Social Determinants of Asthma: From Data to Action

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*Per 1000 population.
†NHIS was redesigned in 1997, resulting in a discontinuation of the trend.
Current Asthma Prevalence Among King County Children Age 0-17
1999-2001 Averages

<table>
<thead>
<tr>
<th></th>
<th>12.0%</th>
<th>7.9%</th>
<th>4.8%</th>
<th>5.4%</th>
<th>7.9%</th>
<th>8.0%</th>
<th>5.5%</th>
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</thead>
<tbody>
<tr>
<td>WHITE</td>
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<td>INCOME&lt;$20K</td>
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<td>INCOME&gt;$20K</td>
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Source: BRFSS
Asthma Attack Prevalence

4th Graders in Munich:

- Severe asthma (>10 attacks/yr) more prevalent in low SES vs. high SES
- OR = 2.37 (1.28-4.41)

Mielck 1996
Figure 5. Asthma emergency department visits, 2000

Per 10,000 population

- Total: 67
- 0-17 years: 104
- 18 years and over: 54
- White*: 59
- Black*: 133
- Male*: 58
- Female*: 75

* Age adjusted to the 2000 population
Figure 6. Asthma hospitalizations, 2000

Per 10,000 population

- Total: 17
- 0-17 years: 30
- 18 years and over: 12
- White*: 10
- Black*: 32
- Male*: 15
- Female*: 19

* Age adjusted to the 2000 population
Asthma Hospitalizations Increase 20x among Black Children
Medical University of S. Carolina

Crater 2001
## Trends in U.S. Asthma Hospitalization Rates per 10,000 Population, by Selected Characteristics, 1984-95

<table>
<thead>
<tr>
<th>Asthma Diagnosis</th>
<th>1984-86</th>
<th>1993-95</th>
<th>% Change</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>All ages under 15</td>
<td>19.7</td>
<td>18.4</td>
<td>-7</td>
<td>-27</td>
</tr>
<tr>
<td>Male</td>
<td>17.6</td>
<td>15.6</td>
<td>-13</td>
<td>-44</td>
</tr>
<tr>
<td>Female</td>
<td>22.0</td>
<td>21.1</td>
<td>-4</td>
<td>-26</td>
</tr>
<tr>
<td>White</td>
<td>15.6</td>
<td>11.3</td>
<td>-38</td>
<td>-29</td>
</tr>
<tr>
<td>Black</td>
<td>32.8</td>
<td>37.8</td>
<td>13</td>
<td>-25</td>
</tr>
</tbody>
</table>

CDC/NCHS, NHDS.
Asthma Mortality, US

Figure 7. Asthma deaths, 2000

Per 100,000 population

- Total: 1.6
- 0-17 years: 0.3
- 18 years and over: 2.1
- White* Non-Hispanic: 1.3
- Black* Hispanic*: 4.0
- Male*: 1.5
- Female*: 1.3

* Age adjusted to the 2000 population
TRENDS IN US ASTHMA MORTALITY RATES PER 100,000 POPULATION, PERSONS UNDER 35 YEARS, 1979-98

Rate per 100,000 Population

US mortality data, CDC, WONDER System.
Hospitalization rates are highest in neighborhoods with the greatest poverty

King County, Washington
Allies Against Asthma

Target Area

4048 Miles

Data Source:
Washington State Department of Health, Office of Hospital and Patient Data Systems

Prepared By:
Epidemiology, Planning & Evaluation, Public Health-Seattle & King County, 4/12/02

Asthma Hospitalization Rates Among Children Age 1-17
By ZIP Code in King County, 1995-1999

Asthma Hospitalization Rates
By ZIP Code

- 0 - 110 per 100,000
- 110 - 193 per 100,000
- 193 - 310 per 100,000
- 310 - 600 per 100,000
- 600 - 1,059 per 100,000

4 0 4 8 Miles
Asthma in Harlem

- Hospitalization rates in East Harlem are 21 times greater than on upper East Side (Claudio, 1999)

- Prevalence among children may be as high as 25% (Harlem Children’s Zone, 2003)
Social Factors Associated with Disparities in Asthma

- **Poverty**
- **Differential exposure to environmental triggers**
  - Substandard housing
  - Diesel exhaust and other air pollutants
  - Environmental tobacco smoke
- **Stress**
- **Lack of social support**
- **Neighborhood violence**
- **Medical care**
  - lack of access
  - inadequate quality of care
Stress

- Caregiver stress in first 2-3 months of life associated with increased risk of repeated wheezing during first 14 months of life (RR = 1.4, CI = 1.1-1.9).

- Prospective birth-cohort study (n = 496).

- Controlled for parental asthma, SES, birth weight, race, smoking, breast feeding, allergen exposure and LRIs.

(Wright 2002)
Inadequate Quality of Care

- Of 900 school age inner-city children with asthma in Detroit, Houston and Birmingham, 2/900 had a written Asthma Treatment Plan (National Inner City Asthma Study).
- Among Medicaid children with asthma in five managed care plans, Black (RR = 0.69) and Latino (RR = 0.58) less likely to use inhaled anti-inflammatory medications (Lieu 2002).
- Inner city children used inhaled anti-inflammatory medications at less than half the rate of the general population (Eggleston 1998).
Housing

- Substandard housing is related to increased exposure to asthma triggers
  - Moisture (mites, mold)
  - Roaches
  - Poor ventilation (higher allergen and ETS levels)
- Substandard housing also associated with other health problems
  - Lead exposure
  - Injury hazards
Public Health Approaches to Housing and Health

- Addressing housing through the lens of asthma is a potent public health strategy
- Health education and client advocacy
  - Community health workers
- Assessment
  - Housing inspections
- Research
- Epidemiology
  - Conducting Housing and Health surveys
Public Health Approaches to Housing and Health

- **Policy**
  - Updating housing code to reflect Healthy Homes principles
  - Incorporating Healthy Homes and Healthy Communities design principles in new public housing construction
  - Assisting public housing tenants with special health needs in obtaining appropriate units

- **Advocating for availability of healthy and affordable housing for low income families**

- **Community organization**
  - Housing and Health Work Group
STAFF:
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Project Coordinator / Outreach Worker
Sharon Harris
CHES Support
Blythe Horman
Admin. Assistant
Lisa Lopez
Research Coordinator
Maggie Mendoza
Community Interviewer
Matthew Ha Nguyen
Outreach Worker
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Methods: Community Health Worker Home Visits

- Make 5-9 visits over one year
- Assess home environment & develop specific Action Plan
- Offer client education and encourage behaviors to implement plan (e.g. dust control, ventilation, smoking)
- Provide social support
- Offer advocacy/referral (housing, food, furniture, jobs, etc.)
Methods: Provision of Trigger Control Resources

- Allergy control bedding covers
- Low-emission vacuum cleaner with dirt finder sensor
- 1-Year supply of microfiltration vacuum bags
- Commercial doormat
- Cleaning supplies (green kit, mop, pail, scrub brushes, bleach)

Using a low-emission vacuum

Putting on a mattress cover
Recruitment and Research Design

- **Eligibility**
  - household income below 200% poverty
  - child age 4-12 with asthma
  - speak English, Spanish or Vietnamese

- **Randomized controlled design:** participants randomized into high (n=138) and low (n=136) intensity intervention groups.
  - High group: full intervention
  - Low group: one visit, follow-up call, bedding covers only
  - Low group crosses over to high group after one year

- **Community-based participatory research methods**
Baseline: The Home Environment

- Smoker in house
- Mold
- Water damage
- No working bath fan
- Carpet in bedroom
- Pets
- Cockroaches

Percent of homes with high and low issues.
Baseline Findings: Resources and Knowledge

- Have bedding covers
- Have low-emission vacuum
- Know tobacco triggers
- Know mold triggers
- Know roaches triggers

Percent of participants

- High
- Low
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: Caregiver Quality of Life

p-values:
0.000  (high intensity, baseline vs. exit, chi-square)
0.006  (low intensity, baseline vs. exit, chi-square)
0.001  (exit, low vs. high intensity, regression adjusted for baseline score)
Outcome: Urgent Health Services

- **p-values:**
  - 0.000 (high intensity, baseline vs. exit, chi-square)
  - 0.414 (low intensity, baseline vs. exit, chi-square)
  - 0.041 (exit, low vs. high intensity, regression adjusted for baseline score)
Outcomes: Participant Actions

- Vacuum child's BR >2x/2wk
- Use allergy control cover
- Wash sheets weekly

* p value comparing high vs. low exit values after adjustment for baseline values using logistic regression
Outcomes: Floor Dust Loading

- Dust loading child's bedroom baseline, high
- Dust loading child's bedroom exit, high
- Dust loading child's bedroom baseline, low
- Dust loading child's bedroom exit, low

\[ p = 0.008 \]
\[ p = 0.070^* \]
\[ p = 0.172 \]

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

A community health worker intervention addressing multiple exposures reduced asthma symptom days, improved caretaker quality of life and reduced urgent health services utilization:

<table>
<thead>
<tr>
<th>Outcome</th>
<th>High Intensity</th>
<th>Low Intensity</th>
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<tbody>
<tr>
<td>Symptoms</td>
<td>↓</td>
<td>↓</td>
</tr>
<tr>
<td>Quality of Life</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Urgent utilization</td>
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</table>
Next Steps: Healthy Homes II

- Need to demonstrate value of in-home interventions to health care payors
- Compare effectiveness of CHW in-home asthma support to clinic-based education
- CHW intervention combines support for medical aspects of asthma self-management with reduction of indoor triggers
- RCT of 380 low-income households with children with asthma funded by NIEHS
- Sponsored by local asthma coalition
Next Steps: Better Homes for Asthma

- Remediate 70 substandard homes with conditions associated with asthma and other health risks:
  - improve ventilation
  - remove old carpet
  - eliminate water intrusion
  - install lighting and barriers to prevent falls
  - address lead paint if present
- Assess impact of remediation on asthma-related health outcomes and exposures to asthma triggers with RCT
- Compare marginal value of remediation relative to community health worker intervention
Healthy Public Housing Communities: High Point

- Redevelop 1600 units
- Incorporate features to promote health
  - Network of open spaces and trails
  - Increase access to transit to decrease auto use
  - Develop spaces for social interaction
  - Incorporate healthy homes approaches into construction of new units
  - Designate tobacco-free units and zones
  - Design buildings to promote physical safety
  - Neighborhood market providing healthy, affordable food
  - Community gardens

Map overview of the High Point redevelopment.
Healthy Public Housing Communities: Resident Participation

- Assessment and planning by youth and adult teams
- Community discussions
- Community outreach and education
- Youth team environmental health projects
- Mutual housing agreements
Healthy Public Housing Communities: Evaluation

- Process
- Pre-post community surveys
- Qualitative impact assessment
- Outcomes among families with asthma
  - changes in home environment
  - changes in asthma-related health outcomes
Healthy Housing Guidelines

- Dissemination of guidelines for construction of healthy new homes
- Consensus conference to develop healthy homes guidelines for existing units
- Review of local housing codes
  - Assess for inclusion of healthy homes principles
  - Develop model language to address gaps
  - Promote adoption of healthy housing codes
  - Train housing inspectors, housing advocates, builders, etc.
Moving from Data to Action

● Essential ingredients
  ■ Long-term vision
  ■ Partnerships
  ■ Time, patience and commitment

● Challenges
  ■ Politics
  ■ Exigencies of academia
  ■ Funding