The Case for Smoke-Free Multi-Housing

Stages of Smoke-Free Multi-Housing Program Development:
A series for public health professionals

Part One of Nine | October 20, 2011

Welcome!

- Please be sure to turn up the volume on your computer speakers
- If you have questions, please type them into the chat box at the bottom of your screen and we will answer them during or after the presentation
- The presentation will be recorded and archived on our web site at www.mnsmokefreehousing.org/webinar
- Print a pdf of today's presentations

Today's Speakers

Brittany McFadden

Program Director,
Live Smoke Free

Martha Hewett

Director of Research,
Center for Energy and Environment

Carissa Larsen

Assistant Program Director,
Live Smoke Free

Live Smoke Free

- Program of the Association for Nonsmokers—Minnesota
  - Working on smoke-free housing since late 1990's
  - Three full-time staff dedicated to project
  - Assisted hundreds of property managers in policy adoption, including public housing authorities; private owners; suburban, urban, and rural properties
- Recipient of MN Mentoring Supplement to provide technical assistance to Communities Putting Prevention to Work (CPPW) grantees
- Partnering with the Public Health Law Center
- Made possible by funding from the U.S. Department of Health and Human Services. Sponsored by the Minnesota Department of Health

Technical Assistance Team

Brittany McFadden

Program Director,
Live Smoke Free

Warren Ortland

Staff Attorney,
Public Health Law Center

Carissa Larsen

Assistant Program Director,
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Technical Assistance Scope of Work

- Webinar series on the stages of developing a smoke-free housing program
- Development of a comprehensive "how-to" training manual for smoke-free housing advocates
- Individual consultations, including site visits, on strategy development, legal issues, and materials
- Coordination of a smoke-free housing training on November 14, 2011, in conjunction with the CPPW "Making it Better" conference in Minneapolis

Stages of Smoke-Free Multi-Housing Program Development

Phase 1: Understanding the Need for Smoke-Free Multi-Unit Housing

Stages of Smoke-Free Multi-Unit Housing Program Development (Continued...)

The Case for Smoke-Free MUH	Getting to Know the MUH Industry	Building Your Smoke-Free MUH Program	Understanding Legal Issues
The importance of adopting smoke-free MUH policies	Assessing the MUH stock and learning what's important to the industry	Creating goals, materials, and procedures to sustain a program	Learning the local, state, and federal laws pertaining to MUH

Phase 2: Working Toward Smoke-Free Multi-Unit Housing Policy Adoption

(Continued) **Stages of Smoke-Free Multi-Unit Housing Program Development**

Strategies to Reach the Housing Industry	Working with MUH to Adopt a Policy	Providing Cessation in Smoke-Free Buildings	Working with Renters Exposed to Smoke	Program Sustainability
Getting your message to landlords	The policy adoption process	Helping current residents make the transition to a smoke-free environment	Empowering renters suffering from secondhand smoke drift	Partnering with other smoke-free MUH programs

Print a pdf of the Smoke-Free Multi-Housing Program Continuum

Webinar Series

Based on the Smoke-Free Multi-Unit Housing Program Continuum

- **The Case for Smoke-Free Housing**
- Getting to Know the Multi-Housing Industry – October 27th
- Building Your Smoke-Free Housing Program – November 10th
- Understanding Legal Issues – December 1st
- Strategies to Reach the Housing Industry – December 15th
- Working with Property Owners/Managers to Adopt a Smoke-Free Policy – January 12th
- Providing Cessation in Smoke-Free Buildings – January 26th
- Working with Renters Exposed to Secondhand Smoke – February 9th
- Program Sustainability – February 23rd

Learn more and register at
www.mnsmokefreehousing.org/cppw

The Case for Smoke-Free Housing

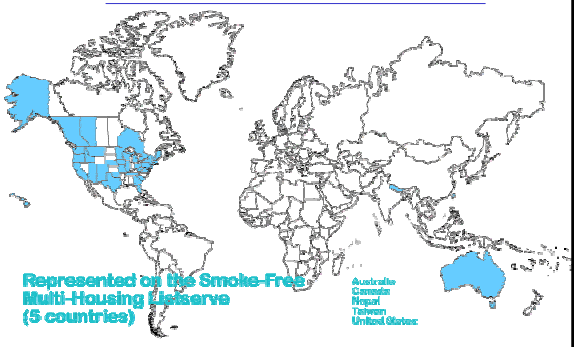
Topics Covered Today:

- The landscape of smoke-free housing
- The health dangers of secondhand smoke
- The cost savings of going smoke free
- The risk of smoking-related fires
- The market demand for smoke-free buildings
- How smoke drifts from unit-to-unit

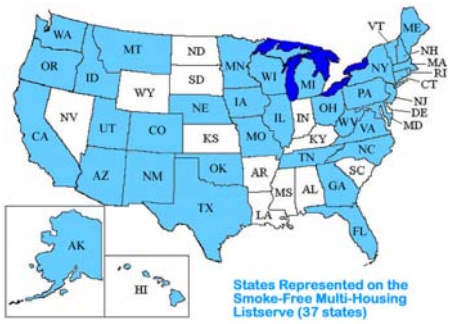
Smoke-Free Housing is Happening Globally

- Hundreds of members of an online global coalition and listserve
  - To join, contact Jim Bergman at jbergman@tcsg.org
- Smoke-free multi-unit housing (MUH) buildings in the US:
  - Over 230 housing authorities
  - Thousands of market-rate buildings
- Many states/countries/provinces/regions have at least one smoke-free housing program

Programs Around the World



Programs in the US



States Represented on the Smoke-Free Multi-Housing Listserve (37 states)

Rental Housing in the U.S.

- 34% of U.S. households are renter-occupied
  - Of that, 61% are in MUH
- In the 10 largest U.S. cities, between 40%-70% of all housing units are occupied by renters
- 53,752,000 U.S. residents live in rented MUH
- 42% of all people age <30 live in rental housing
- 19% of rental housing occupants are 65+

(U.S. Census, 2010)

Priority Populations

- Apartment residents have lower incomes
  - Avg. income of U.S. apartment households: $36,000 (2009 U.S. Census)
  - Avg. income of all U.S. households: $65,000 (2009 U.S. Census)
- Almost 16 million of the 36 million rental households are minority households (45%)

(America's Rental Housing, Harvard, 2006)

The Dangers of Secondhand Smoke

Secondhand Smoke is Deadly

- Group A carcinogen -- a substance known to cause cancer in humans
- The 2006 Surgeon General's Report concluded that **there is no risk-free level of secondhand smoke**
- Secondhand smoke kills more than 600,000 people worldwide each year, including 165,000 children
  (Campaign for Tobacco-Free Kids)

Health Effects

- Secondhand smoke cause or worsen illnesses such as bronchitis, pneumonia, ear infections, and asthma
- Nonsmokers who are exposed to secondhand smoke increase their risk of developing heart disease by 25-30% and their risk of developing lung cancer by 20-30%
- Children are especially vulnerable because their bodies are developing

(Surgeon General, 2006)

Exposure in the Home

- Almost 60% of U.S. children aged 3-11 years—or almost 22 million children—are exposed to secondhand smoke
  (Surgeon General, 2006)

- Exposure tends to be high for persons with low incomes: 60.5% of persons living below the poverty level in the US were exposed to secondhand smoke in 2007–2008
  (Centers for Disease Control & Prevention)

Relaying the Message

Why is secondhand smoke exposure important to property managers?

- Provide a safe, healthy environment for all residents and staff
- Regulations are in place to protect residents from other toxins
- Unhealthy environments are a social justice issue
- However, this may not be the highest priority for some managers

Property Damage Caused by Smoking

Reduce Cleaning Costs

- Residue and stains on walls, curtains, cabinets, blinds, appliances, and fixtures
- Odor in carpets, curtains, and walls
- Burn damage to tiles, carpets, curtains, countertops, bathtubs
- The cost of cleaning a unit that has been smoked in is often 2-3 times more than a smoke-free unit

Turnover Costs Add Up

	Non-Smoking	Light Smoking	Heavy Smoking
General Cleaning	$240	$500	$720
Paint	$170	$225	$480
Flooring	$50	$950	$1,425
Appliances	$60	$75	$490
Bathroom	$40	$60	$400
Total	**$560**	**$1,810**	**$3,515**

Data reflects surveys from housing authorities and subsidized housing facilities in New England. Collected & reported by Smoke-Free Housing New England, 2009. This information is courtesy of the National Center of Healthy Housing.

Property Damage Caused by Smoking

Residue on Electrical Outlet

A/C Filter With Smoke Damage

Residue on Walls

Thirdhand Smoke

- Chemicals that absorb into surfaces eventually break down and desorb back into the air
- Residue can continue to damage property, even after the smoker moves out, and can be picked up when people touch surfaces

Smoking is a Fire Hazard

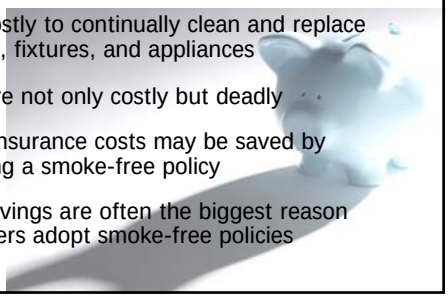
- The fatality rate of cigarette-related fires is 8x greater than other fires; the injury rate is 3x greater
- Almost 95% of cigarette-related fires occur outside of a trash can
- Cigarette-related fires are usually started in combination with a careless act
- Damage is done by the flames, the smoke, and the water from sprinklers

(Interview with Minneapolis Fire Department, 2010)

Relaying the Message

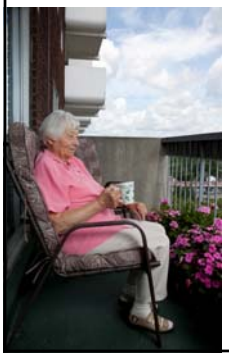
Why is property damage important to property managers?

- Very costly to continually clean and replace carpets, fixtures, and appliances
- Fires are not only costly but deadly
- Some insurance costs may be saved by adopting a smoke-free policy
- Cost savings are often the biggest reason managers adopt smoke-free policies



The Market Demand for Smoke-Free Housing

Typical Renter Concerns Regarding Smoke



- Live Smoke Free regularly receives calls from concerned renters
  - Frustrated by lack of assistance from management
  - Renters in senior or subsidized housing are of particular concern
- As more public places become smoke free, renters demand that their own living space be so as well

Renters Want Smoke-Free Housing

There have been many local surveys:

- Sault Tribe (MI) survey of housing authority residents in December, 2008 found 70% of respondents preferred to live in smoke-free housing. Forty-four percent of residents smoke or live with a smoker.
- Healthy Androscoggin in Auburn, Maine surveyed 850 tenants; 76% would choose to live in a smoke-free apartment complex

(Smoke-Free Environments Law Project in Michigan)

Renters Want Smoke-Free Housing

There have been several statewide/regional surveys:

- According to the New York Adult Tobacco Survey, a majority of respondents in MUH (55.6%) support a policy that bans smoking in all areas of their building, including residential units; support was significantly higher among ethnic minorities and individuals who reside with children.
  (Roswell Park Cancer Institute, 2010)
- In Oregon, 70% of renters (and 40% of smokers) say they would choose a smoke-free rental, "other things being equal." (Campbell DeLong Resources, Inc., 2008)

Minnesota Research

2000-2004 Statewide

1. Survey of renters
2. Survey of owners
3. Legal advisory committee
4. Testing of air movement

2009 Twin Cities Metro

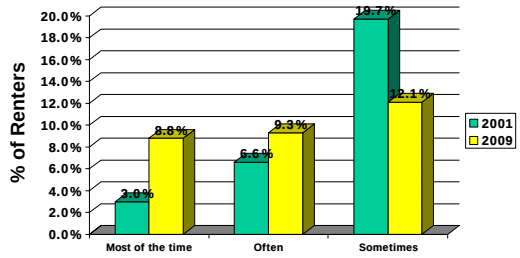
1. Survey of renters

- Goal: trend as much as possible

(full reports available on www.mnsmokefreehousing.org)

Renters are Exposed to Smoke

"How often has tobacco smoke odor gotten into your apartment from somewhere else in the building?"



Renters' Interest in Smoke-Free Areas

All units: 73%

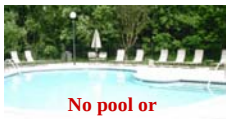
Patio/balconies: 62%

Bldg. Entrances: 64%

All property: 62%

Some Renters Will Give Up Amenities for a SF Building

"If you were planning to move, would you be willing to do the following to live in a completely SF apartment building?"



No pool or playground 47%

Drive 10 minutes further to work 36%

Pay $25 more each month in rent: 23%

Relaying the Message

Why is market demand important to property managers?

- Secondhand smoke exposure in apartment buildings is occurring and is a problem
- The risk of losing renters is small
- There is a likelihood of attracting more renters and retaining current renters

Air Movement in Multi-Unit Buildings

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Center for Energy and Environment presents

Secondhand Smoke Transfer in Multi-Unit Buildings

Martha J. Hewett Director of Research mhewett@mncee.org October 20, 2011

Research funded by ClearWay MINNESOTA

- Early 2000s (most work discussed today)
  - 6 buildings
  - Tested multiple apartments clustered around a smoker in each building
  - Measured air transfer between units
  - Measured reductions in transfer through air-sealing & ventilation
- In progress
  - Probability sample of 100 apartments
  - Concentrations of SHS constituents
  - Results late 2011/early 2012

This research was funded in part by ClearWay Minnesota … funded by proceeds from the Minnesota tobacco settlement. These findings are solely the responsibility of the authors and do not necessarily represent the official views of ClearWay Minnesota

Overview

- How much air is transferred between apartments?
- How big are the leaks?
- Where are the leaks?
- What drives air through these openings?
- How much can air transfer be reduced by air sealing and ventilation?
- How can you measure SHS transfer?
- For further information

How much air is transferred between apartments?

Test buildings

8-Plex
1970

Duplex
1930s

12-Plex
1964

Test buildings

11 story
1982

4 story
2001

138 unit
1999

Measurement method

- Passive perfluorocarbon tracer (PFT) gas system – Brookhaven National Lab
- "Tag" air in each apartment with a unique PFT
- Sample and analyze air in each apartment
- Compute flows

Emitter 

Sampler 

Results: Air from adjoining apartments as a percent of total inflow (winter)

	Range	Median
Top-floor units:	2 to **65%**	**16%**
Mid-floor units:	1 to **20%**	5%
Lowest-floor units	1 to 4%	2%

Overall average = 5%

How big are the leaks between apartments?

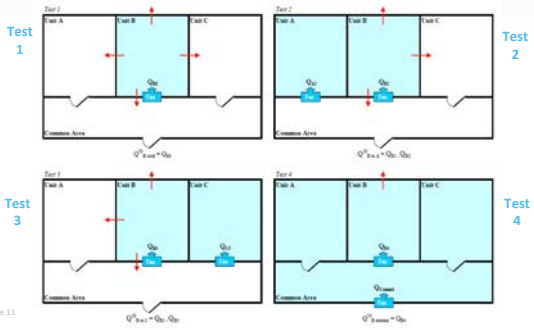
Method: guarded zone blower door tests

- Pressurize apartment to a known pressure differential
- Measure “blower door” fan flow
- Compute “effective leakage area” that allows that much flow at that pressure difference

Blower door

Sample test sequence: “guarded zones”

Shaded areas indicate zones that are pressurized to the same level.



Results: Effective leakage area (ELA) and leakage area between units as percent of total

	Total ELA (sq. in.)	To adjacent units ELA (sq. in.)	To adjacent units (% of total)
Range	25 to 130	5 to 26	16% to 59%
Average	47	9	27%

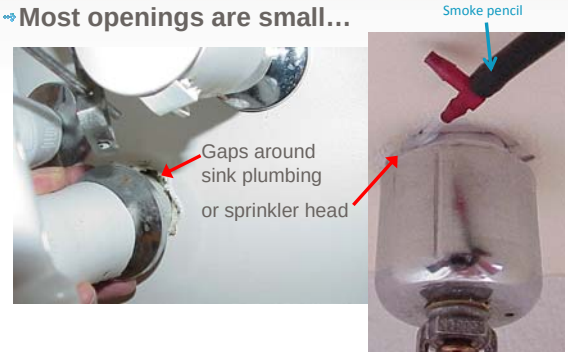
Can SHS move through 9 square inches of leaks? Oh, yeah!

Where are the leaks?

Gaps in walls, floors, ceilings, mechanical chases

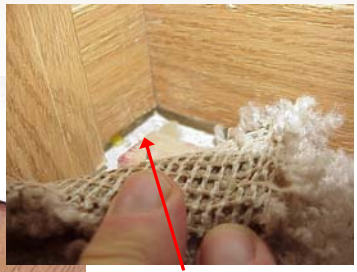
- Some accessible
- Some inaccessible or too diffuse to seal

Most openings are small…



Light fixtures:
Leaky (2.5 sq. in.)
Tight (0.1 sq. in.)

Many leaks are diffuse…

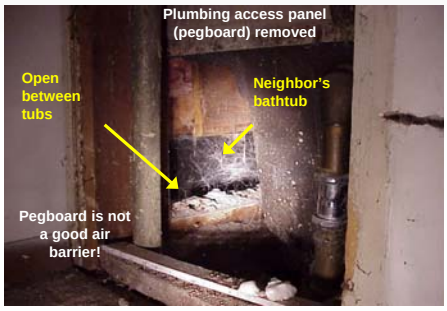


Gap along baseboard under carpet

Baseboards

Gaps behind baseboard heaters

Some leaks are BIG!



"Why do our clothes smell like smoke?"

Hidden high rise mechanical chases = large uncontrolled air flows

Concrete penetrations much bigger than pipes – lots of room for air flow!

Hidden openings hard to access & seal

What drives air through these openings?

Winter stack effect

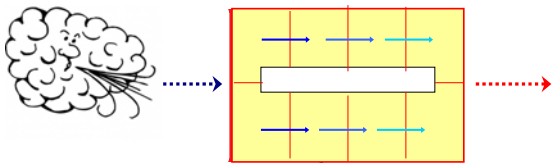
- Air comes in at the bottom and goes out at the top
  - Air inside is lighter than air outside, so it rises through the building
  - Same principle as a chimney ("stack")
- The taller the building, the bigger the effect

Winter stack effect is the reason for these differences by floor

	Range	Median
Top-floor units:	2 to **65%**	**16%**
Mid-floor units:	1 to **20%**	5%
Lowest-floor units	1 to 4%	2%

Wind effect

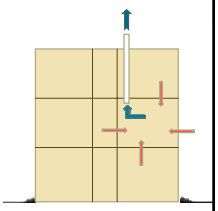
- Air goes in on the windward side, out on the leeward side
- Again, the taller the building, the bigger the effect



plan view

Mechanical system effects

- Mechanical ventilation is required by code in bathrooms & some kitchens
- Typical bathroom ventilation is an exhaust fan
  - Exhausts air from bathroom (obviously)
  - Draws air into the apartment from somewhere else to replace it (not so obviously)
- Intermittent exhaust -- or continuous but improperly balanced exhaust -- can cause air to move from one apartment to another



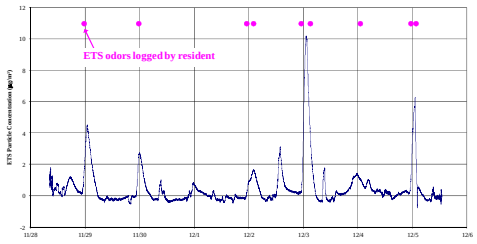
elevation view

What happens when you run an exhaust duct from the lower to upper level?

- In at the bottom and out at the top
- When the roof fan is off air tends to go in to the exhaust register in lower floor apartments, but come out of the exhaust register in upper floor apartments

Example: SHS transfer via exhaust ducts

- Smoker in first floor unit
- Central exhaust turned off at midnight daily
- Monitoring in non-smoker's unit on 11th floor



What if you open a window?

- If the smoker is on a lower floor and it is winter, opening a window tends to increase air flow and SHS transfer to upstairs neighbors
- If the nonsmoker is on an upper floor and it is winter, opening a window tends to increase air flow and SHS transfer from downstairs neighbor

How much can transfer be reduced by air-sealing and ventilation?

Treatments in 6 test buildings

- Sealed leaks to extent practical: 3 to 12 labor hours/apartment
- Installed effective (and quiet) exhaust fans
- Converted intermittent exhaust to continuous exhaust
- Balanced exhaust air flows, to minimize mechanical driving force between apartments

Direct effects of treatments

- Decreased fraction of air coming from other apartments for two-thirds of the apartments
- Increased fraction of air coming from other apartments for some lower level apartments
  - Caused by balancing of exhaust flows
- Increased average ventilation rate by 60%
- Substantially reduced variation in ventilation between units

Net impact of treatments

- Reduced contaminant concentrations in nonsmokers' apartments by a median of 29% for a given source strength
  - Not a high percentage for a lot of $$$ spent
- Over 80% of residents with pre-existing SHS problem said it was less frequent & less severe after treatments
  - But not gone
- There is no safe amount of SHS (US Surgeon General)

How good is the human nose?

Junker 2001 Olfactory lab testing with non-smokers

- Threshold of odor acceptability for respirable SHS particles (SHS RSP): 1 $\mu g/m^3$
- Threshold of eye, nose and throat irritation: 4.4 $\mu g/m^3$
- One cigarette produces 6,000 to 14,000 μg of RSP.
- Dispersed uniformly, one cigarette would require:
  - 3,000 cubic meters (106,000 cubic feet) to be below the irritation threshold,
  - 19,000 cubic meters (670,000 cubic feet) to be below odor acceptability threshold

How can you measure SHS transfer?

No easy answers

- No current method:
  - Is low cost
  - Is widely available, and
  - Reliably distinguishes between SHS and other sources
- An active area of research

For further information on CEE research

http://bit.ly/ceesecondhandsmoke

Training for Public Health Professionals

- Day-long training covering entire process of working on smoke-free MUH featuring national experts
- November 14, 2011, 8:30 am – 4:30 pm
- Held in Minneapolis, MN in conjunction with the CPPW "Making it Better" conference
- Registration is FREE and travel scholarships available
- Register at www.makingitbetterconference.org

Contact Information

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