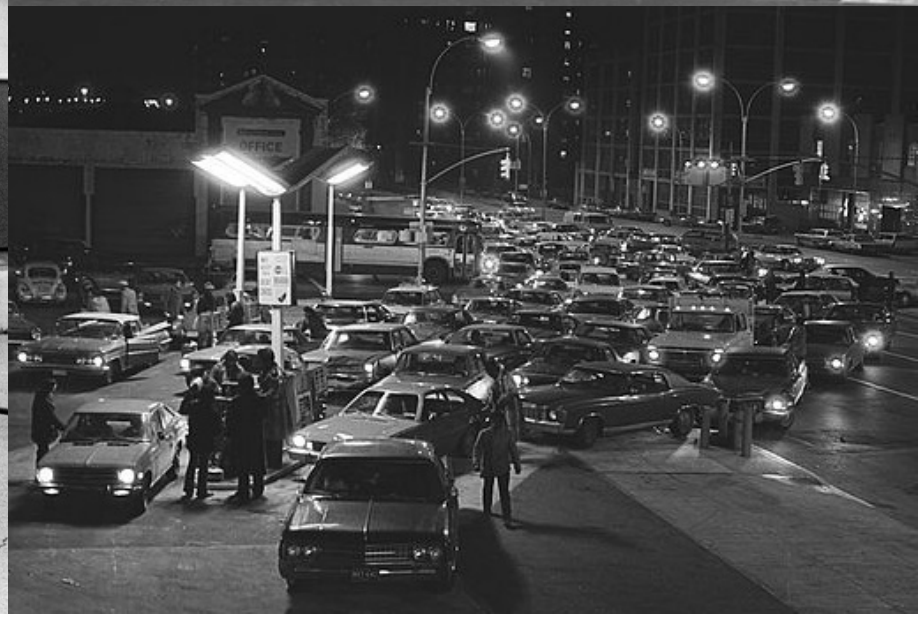
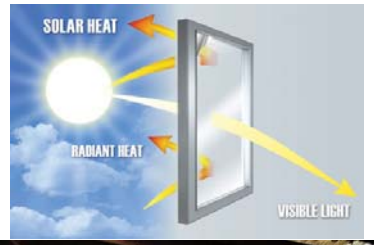
THE ARAB OIL EMBARGO OF 1973



State and Utility Energy Efficiency Programs Were Born



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But, With Incentives Comes Regulation

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

Alphabet Soup of Cost-Effectiveness Tests

Or, the utilities are allowed to introduce what I call "dreamed" savings rebate programs.

Need for Home Energy Retrofit Contracting

About a **one-third** of 80 million owner-occupied homes are now at least **45 years old** and an additional third is **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.

greentechefficiency:

Sea

ARTICLES: ENERGY EFFICIENCY

PREVIOUS ARTICLE
Gaming Costs $10B Annually in...

NEXT ARTICLE
Could Fuel Cells Solve the...

We're Doing Residential Energy Efficiency All Wrong

Nate Adams says radical changes are needed in the home-performance business.

Nate Adams
September 8, 2015

Utilities are now spending nearly $7 billion a year on energy-efficiency programs. It seems we have little to show for it aside from expensive consultants who will model any results you would like.

These programs tend to focus their marketing on the energy savings or money savings from the projects. Consumers don't care. If they did, we would see geometric growth instead of a resounding "meh."

MIT Technology Review

NEWS & ANALYSIS | FEATURES | VIEWS | MULTIMEDIA | DISCUSSIONS | TOPICS

POPULAR: INNOVATORS UNDER 35 KIRIGAMI SOLAR CELLS

Solving the Energy Efficiency Quandary

New research showing dismal results for energy efficiency in homes highlights the need for performance-based measures.

By Richard Martin on July 8, 2015

American industries have done a good job of becoming more efficient. According to a new report from the American Council for an Energy-Efficient Economy, the energy intensity of the U.S. economy (measured in BTUs consumed per dollar of GDP) has roughly halved since 1980. Energy use in the United States rose by 26 percent from 1980 to 2014, according to the group – a period when the U.S. GDP went up 149 percent.

Making homes more energy efficient has proved more difficult – and harder to measure. While the energy intensity of the residential sector has gone down slightly in recent years, the increase in average house size (along with greater use of home electronics) has meant that overall energy consumption by households has continued to rise, according to the U.S. Energy Information Administration. That has fueled a search for more effective residential efficiency programs – and intensified the debate over their benefits relative to their costs.

That debate has gotten hotter since the release, in late June, of a study by researchers at the University of Chicago and the University of California, Berkeley. Entitled *Do Energy Efficiency Investments Deliver? Evidence from the Weatherization Assistance Program*, the study examined 30,000 Michigan households participating in the federal Weatherization Assistance Program (WAP), which has provided free home upgrades like insulation and weather stripping to low-income households since 1976. The results were striking: "The costs to deploy the efficiency upgrades were about double the energy savings."

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Ramping Up Home Performance

Scenarios for Achieving Scale:

State	Units of Housing	10,000 Years	1000 Years	100 Years	10 Years
US	133,957,180	13,396	133,957	1,339,572	13,395,718

Are we on a 1000 year or a 10,000 year cycle for upgrading the performance of our existing housing stock?

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

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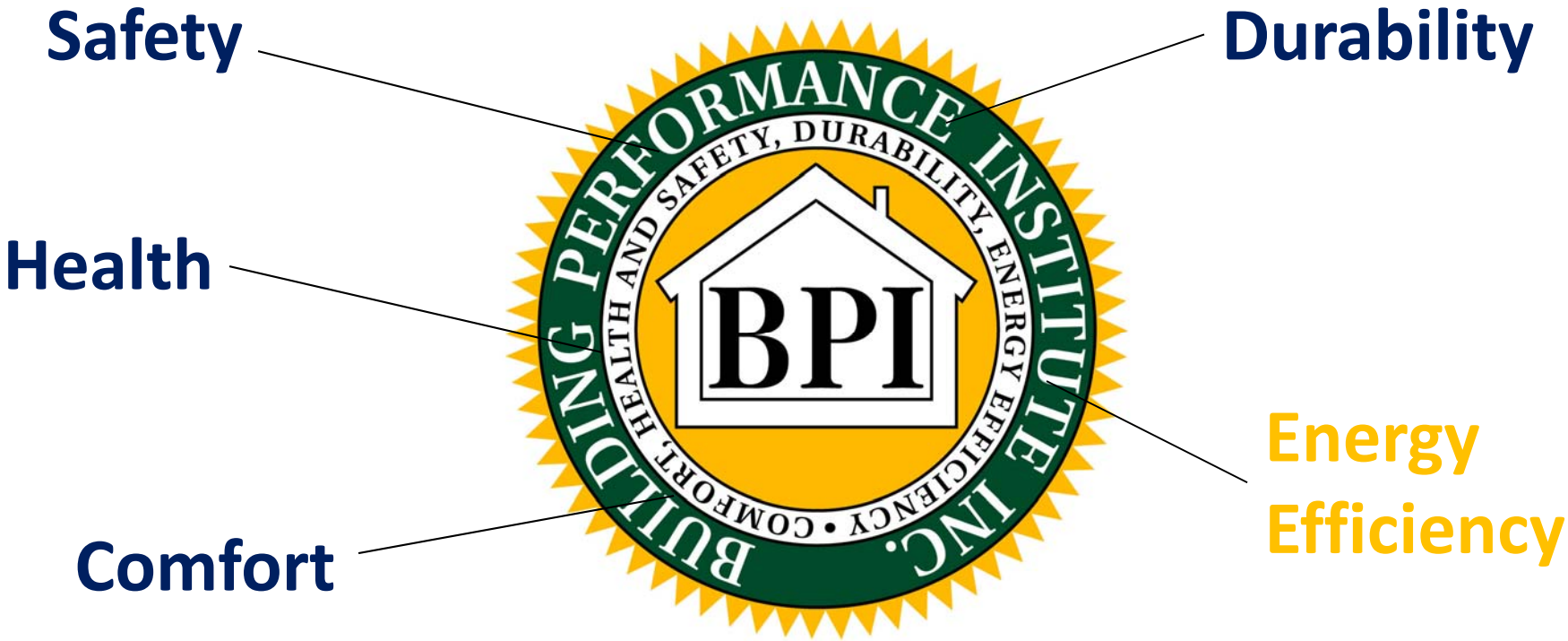
Let's meet...
The NEBS

So, what are Non-Energy BenefitS?



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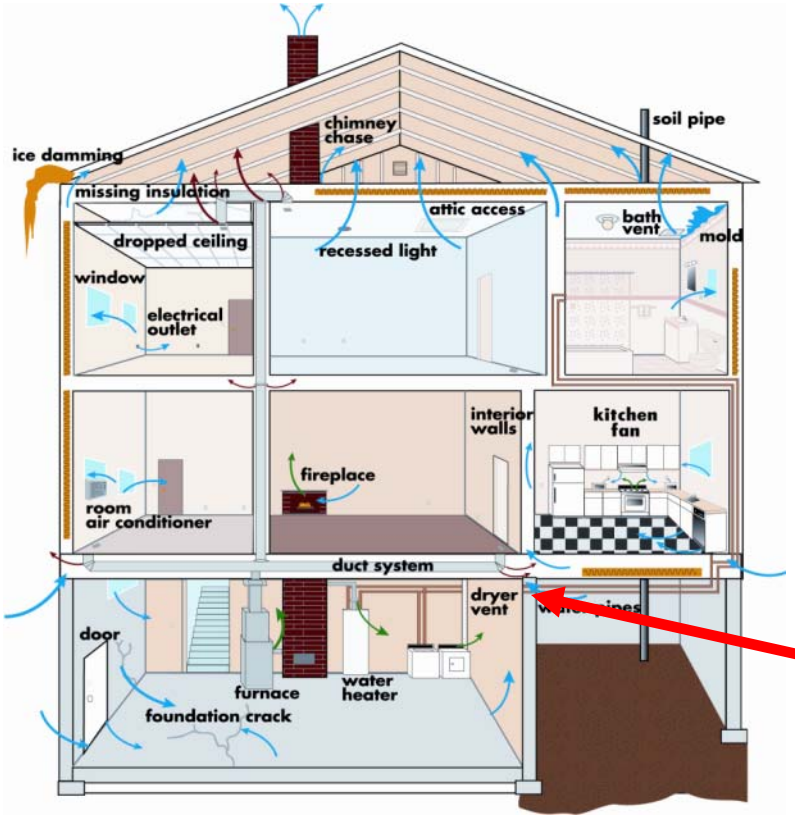
Typical home…full of systems…

- 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



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

ADVANCED ENERGY

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Photo courtesy of Stephen L. Smith

Photo courtesy of Stefan Peter-Contesse

“Silly raccoon, that’s a squirrel cage.”

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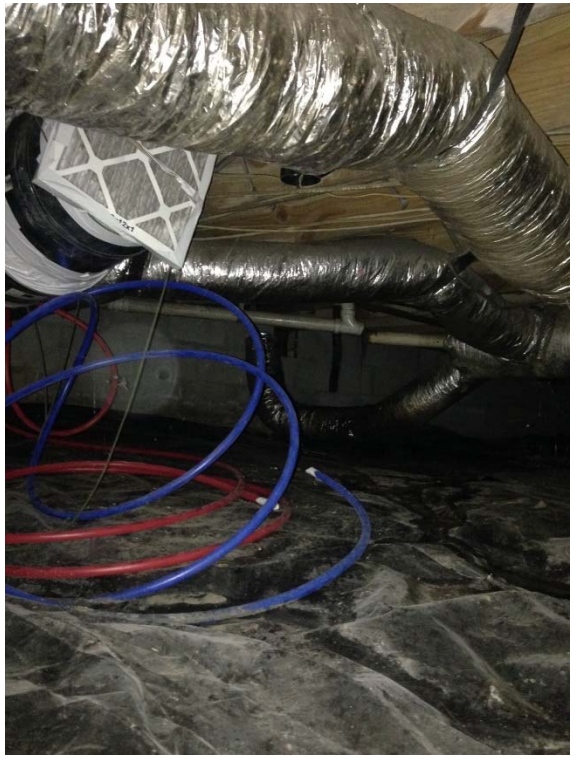
What happens when you:

Cool a Bonus Room with Crawl Space Air?



Photos courtesy of Chris Myers of
E3 Innovate LLC

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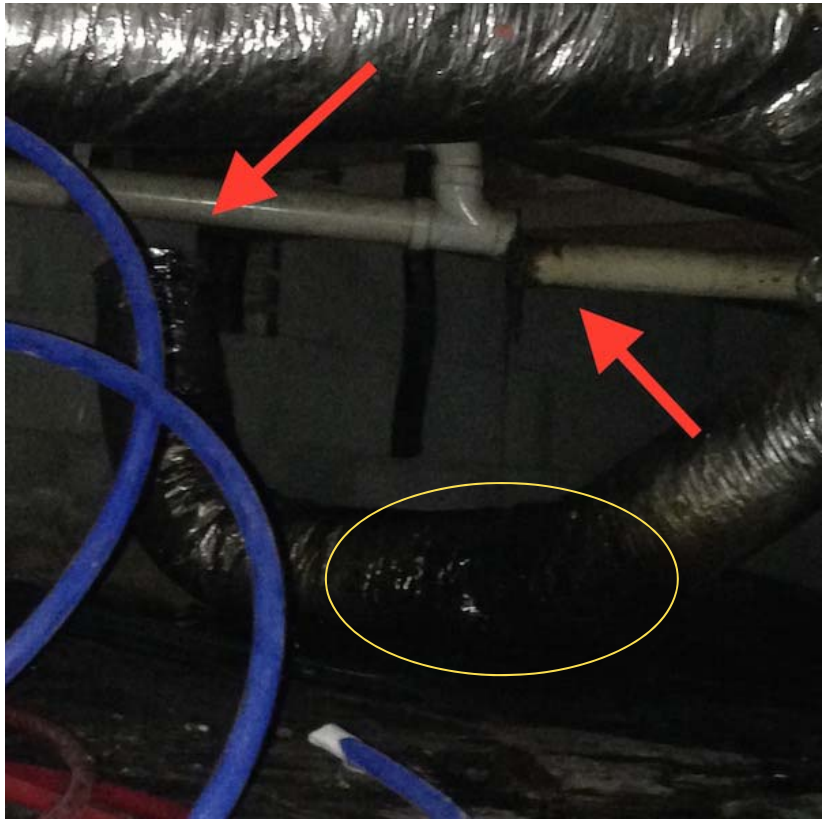

Photos courtesy of Chris Myers of
E3 Innovate LLC

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Photo courtesy of Peter Troast
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theguardian

Asthma could be worsened by energy-efficient homes, warns study

Lack of ventilation caused by better insulation could create spike in indoor pollutants, research warns

The report predicts there may be an 80% rise in the number of people suffering from asthma by 2050. Photograph: Image Source/Rex Shutterstock

The number of Britons with asthma could almost double by 2050 because the air inside homes is becoming more polluted as they become more energy-efficient, a new report warns.

The trend towards airtight houses could also worsen allergies as well as breathing problems, and even exacerbate lung cancer and heart problems, according to a leading expert in indoor air quality.

Airborne pollutants created by cooking, cleaning and using aerosols such as hairsprays will increasingly stay indoors and affect people's health as homes are made ever more leak-proof to help meet carbon reduction targets, a report by Professor Hazim Awbi claims. Small amounts of chemicals found in detergents

Energy Vanguard Blog

Do Energy Efficient Homes Cause Asthma?

Posted by Allison Bailes on Thu, Sep 24, 2015

The mythology lives on

*"No, a house doesn't need to breathe. No, energy efficient houses don't cause asthma. No, the problem isn't that we're making houses more airtight… And, look, a lot more people are getting sick because of poor indoor air quality in homes that are **not** energy efficient in the least."* Allison Bailes, Ph.D.

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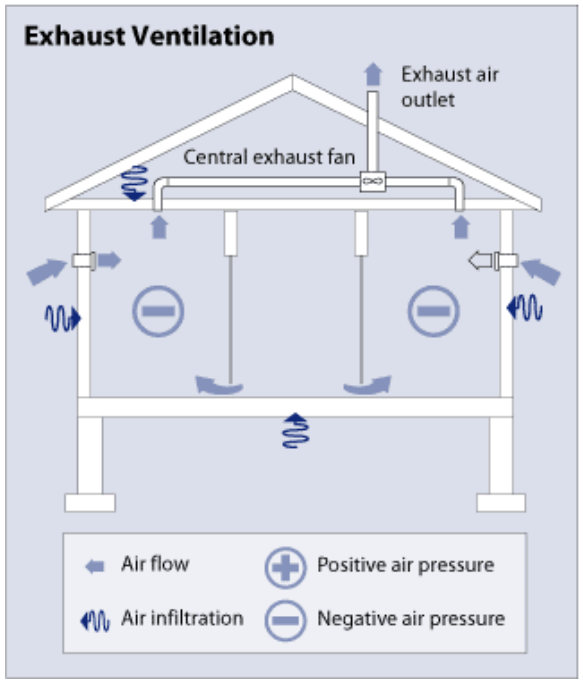
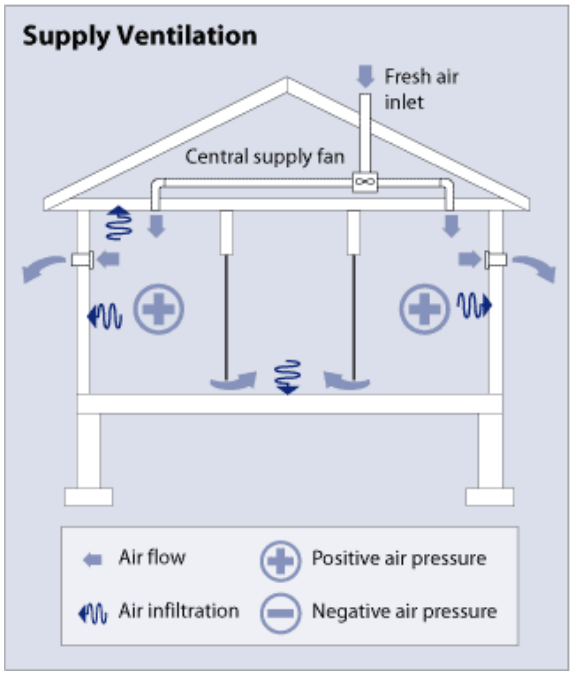
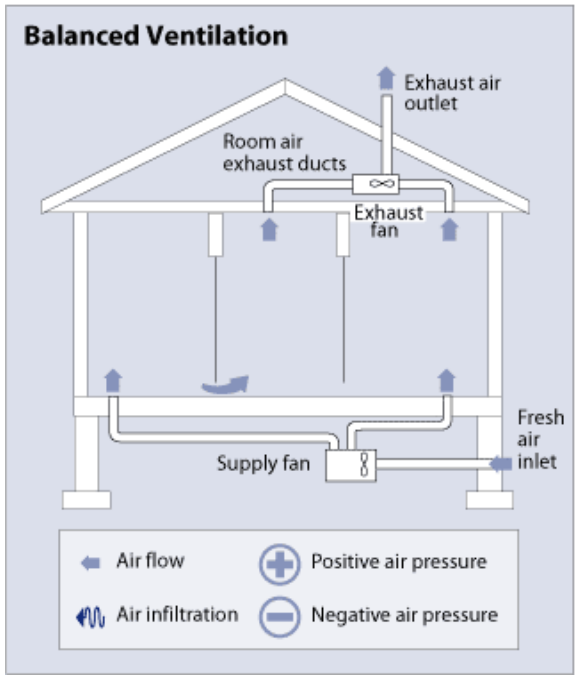
Ventilation System Approaches







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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

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

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

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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?

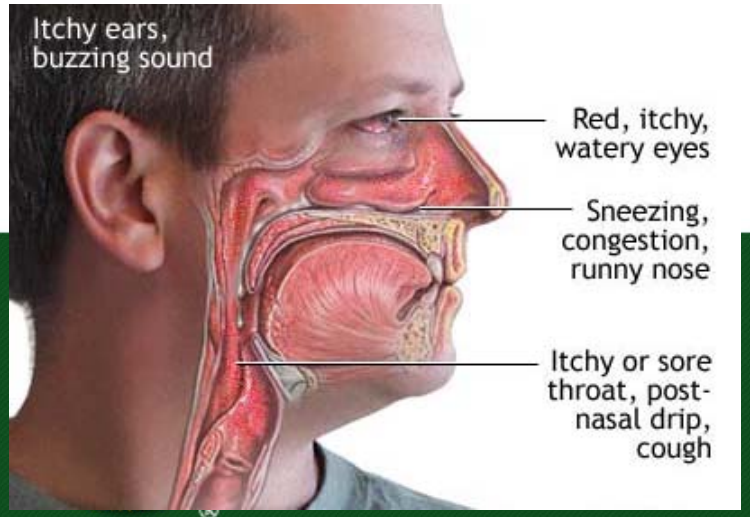
Read the paper from Mayo Clinic which states that 93% for chronic sinusitis is mold related.

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.



Original Article

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).

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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.

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

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.

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.

EECA energywise
THE POWER TO CHOOSE

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

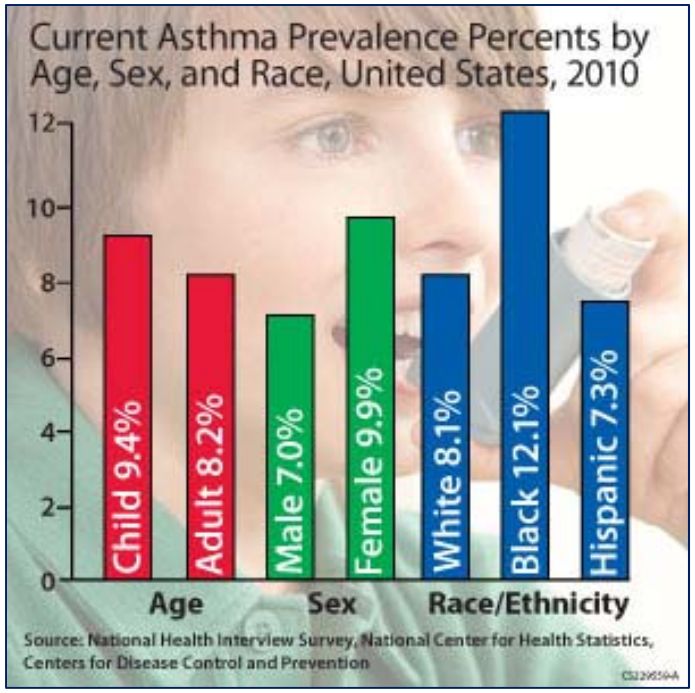
EECA energywise
THE POWER TO CHOOSE

Health Benefit Studies on Retrofitted houses

Results of the studies undertaken so far:

- admissions to hospitals for respiratory conditions drop by 43%
- days off school reduce by 23%
- days off work drop 39%
- identified the costs of certain diseases
- causal links between cold and damp housing and poor health
- psychological and stress benefits
- quantitative risks to respiratory health established
- 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%
- Over 90% of benefits are health

CAN HOME UPGRADES IMPROVE OCCUPANT HEALTH?



Results from Two Meta-analyses

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CDC AND NATIONAL CENTER FOR HEALTHY HOUSING (NCHH) 2009

Table 1. Summary of Intervention Findings

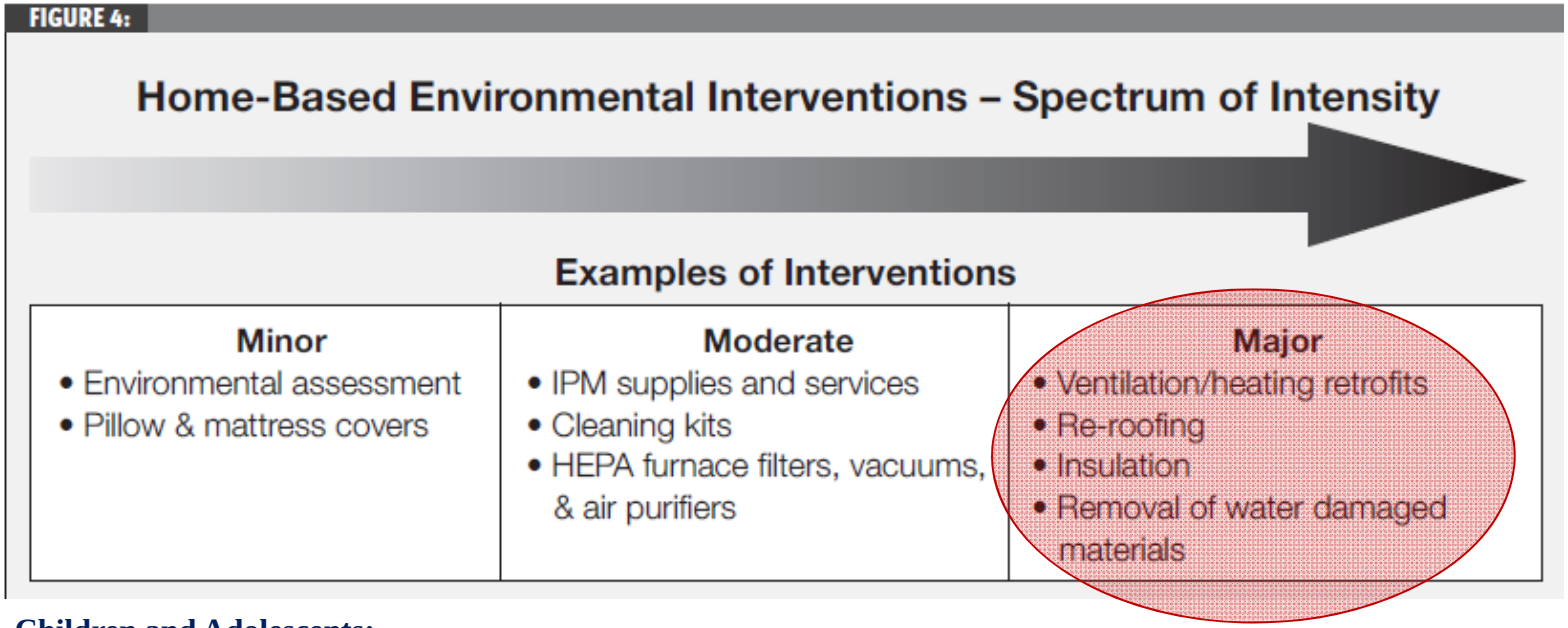
Panel	Sufficient Evidence	Needs More Field Evaluation	Needs Formative Research	No Evidence or Ineffective
Panel 1: Interior Biological Agents (Toxins)	• Multi-faceted tailored asthma interventions • Integrated Pest Management (allergen reduction) • Moisture intrusion elimination	• Dehumidification • General & local exhaust ventilation (kitchens & baths) • Air cleaners (to reduce asthma) • Dry steam cleaning • Vacuuming	• Carpet treatments • One-time professional cleaning • Acaracides	• Bedding encasement alone • Sheet washing alone • Upholstery cleaning alone • Air cleaners releasing ozone
Panel 2: Interior Chemical Agents (Toxics)	• Radon air mitigation through active subslab depressurization • Integrated Pest Management (pesticide reduction) • Smoking bans • Lead hazard control	• Radon mitigation in drinking water • Portable HEPA air cleaners to reduce particulate • Attached garage sealing to limit VOC intrusion • Particulate control by envelope sealing	• Radon air mitigation using passive systems • Improved residential ventilation • VOC avoidance	• Portable HEPA air cleaners to reduce environmental tobacco smoke and formaldehyde • Air cleaners using or releasing ozone • Single professional cleaning to reduce long-term lead exposure

Source: Housing Interventions and Health: A Review of the Evidence, National Center for Healthy Housing, 2009

CDC AND TASK FORCE ON COMMUNITY PREVENTIVE SERVICES

Meta-analysis #2

FIGURE 4:



Children and Adolescents:

Asthma symptom days: median decrease of 21 days per year (6 studies).
School days missed: median decrease of 12 days per year (5 studies).
Acute healthcare visits: combined median decrease of 0.57 visits per year (10 studies)

Source: http://www.thecommunityguide.org/asthma/multicomponent.html

Source: Hoppin P., Jacobs M., & Stillman L. (2010). Investing in Best Practices for Asthma: A Business Case for Education and Environmental Interventions. Asthma Regional Council of New England.

Medicaid: Essential Benefit Rule

New Language- Preventive services must be *recommended* by a physician or other licensed practitioner of the healing arts within the scope of their practice under state law

Preventive services means services ***recommended by*** *a physician or other licensed practitioner of the healing arts acting within the scope of authorized practice under State law to - 1) Prevent disease, disability, and other health conditions or their progression; 2) Prolong life; and 3) Promote physical and mental health and efficiency*

The Future of Health Care is *Changing*

For Medicaid patients, the proposed new rules allow for home assessment services by a non-clinical, licensed person.

This means reimbursement may soon be available for healthy home assessments!

Dept. of Health & Human Services, Final Rule on Essential Health Benefits, February 2013

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A Shift in Health Care Services

Active conversations among DHHS/CMS and state Medicaid offices around the country:

- What will be the process?
- What will be the procedure?
- How much is allowable?
- Who will perform the work?
- What credentials will they need?
- **Is the upgrade work reimbursable?**

States currently working on some kind of program:
CT, KS, KY, MA, MD, MI, MO, NY, OH, OR, PA, TX, WA

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

Or, is it more like this?

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Toward a *Healthy Home Evaluator* Micro-Credential

Healthy Home Evaluator Micro-credential

Building Analyst Professional

Energy Auditor Professional

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Scope of HHE Credential

- The *Healthy Home Evaluator* micro-credential builds upon the knowledge of the certified BPI Building Analyst professional or BPI Energy Auditor 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: Prime Domains

- Principles of a Healthy Home (8-10%)
- Data Collection (38-42%)
- Analysis and Interpretation (18-20%)
- Recommendations and/or Scope of Work (18-20%)
- Communication and Client Education (5-10%)
- Personal Safety, Insurance and Liability (8-10%)

Thank you

Feel free to contact me at:

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(202) 256-3893 (direct)

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