

Healthy Homes In Seattle

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Asthma and Housing

- Indoor asthma triggers increase asthma morbidity.
- Substandard housing increases exposure to asthma triggers.
 - Excessive moisture and water damage (mites, mold, roaches)
 - Breaks in walls (roaches and rodents)
 - Poor ventilation (mites, molds, tobacco smoke)
 - Deteriorated carpeting (reservoir for triggers)
 - Inadequate heating (mites, molds)
- Resident behaviors also affect housing conditions.
 - Cleaning
 - Hazardous household products
 - Smoking
 - Pets



Mold due to leaky roof

Seattle Healthy Homes Asthma Intervention Spectrum

Healthy
Homes I
1997-2001

Community Health Worker – Low intensity group
Community Health Worker – High intensity group

Healthy
Homes II
2001-2005

Clinic Asthma Nurse
Clinic Asthma Nurse + Community Health Worker

Better Homes
for Asthma
2002-2006

Community Health Worker
Community Health Worker + Home Repair

Breathe Easy
Homes
2003-2007

Community Health Worker
Community Health Worker + New Healthy Housing

Healthy Homes /

Seattle-King County



Healthy Homes Project

Community Health Worker Home Visits

- 5-7 visits to low-income children with asthma.
- Assess home environment and develop environmental Action Plan.
- Offer education and support for self-management.
- Link to primary care.
- Provide asthma trigger control resources (bedding covers, vacuum, door mat, cleaning supplies).
- Provide social support.



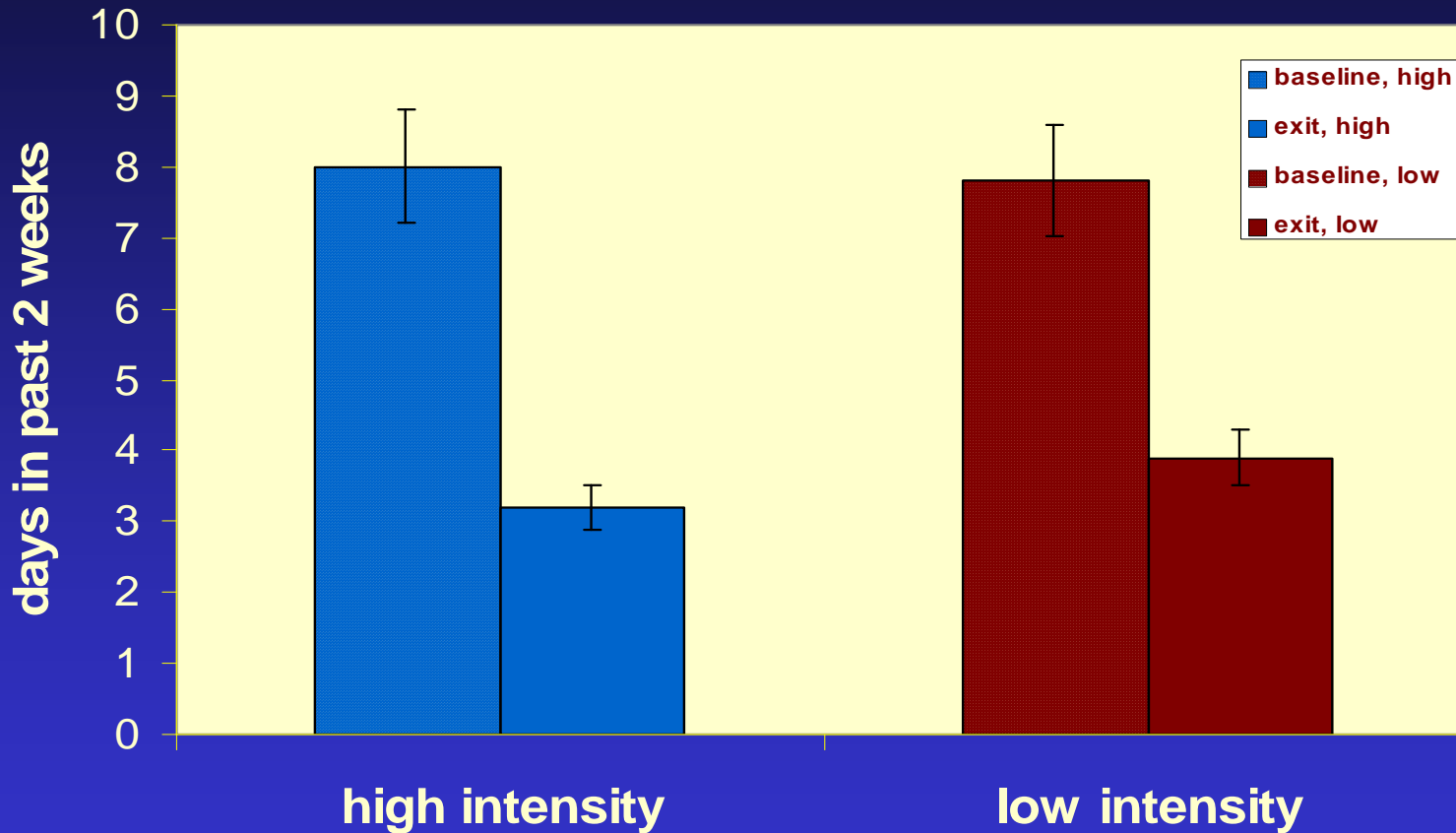
Putting on a mattress cover

Community Health Worker Home Visits

- Promote tenant-landlord communication
- Liaison with Housing Authority
- Provide social support
- Offer advocacy/referral (housing, food, furniture, jobs, etc.)
- CHWs are from participating communities, receive rigorous training, and have personal experience with asthma



Outcome: Symptom Days



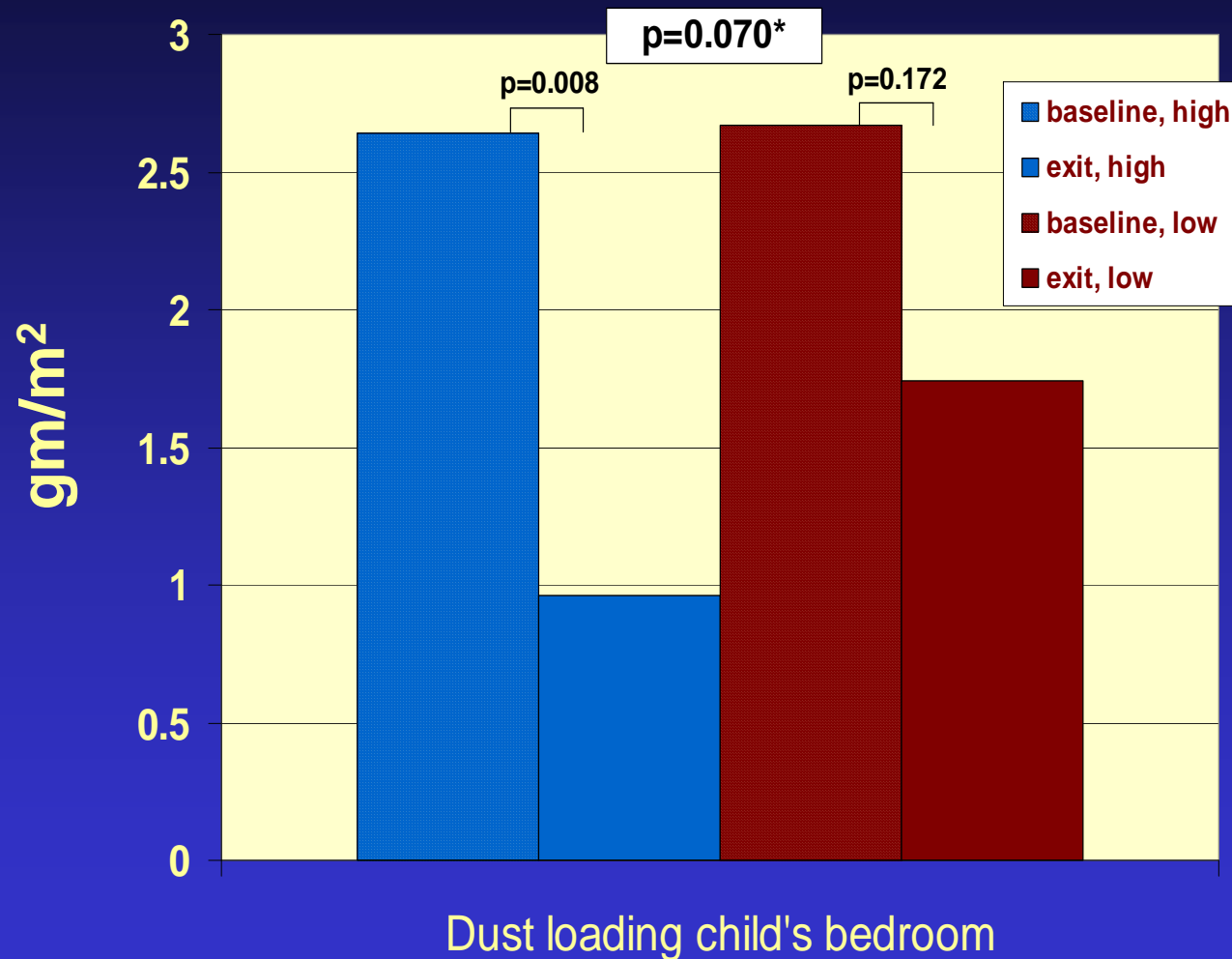
p-values:

0.000 (high intensity, baseline vs. exit, chi-square)

0.000 (low intensity, baseline vs. exit, chi-square)

0.123 (exit, low vs. high intensity, regression adjusted for baseline score)

Outcome: Floor Dust Loading



* p value comparing high vs. low exit values after adjustment for baseline values using linear regression

Outcome: Costs and Savings

- **Program costs per client**
 - ◆ High Intensity: \$1345
 - ◆ Low intensity: \$222
- **Urgent medical care savings per client (12 months)**
 - ◆ High intensity: \$1205 - 2001
 - ◆ Low intensity: \$1050 - 1786
- **High vs. Low Intensity projected over 4 years**
 - ◆ Marginal cost of high: \$1127
 - ◆ Marginal savings in urgent medical care: \$1316-1849
- **Cost of fluticasone 220 ug: \$1392/year**

Summary

Outcome	High Intensity	Low Intensity
Symptoms	↓	↓
Quality of Life	↑	↑
Urgent Utilization	↓	
Behaviors to ↓ Exposure	↑	
Surface Dust Loading	↓	
Allergen Loading	↓ (mite)	↓ (cat)
Moisture	↓	
Trigger Knowledge	↑	↑
Trigger Score	↓	

Healthy Homes II





Healthy Homes II

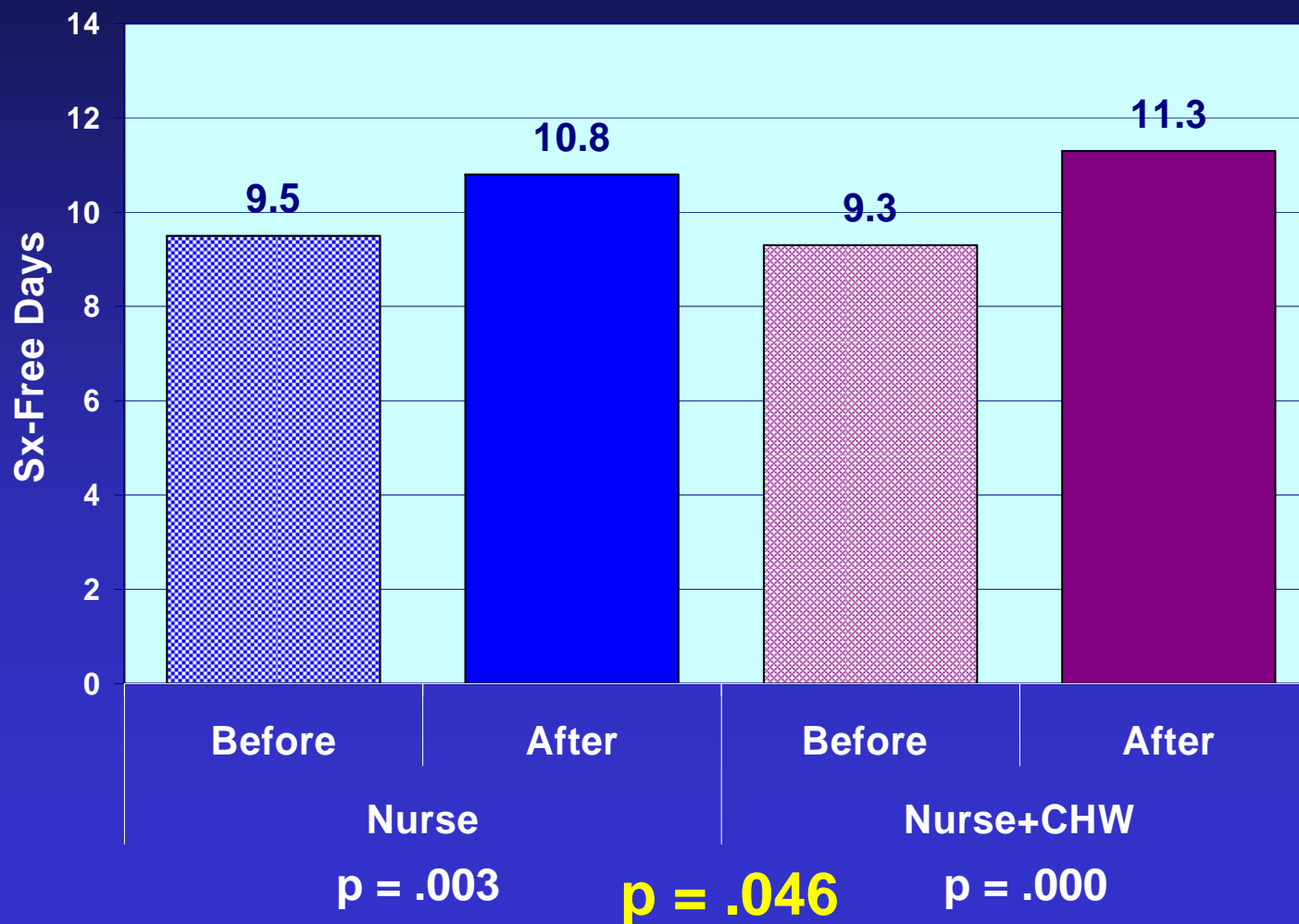
- Combine indoor environmental and clinical self-management approaches for improving asthma control
- Comparison of CHW in-home asthma support to clinic-based education
- RCT of 309 low-income households with children age 3-13 with asthma



Home Visits

- CHW makes 3-5 visits over one year
- **Asthma self-management skills**
 - **Medication use**
 - **Self monitoring**
 - **Action plan use**
- Home environment assessment and trigger reduction
- Asthma Control Plan
- **Provider-patient communication**
- **Health system navigation**
- Social support
- Advocacy/referral (housing, food, furniture, jobs, etc.)

Symptom-Free Days



Outcomes Summary

Outcome	Nurse Only	Nurse + CHW
Symptoms	↓	↓
Quality of Life	↑	↑
Urgent Utilization	↓	↓
Actions to Control Asthma	↑	↑
Trigger Score	↓	↓

Conclusions

- **Home visits by CHWs that address indoor trigger exposure improve asthma outcomes**
- **Addition of home visits by CHWs to clinic-based education improves asthma outcomes**
- **CHW home visits added 24 more symptom-free days per year**
- **Benefits in quality of life and urgent health service use were more modest**

Conclusions

- **Offering CHW home visits is a promising strategy for reducing asthma disparities**
- **Offering families a choice of options for self-management support may be optimal**
 - ◆ **Home visits**
 - ◆ **1:1 clinic-based education**
 - ◆ **Group activities**

Breathe Easy Homes



Breathe Easy Homes: Building New Asthma-Friendly Homes

- **Build 35 Breathe Easy units for children with asthma at High Point Public Housing site**
 - Insulated slab to keep floor warm and dry
 - Exterior grade plywood (no OSB)
 - Airtight drywall with low-emission joint compound
 - Cement board exterior siding/rain screen
 - Low emission doors, trim, cabinets, finishes, adhesives
 - Hard surface floors (marmoleum)
 - Enhanced ventilation (HEPA whole house continuous fan, kitchen/bath fans with timers)
 - Radiant/Hydronic baseboard heat to decrease humidity

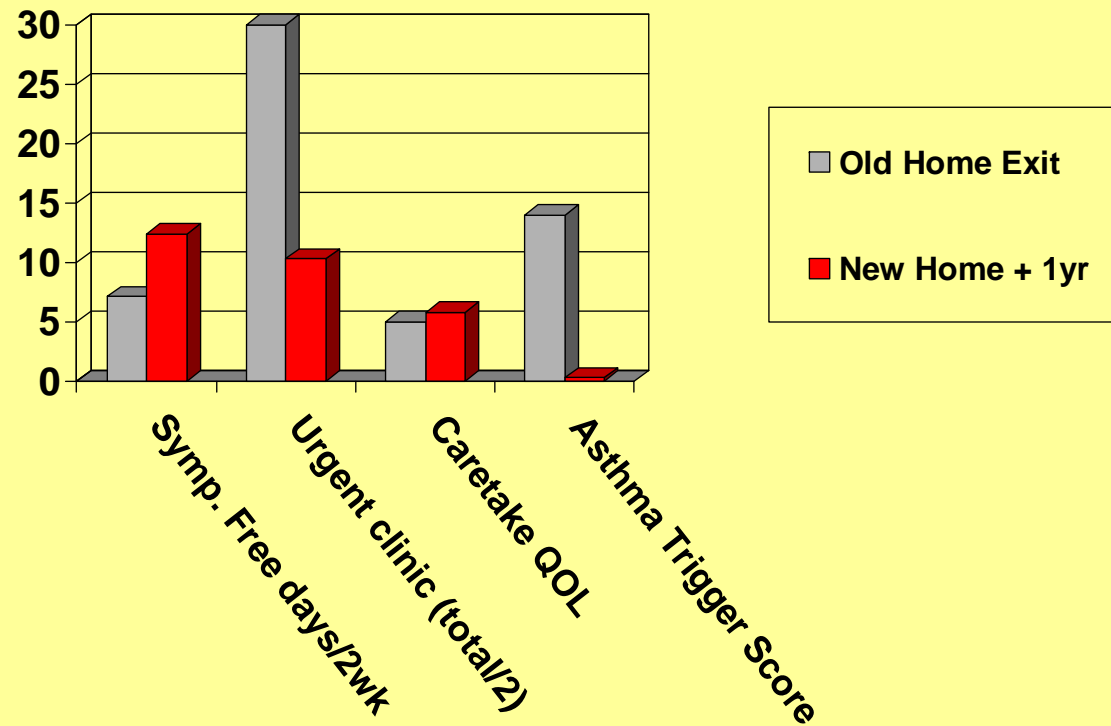


**Old High Point
Housing**

**New High Point
Breathe Easy
Home**



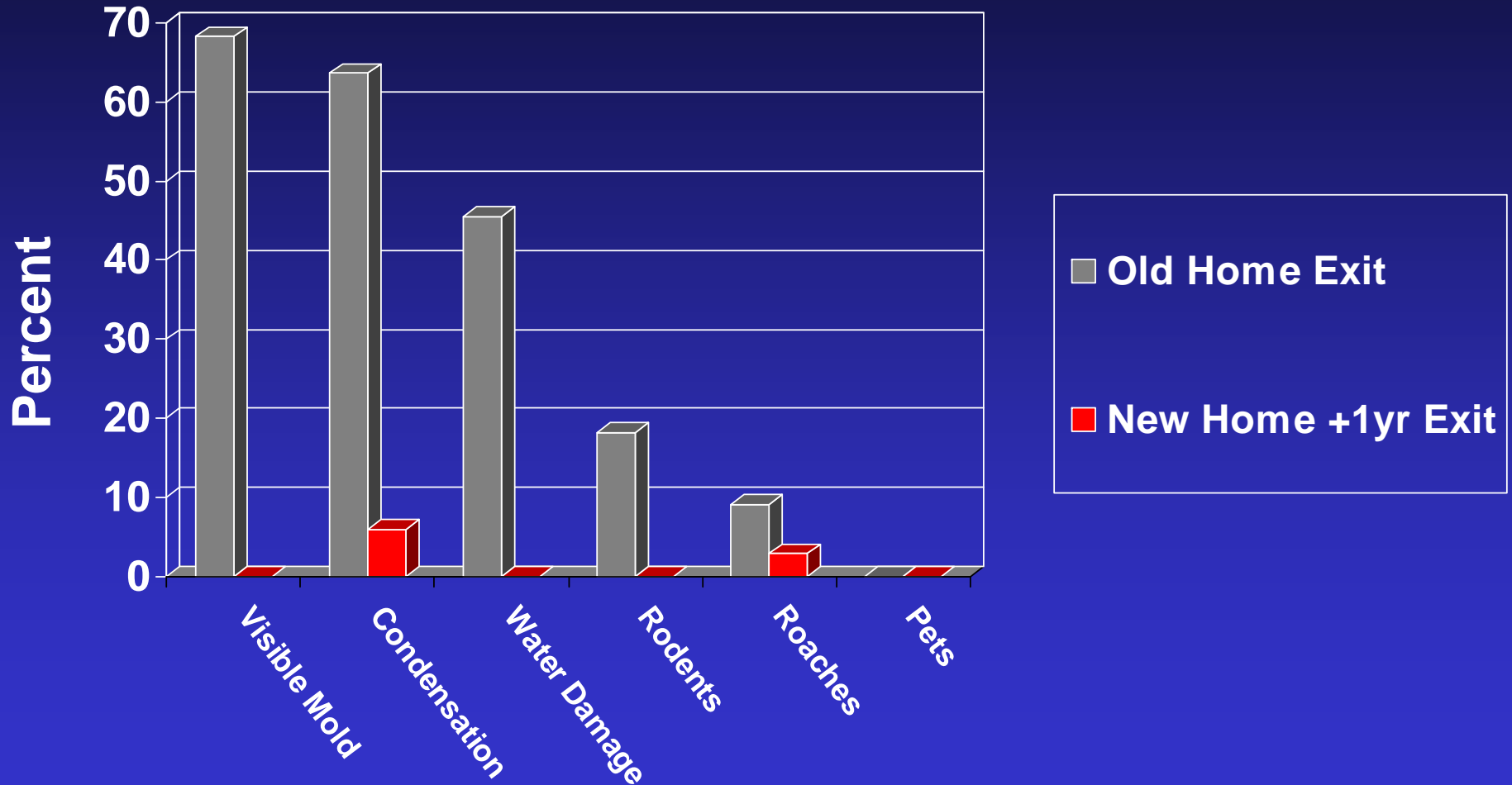
Clinical Outcomes



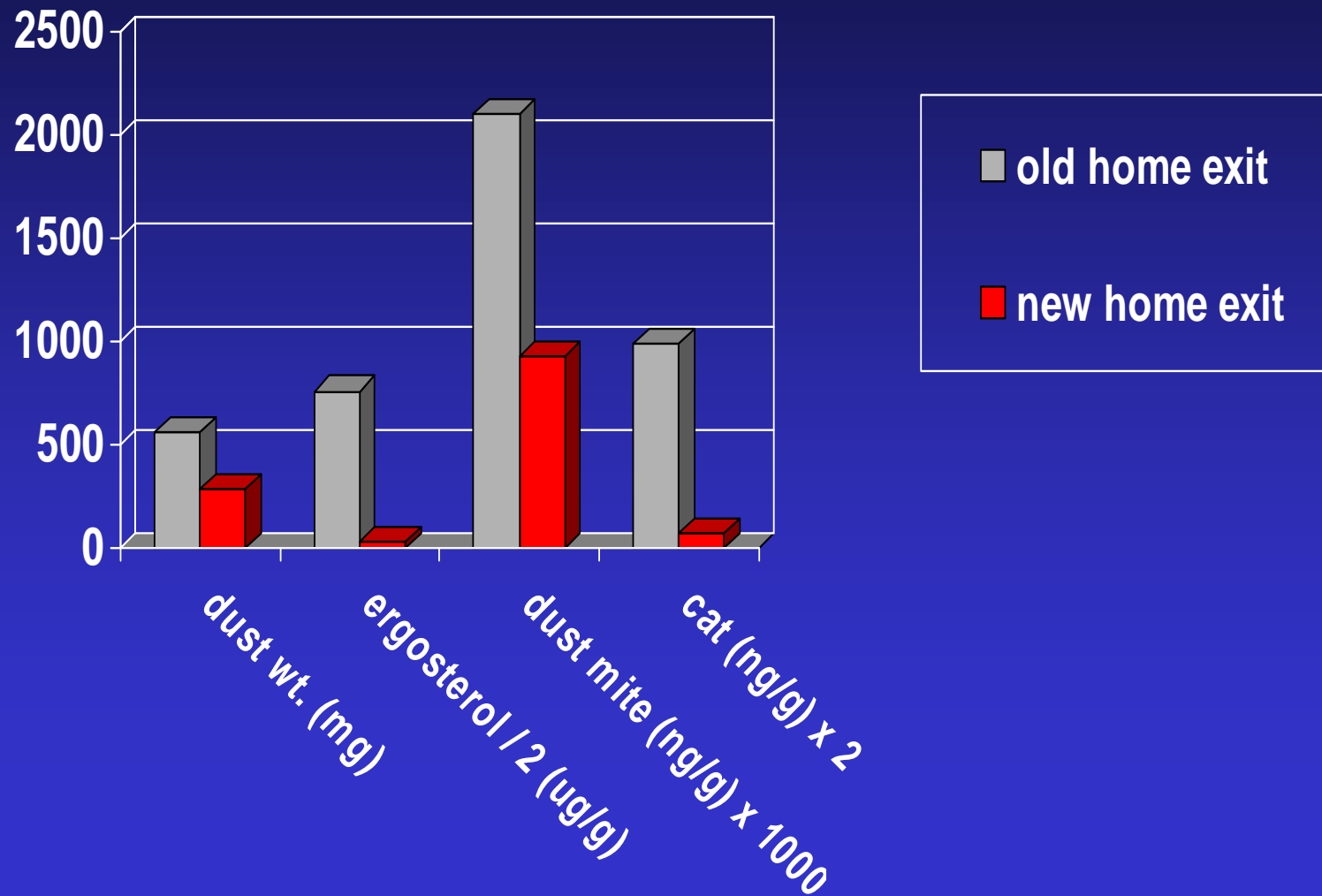
* $p < 0.004$

Old Home to New Home +1 yr.

Environmental Measures



House Dust Measures from Child's Bedroom Floor



Limitations

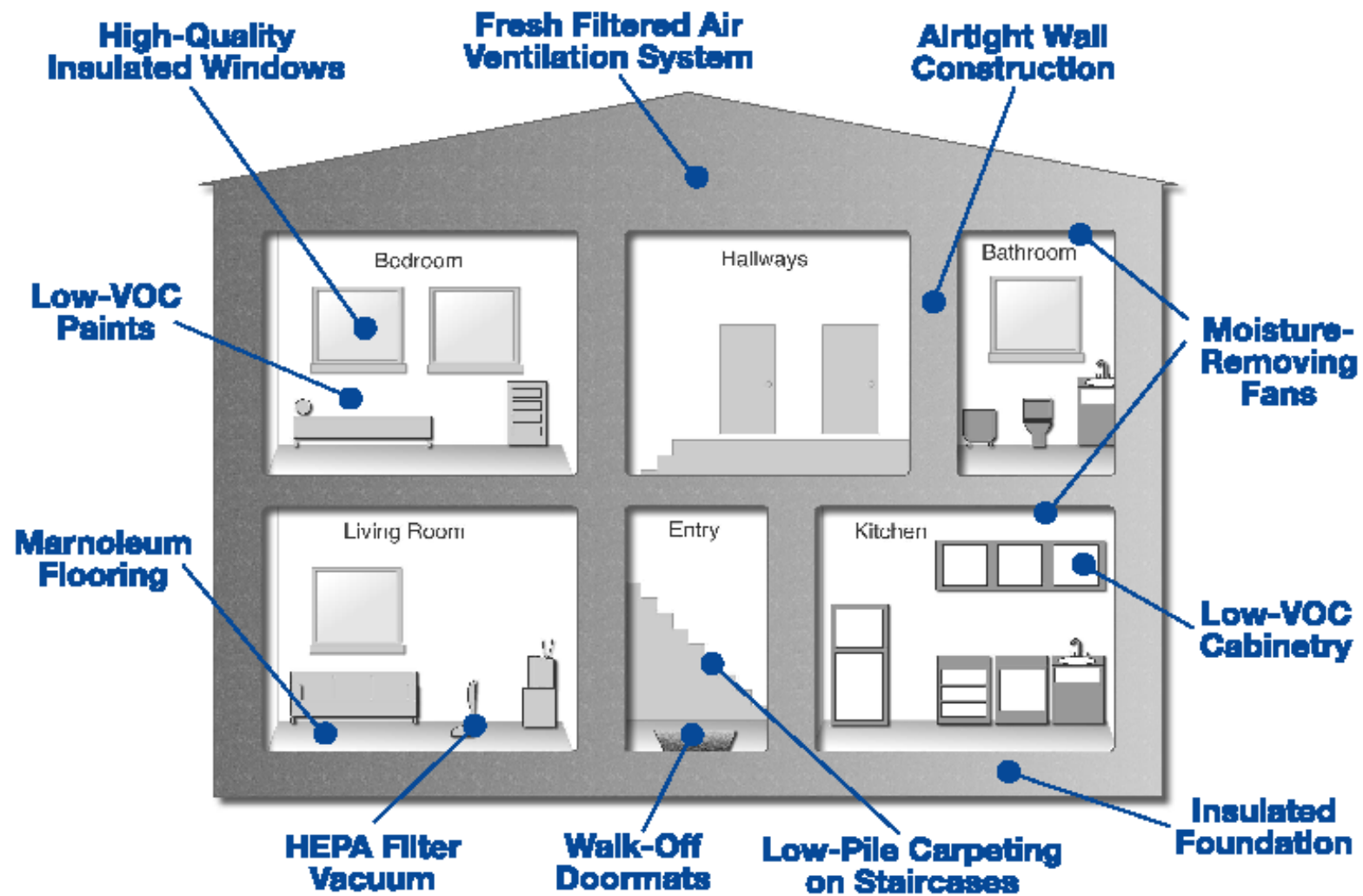
- **Necessity of Pre-Post Design limits the ability to interpret the relationship between trigger reduction and clinical response**

Policy Actions: Housing

- **Disseminate guidelines for healthy homes construction and renovation**
- **Update local housing codes**
- **Train housing inspectors, housing advocates, designers, builders, contractors, public housing agencies**
- **Advocate for healthy and affordable housing for low income families**

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HIGH POINT BREATHE EASY HOMES