

Multifamily Housing, Energy, and Health

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**SAVING ENERGY
MEANS
SAVING MONEY**



But does it really? Bill payers are unsure





Property Management Sells Comfort You Provide Comfort



Convenience...
Comfort...
Relaxation...
Premium location in Houston, Texas



42%

admit they regularly choose their comfort over the environment (and comfort is the real benefit they're seeking in more efficient, greener homes).

Source: Eco Pulse 2015

Gain a sustainable advantage

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**National Center for
HEALTHY HOUSING**

Thanks to Suzanne Shelton of the Shelton Group

66%

are at least somewhat
concerned about indoor air quality.

Source: Eco Pulse 2015

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84%

think energy-efficient homes
are healthier homes.

Source: Energy Pulse 2014

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HEALTHY HOUSING**

You Provide:

- Physical Comfort
 - Temperature
 - Humidity
- Mental Comfort
- Lighting
- Sound
- Reliability
- Physical Health
- Better Indoor Environment

Convenience and control are the underlying drivers of comfort



n=794

Q25 – [Asked of those who chose “to make my home more comfortable” in Q22]
 Which of these messages about comfort would be most likely to influence you to make energy-efficient home improvements? (Choose two)

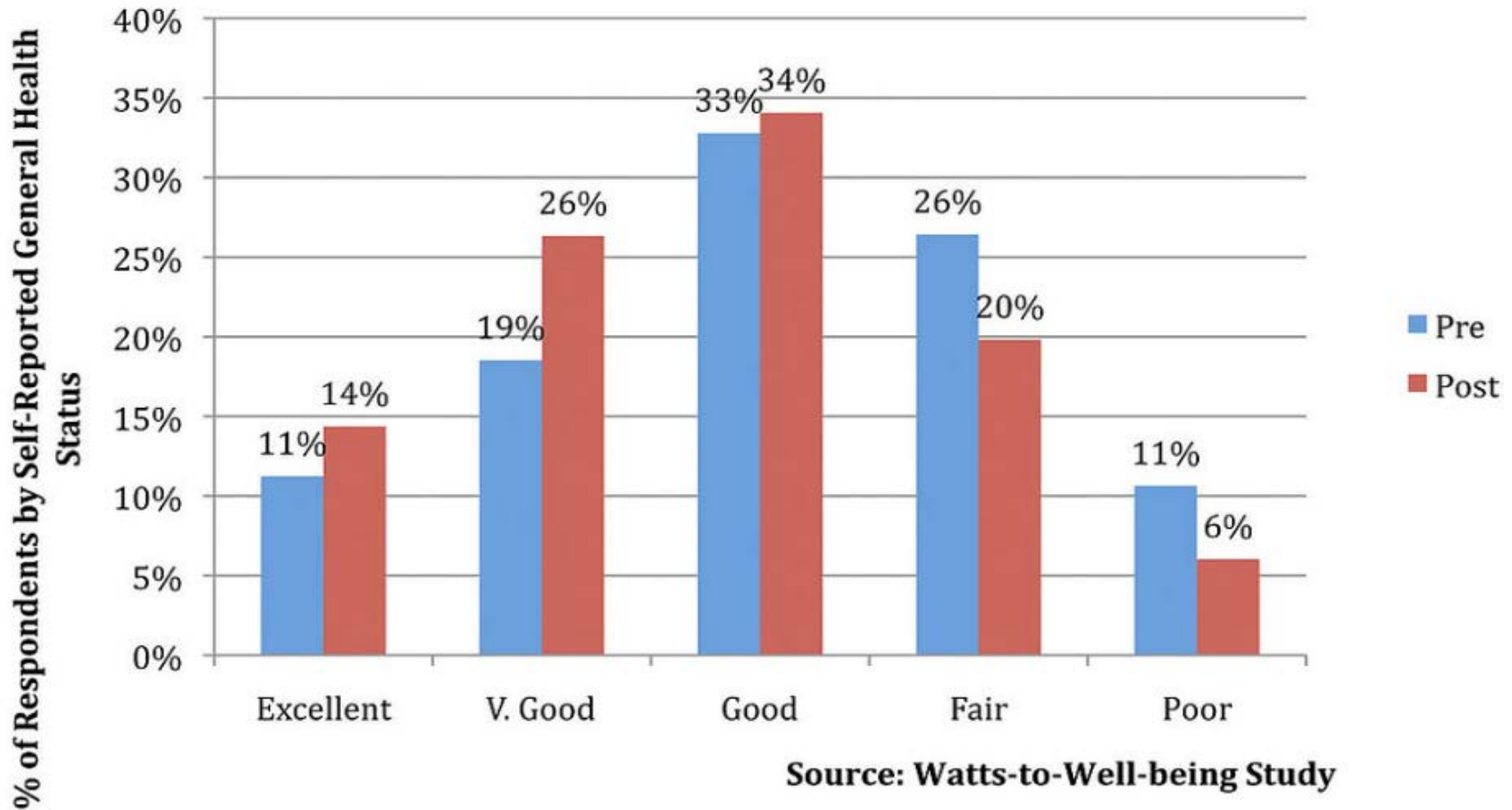
energypulse™
2016

National Center for
HEALTHY HOUSING

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Studies Document Improved Well-Being After Energy Efficiency Measures



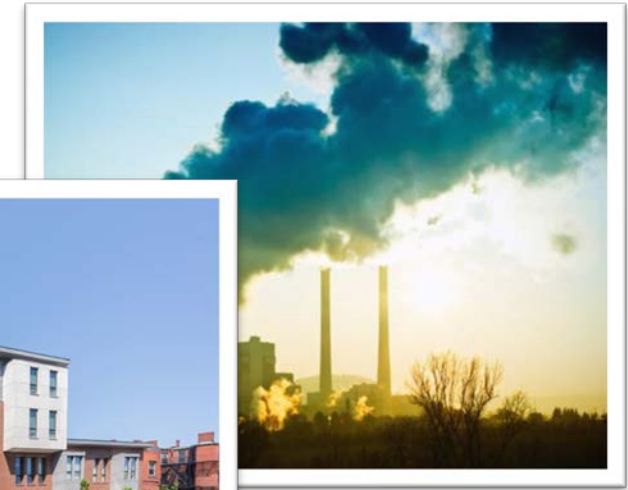
Sick Building Syndrome is Real

Less Air Exchange =
More Contaminants
Trapped in Home



Indoor Levels Eclipse Outdoor

- Carbon monoxide
- Nitrogen oxides
- Particulates
- Volatile organic compounds
- Formaldehyde
- Radon



Our Material:



100% Natural
Solid Pine

Actual photo of
our shelf section

Their Material:



Mixture of wood chips
& Formaldehyde

Actual photo of
shelf section from
major retailer

**"Formaldehyde is also
a known Human Carcinogen"**
California Environmental Protection Agency

Asthma

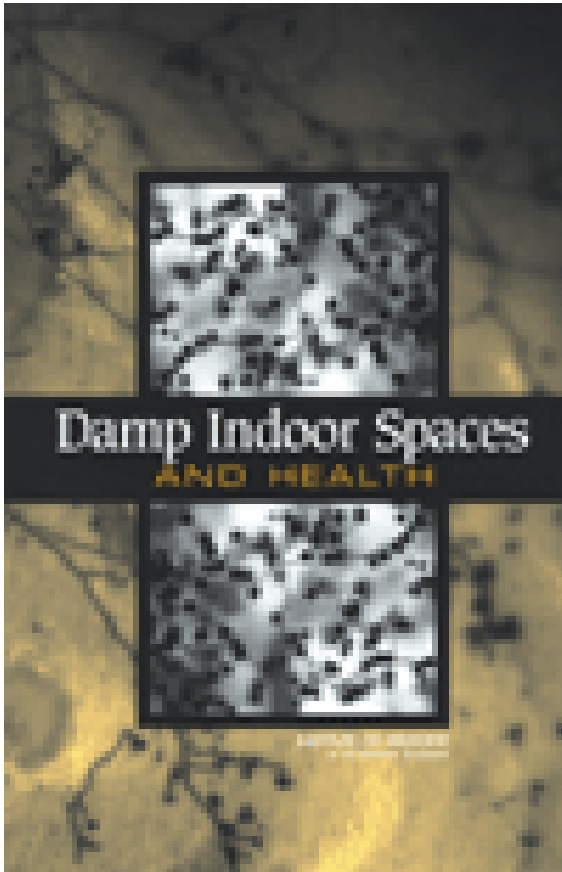


- Asthma directly affects over 25 million people in the US (7.9%)
- About 5% of the population incur health care costs related to their asthma each year (~\$56 billion)
- **10 people die a day of asthma**
- 60% of asthma “attacks” are triggered in part by allergens like pests and mold

Housing-Based Asthma Triggers



2004 Institute of Medicine Report on Health Effects Associated with Moisture and Mold



- Upper respiratory tract symptoms
- Coughing
- Wheezing
- Asthma
- Hypersensitivity pneumonitis

Moisture Supports a Host of Health Hazards

- Mold
- Dust mites, cockroaches, other pests
- Structural damage (wood rot)
- Paint failure (creating lead hazards in older housing)

Multifamily Properties are Not Immune

Multifamily

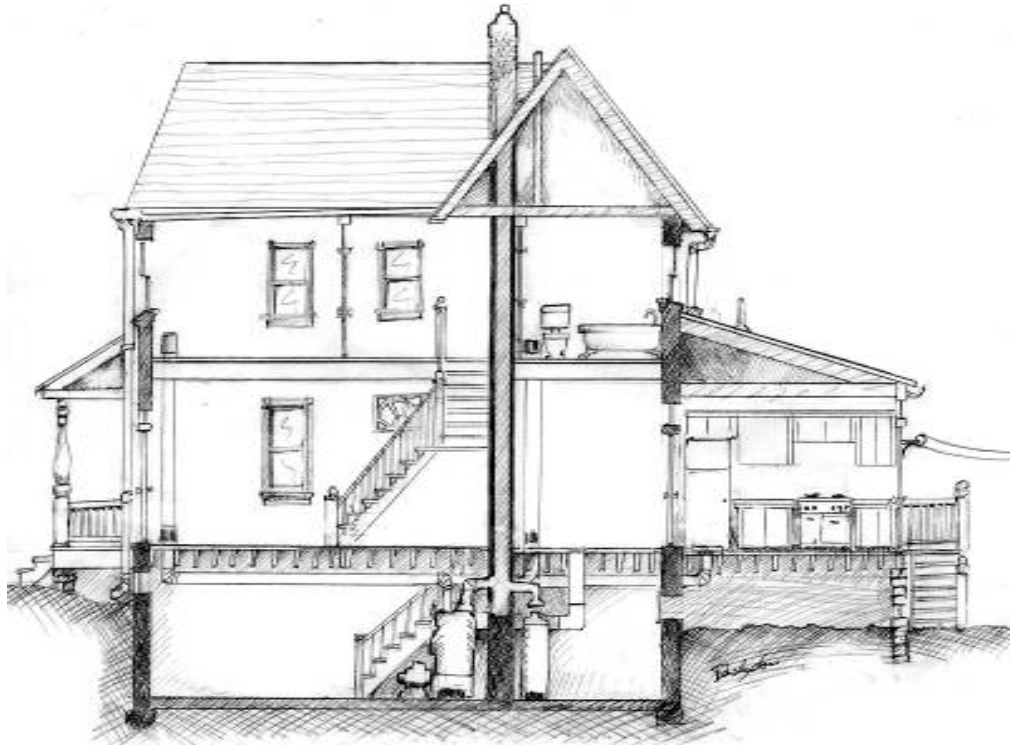
- Daily musty odors 15%
- Inside water leak 11%
- Outside water leak 7%
- Cockroaches 19%
- Rodents 7%
- SHS at least weekly 9%*

Non-Multifamily

- Daily musty odors 17%
- Inside water leak 10%
- Outside water leak 10%
- Cockroaches 16%
- Rodents 12%
- SHS at least weekly 5%

*SHS = Second Hand Smoke entered dwelling
Source: American Housing Survey, 2015

Healthy Homes Principles



Keep It:

1. Dry
2. Clean
3. Ventilated
4. Pest-Free
5. Safe
6. Contaminate-Free
7. Maintained

Green Rehabilitation

Chicago

Compared occupant health in green rehab to 10 year old rehab, Chicago public housing

Green elements:

- Ventilation
- high efficiency heating systems
- Insulation
- low toxic materials
- roof/window flashing
- bath/kitchen fans
- moisture controls
- less carpet

Results:

- Improved child general health
- Marginally improved adult general health
- Improved adult mental health (sadness, hopelessness)
- Improved adult angina, hay fever, and sinusitis

2 other NCHH studies provide similar results

Green Rehab (con't)



National Center for
HEALTHY HOUSING

Asthma Benefits

Reduced adverse health effects

- asthma symptoms

 - 61% adults

 - 65% children

- headaches

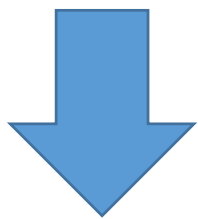
Less urgent care for child asthma (20% reduction)

Fewer missed school/work days due to asthma (4%)

Recent/Ongoing Work

- Documented benefits of upgraded rooftop fans and air-sealed vent shafts as part of multifamily improvement plan in Coney Island, NY. Results compared to other units with fans/vents repaired.

Relative humidity



Carbon Dioxide



Formaldehyde



- Currently investigating effects of ASHRAE 62 compliant rehabbed dwellings vs non-compliant rehabbed dwellings

Lessons Learned

- Energy efficiency and by extension, energy codes, offer a service that multifamily property owners want to sell: COMFORT
- Comfort serves as a catch-all term for improved perceptions of well-being, mental health, and physical health
- People feel better after energy efficiency that is properly done
- Energy efficiency is not without risk, but it is a risk that can be managed
 - Energy efficient projects and the codes that set the performance standards must recognize the risks of lower air exchange rates and increased contaminant levels; proper ventilation (e.g., ASHRAE 62) should be included

Thank you

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