Translating Research to Public Health Action: Asthma, Pest Infestation, and Unsafe Pesticide Use In New York City

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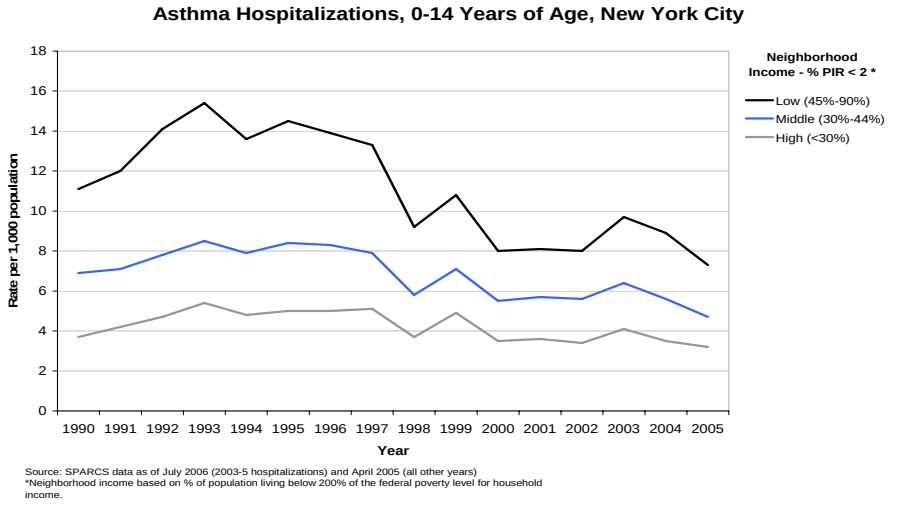
Overview

- Pediatric asthma - New York City context and public health programs
- DOHMH IPM, pesticide use reduction, and surveillance initiatives
- Public health agency-academic collaboration

Asthma hospitalization rates among children have fallen, but large disparities remain.



Source: SPARCS data as of July 2006 (2003-5 hospitalizations) and April 2005 (all other years)
*Neighborhood income based on % of population living below 200% of the federal poverty level for household income.

Health care and environmental context

- Use of controller medications increasing
- ICS under used in selected populations studied
- NYC MSA in non-attainment status for ozone and PM 2.5
- Insufficient data on neighborhood variation in ambient air pollution
- Asthma disparities are mirrored by disparities in pest infestation and unsafe pesticide use

NYC Asthma Initiative Goals

- Improving asthma clinical management
  - Severity assessment
  - Appropriate medication use
- Promoting asthma self-management skills
- Improving care coordination
- Reducing asthma trigger exposure

NYC Asthma Initiative Programs

Programs	Approach
Managing Asthma in Schools, daycares	Care coordination; self-management education
Community asthma care coordinators	Care coordination
Training institute, public health detailing	Guideline dissemination/ promotion
NYC Asthma Partnership	Coalition building, policy development
Community IPM	**Allergen reduction in homes**

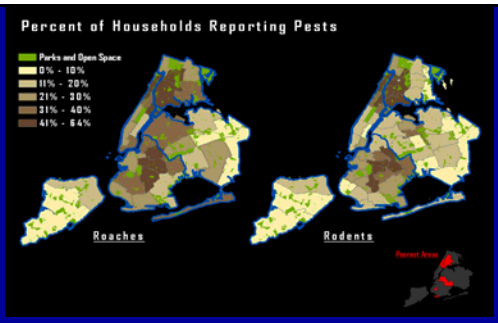
Other local initiatives with asthma control benefits

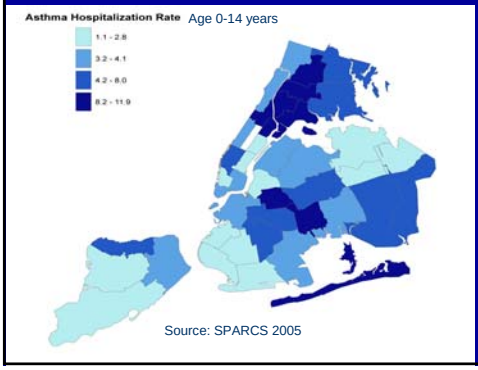
- **Tobacco control** – bar and restaurant smoking ban, increased cigarette taxes, large-scale free NRT distribution
- **Reducing diesel particulate emissions** in MTA fleet, construction equipment, and school busses
- NYC HANES, CHS, Automated Student Health Record, Primary Care Information Project - **Enhanced surveillance of asthma and relevant exposures**

Home allergen reduction for inner- city children with asthma

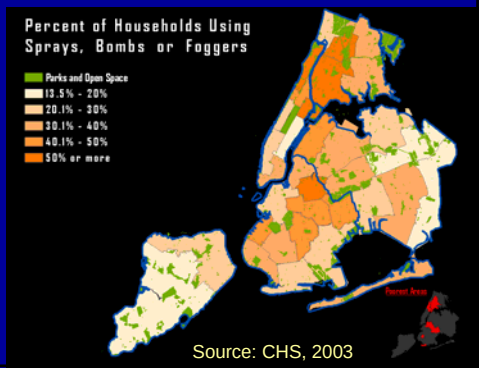
- Controlled studies - variations on home education/ coaching, provision of tools/ supplies, professional extermination, and repeated visits.
- Cost ~ $1000-$2000 per home
- Reduction in allergen levels
- Fewer symptom days, in some cases urgent health care use

Sources: Kreiger et al. AJPH 2005;95:652-659; Carter et al. JACI 2001;108:732-7; Morgan et al. NEJM 2004;351:1068-80; Eggleston et al. AAAI;2005;95:496-7.





Source: SPARCS 2005



Source: CHS, 2003

Collaboration: DOHMH and the Columbia CCEH

- NYC Public Housing Authority IPM intervention design and evaluation
- Pesticide exposure surveillance
- Policy formation and implementation

Public Health Rationale for Promoting IPM

- Targets a contributor to asthma disparities
- IPM overlaps with interventions that address other housing-related health concerns
- Health risks from residential pesticide use
  - ~1,000 annual referrals to Poison Control Center and > 60 hospitalizations
  - Subclinical developmental toxicity

Why start with NYC Housing Authority?

- Largest PHA in North America
  - 179,000 apartments, 344 developments, 2,700 buildings
  - ~ 9% of NYC's rental apartments, 5% of population
  - 75,000 families, 413,000 authorized residents
- Developments concentrated in areas with high asthma prevalence and morbidity
- Likelihood of IPM success and sustainability: quality low-income housing and centralized pest control policies

Intervention Design and Evaluation

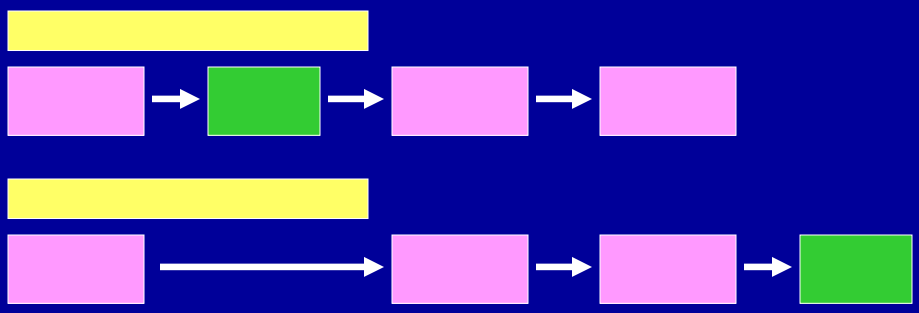
- In 2001, DOHMH expanded pilot IPM effort with NYC Housing Authority
- Goal: to test IPM versus traditional pest control for impact on pest burden in low income housing.
- DOHMH partnered with David Evans and the CCCEH to expand evaluation to include impact on allergens and, on exploratory basis, asthma symptoms.
- CCEHC provided multi-disciplinary expertise in design, statistical analysis, and asthma evaluation as well as important resource personnel.

NYCHA's IPM Intervention

The IPM intervention involves:

- Professional cleaning to remove food sources and cockroach frass in kitchen and bathrooms.
- Caulking and sealing kitchen cabinets and other points of entry.
- Use of MaxForce gels & bait stations, and boric acid powder.
- Residents receive a garbage can with a lid, food storage containers, and cleaning supplies.

Evaluation Design



Data collected during each home visit:

- Questionnaire about pest sightings, pesticide use, asthma symptoms, and opinions of building conditions
- Cockroach and mouse populations monitored for 1 week
- Dust sample from kitchen floor and up to 3 beds

Results at 6 Months
IPM Units vs. Control Units

- Cockroach counts reduced > 80%
- Rodent sightings reduced > 50%
- Cockroach allergen reduced in kitchens and bedrooms

IPM Evaluation Impact

- Largest evaluation to date of public housing IPM intervention
- NYCHA implementation:
  - Established permanent IPM team hired from residents
  - Suspended the use of residual spray pesticides and pyrethroids for routine pest control
  - Expanding IPM to additional developments
- Manuscript in preparation

Pesticide exposure surveillance

- NYC Health and Nutrition Examination Survey (HANES) - Pesticide Biomonitoring
  - Adopted Whyatt, Barr et al. methods for exposure monitoring of pyrethroids and organophosphates
  - Columbia shared pre-publication results of their cohort studies to help determine biomonitoring priorities
- CCCEH serves on NYC Environmental Public Health Tracking Pesticide Surveillance Advisory Committee

Reducing Unsafe Pesticide Use

- CCCEH – Expert testimony on proposed City Council legislation to prohibit certain pesticide use on City-owned property
- Local Law 37 Features
  - Prohibits use of highly toxic pesticides, products containing carcinogens and reproductive/developmental hazards
  - Commits NYC to adopt IPM for its own property
  - Enhances surveillance of pesticide use, Potential source of future data for studies and collaboration.

Scientific Collaboration

- Pesticide Use – Exposure Validation Study
  - Background
    - New York State Pesticide Use Registry records address-application product specific data
    - DOHMH is studying relationship between birth outcomes and commercial pesticide use
  - Whyatt et al. following mother-child pairs prospectively for pesticide exposure and outcomes
  - Opportunity to validate pesticide use data with address-specific exposure data, linked at address and time.

Translating research to public health interventions

- Finding the right balance of reach and effectiveness
- Credible health impact projections for setting priorities and stakeholder support
- Availability of usable local surveillance data
- Policy, institutional, structural changes to achieve broad reach and sustainability – e.g. school health MAF change
- Interagency collaboration
- Academic collaboration to build needed capacity