Asthma Regional Council
HUD Healthy Homes Demonstration:

In Home Improvements For Childhood Asthma: Interventions in Urban & Rural Settings

Partners:

Boston Medical Center
Boston Public Health Commission
Boston Urban Asthma Coalition
ERT Associates
University of Vermont, Nursing School
Vermont Department of Health
Vermont Housing and Conservation Board

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Overview

- HUD Healthy Homes Demo Grant: 2003-2006
- Administered by Asthma Regional Council; Program coordination by ERT Associates
- Study in Boston- Boston Public Health Commission and Boston Medical Center
- Study in Vermont- Vermont Housing and Conservation Board and University of Vermont, School of Nursing
- Data Analysis-National Center for Healthy Housing

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Asthma and Housing Conditions

Most Common Offenders-Generally:

•House dust mites, pet dander, cockroaches/mice, fungi/molds, and environmental tobacco smoke

Most Common Offenders-Northeast Urban Populations:

•People with asthma living in low income, urban housing have been found to have patterns of specific sensitivities that differ from other populations, with a higher frequency of sensitivity to cockroaches, mice, and molds and less frequent sensitivity to cats, dogs, and house dust mites *(Eggleston, 2000; Eggleston et al., 1999a; Phipatanakul, 2000a and 2000b; Gruchalla et al., 2005)

•The Inner City Asthma Study, found that cockroach exposure and sensitivity predominated in the Northeast, whereas dust-mite exposure and sensitivity were predominant in southern and northwestern cities*(Gruchalla, 2005)

* HUD, Asthma and the Home Environment, 2006

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Contrasting Case Studies

SIMILARITIES:

- Studied home-based environmental interventions for children with physician-diagnosed asthma

- Provided education, supplies and structural housing interventions

- Realized health improvements (Boston 4 months; VT 12 months)

- Used same health assessment tools; Small sample sizes may have limited findings of significant results.

-DIFFERENCES:

• Boston Mostly Renters; VT.Mostly Single Family Homeowners

•Boston had Focus on Pest Control; Pests not large trigger in VT.

• Boston's Demographics: lower SES, more racial diversity and large immigrant population

• Boston used control group and randomized participants

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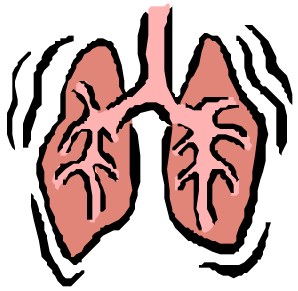
Boston –Why and Who

- **Purpose:** To determine if varying levels of housing interventions improve childhood asthma



- **Participation:**

- children age 0-17 with doctor diagnosed asthma

- 56 families low-moderate income (75 recruited); representing 81 children

- 78% African American & Latino; large immigrant population

-90% renters

- **Partnered** with two non-profit affordable housing corporations. Also used BPHC cases. Mostly larger apartment complexes.

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Boston Site- Interventions

- Two Randomized Groups:Education only; Education and Housing repairs
- The **education** included portable pest control supplies, bedding, and smoking cessation (eventually received interventions)
- The **home intervention** was $2000 per unit to reduce asthma hazards including carpet removal, ventilation improvements, plumbing/mold remediation, and professional IPM. A/Q test conducted.

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Boston Site-Assessment

- At baseline and 4 months after intervention, families had:

- Visual Housing Assessment conducted by trained healthy homes housing inspector and health educator

- Air quality monitoring

- Health and environmental interviews (conditions and practices)

    * Health Status (asthma focus)
    * Demographic Info.
    * Current Housing Conditions

- Educator also called the family every two months to monitor asthma symptoms and health care usage

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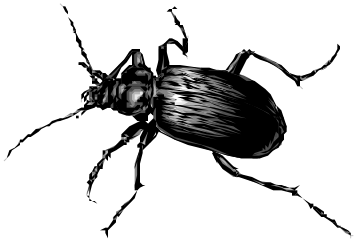
Boston-Environmental Results

- 68% reported a mouse problem at baseline
- Less than 20% cockroach problem
- 38% had at least one pet
  - 11% Bird
  - 19% Cat
  - 4% Dog
  - 4% Other
- 29% had a at least one smoker



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Boston-Home Interventions

- 76 % needed IPM; 6% needed more
- Most frequent interventions
  - 40 % carpet removal
  - 36% bathroom fan
  - 12% HEPA filter
  - 10% Kitchen fan
  - 15% window fan
- Average cost per unit $1870

VENTILATION FAN

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Boston- Environmental Results

- Many housing conditions improved:
  - Reduction in average mouse infestation scores from 1.5 to 0.7 (p=0.02)
  - Reduction in mold in bathrooms (p=.01)
- Education did not show changes
  - No change in mopping, vacuuming, sweeping
  - No change in use of air fresheners, scented or unscented candles

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Boston- Asthma Symptoms Improved

- Asthma symptoms improved after intervention
  - Fewer days of symptoms over 2 weeks (38% vs 23%) (p=<.001)
  - Stopped play for asthma over 2 weeks (21% v. 8%) (p=<.001)
- When compared with education alone, intervention children improved more, trending toward significance
  - Fewer symptoms (-15.3% vs. -6.8%) (p=.287)
  - Stopped play (-12.8% vs. -0.9%) (p=.066)
  - Limited by asthma more than 50% time

  (-3.0% vs. +0.7%) (p=0.058)

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Medication Usage Improved

- Asthma rescue medication usage improved significantly after intervention
  - Need for quick relief medication usage over 2 weeks (67% vs. 48%) (p=.024)
  - Quick relief medications more than twice a week (44% vs. 34%) (p=.226)
- When compared with education alone, intervention children improved more, trending toward significance
  - Quick Relief more than twice a week

  (-10% vs. +11%) (p=.185)

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Limitations

- Due to limitations of the recruitment within the grant period, not all families were randomized, so education only comparison group may be different
- Difficult to examine health care usage
- Difficult to adjust for seasonal variations and change in meds

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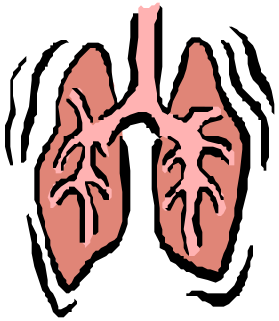
Vermont –Why & Whom

- Purpose: Examined whether minimizing or eliminating triggers in home would reduce asthma symptoms in children living in rural VT.



- Participation:

- 18 households; 24 children
- 96% white/non-Hispanic
- 85% had some college

- Housing Stock

- Older stock (majority built before 1939)
- Ownership similar to VT population:

2/3 owner-occupied single family; 22% Sec. 8

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Vermont - Interventions

- Assessment: Conducted by VHCB trained staff using inspection guide. Surveyed:
  - Basic building systems
  - Room-by-room inspection for mold or moisture problems, dust and debris, pets or pest infestations, and chemicals/fragrances
  - Temperature, humidity and carbon monoxide readings taken in each room.

- Interventions:
  - Education: Binder of Materials
  - Supplies: HEPA vacuum & air purifier, mattress covers, thermometer/hygrometer (smoke alarms and CO detectors)
  - Minor Structural Repairs: Fix plumbing, remove carpets, bathroom fans, minor mold remediation, dehumidifier provided if needed, other
  - Cost: $2,500 average ($1,200 standard; $1,474 structural repairs)

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Vermont -Study Methods

- Study: Pre and Post Intervention Design Limitations: Small sample size, not RCT

- Intervals: Initial assessment, 2-4, 4-6, and 12 months after intervention. Initial assessment involved parent interview, home inspection and health surveys. All follow-ups included health assessment. 12 month also included questions re. effectiveness of equipment & behavior changes re. maintenance practices

- Recruitment: VHCB Lead Hazards Program; Sec. 8 Tenants; Pediatricians, Clinics & School Nurses

- Selection Criteria: Vermont resident, child under 17 y.o. with health care provider asthma diagnosis, live in non public housing, home cannot have major damage or require major structural repairs

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Vermont - Results

- Biggest Problems: Leaks/Mold, Improper Ventilation, Carpeting in bedrooms, Inadequate cleaning habits, Pets, Smoking, Use of chemical sprays & fragrances (candles & sprays)
- Little Problems: Minor mouse infestation
- Little behavior Change 12 months: Smoking prevalence (most smoked outside), cleaning, pets
- Most Behavior Change: Bedding & less fragrances

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Vermont - Results

Health improvements Observed over 12 months:

-Reduction in missed school days (only sig @ 4 months)

-Reduction in controller meds all 12 months (only sig. at 4 months)

-Fewer episodes of wheezing, coughing, chest tightness, did not have to stop playing due to asthma attacks, and did not wake up at night as often. (improvements continued over 12 months)

-Less Caregiver Burden (not sig. @ 12 months)

- Parents thought the HEPA air purifier and vacuum cleaner, plus removing carpeting, made biggest difference

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Project Conclusions

- Housing interventions, including structural remediations that include moisture reduction, mold and carpet removal, and that minimize pest intrusions combined with the provision of basic supplies and equipment such as HEPA vacuums, air filters and bedding covers, can significantly improve the number of asthma symptom days for a relatively small investment. This is true in both urban and rural settings.
- Mice may be bigger problem than cockroaches in both populations
- It's very difficult to get people to change their housekeeping habits (sweeping, mopping, chemicals) even when those habits may knowingly contribute to poor health. Policy and environmental changes may have the greatest potential for improving the factors that contribute to asthma
- Future programs should link medical, public health and housing services to address asthma housing hazards as part if treatment

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