Housing as a Vaccine: The Value of Homes for Health
Megan Sandel, MD, MPH

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- Principal Investigator, Children’s HealthWatch
- Associate Professor of Pediatrics, Boston University Schools of Medicine & Public Health

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Roadmap

1. Dimensions how Homes affect Health
   - Quality, Stability, Affordability, Location
   - How a Home can it be like a Vaccine
2. Homes and People (Population Health)
3. Possible Solutions Together (Examples)
4. Homes as a route to Health Equity
Evidence on Home Quality

- Accidents/Injuries – exposed wiring, needed repairs
- Development and worsening asthma, allergies tied to home
  - Pests (cockroaches and mice)
  - Molds/Chronic Dampness
  - Tobacco smoke
- Lead exposure tied to long term effects
  - Developmental delay, Attention deficit
- Heat or eat

Skinner et al, 2014
• Poor housing quality strongest predictor of emotional and behavioral problems in low-income children

• Much of association between poor housing quality and children’s wellbeing operates through parental stress, parenting behaviors and mental health
Stability: The Home Iceberg

HOMELESS

HIDDEN HOMELESS:

HOUSING INSECURE

- Multiple moves
- Overcrowded
- Doubled Up

UNAFFORDABLE HOUSING
Housing and education

The secret to successful urban schools is housing, argues Megan Sandel, principal investigator at Children’s Health Watch.

Megan Sandel
November 12th 2014

For children to learn in school, they first have to show up. But the data on school absenteeism in many urban schools would make your hair curl. In San Francisco, it is estimated in some school districts that over 50% of students are chronically absent (defined as missing 10% or more of school in a given year).

The longevity of students at a given school is as valuable to them as simple attendance. But students often “churn” — leave and change schools or districts — each year, forcing teachers to re-teach material to new students. In Massachusetts, it was estimated that over a third of students across 11 cities churn through a school in a given year, that is, who start and finish a grade in different places.
Should I Stay or Should I Go?
Exploring the Effects of Housing Instability and Mobility on Children

CENTER FOR HOUSING POLICY
A study out of Minnesota found that first through sixth grade students who had moved three or more times scored on average 20 points lower on reading assessments than students who had not moved.
Being behind on rent is a strong indicator of other household hardship. Sandel et al. In submission.
“The Rent Eats First”

Desmond, 2016
History of Evictions Increases the Odds of Poor Physical and Mental Health for Mothers and Children
Location: Poverty and Zip code remain linked

Durable Inequality. New York City is one of the MTO study sites analyzed by Ludwig et al. The spatial pattern of past and present neighborhood poverty in this and other cities constrained the ability of study participants to move. [Data from (12, 13)]
Place, Opportunity, and Health

- Mapping elevations in the blood pressure of 3 years olds by Child Opportunity Index from diversitydatakids.org

- Vital Village Network at Boston Medical Center maps relationship between opportunity and life course (elevated BP at age 3)
Segregation impacts a number of life-opportunities

- Impacts on Health
  - School Segregation
- Impacts on Educational Achievement
- Exposure to crime; arrest
- Transportation limitations and other inequitable public services
- Job segregation
- Racial stigma, other psychological impacts
- Impacts on community power and individual assets

Neighborhood Segregation
“Biologists often talk about the “ecology” of an organism: the tallest oak in the forest is the tallest not just because it grew from the hardiest acorn; it is the tallest also because no other trees blocked its sunlight, the soil around it was deep and rich, no rabbit chewed through its bark as a sapling, and no lumberjack cut it down before it matured. We all know that successful people come from hardy seeds. But do we know enough about the sunlight that warmed them, the soil in which they put down roots, and the rabbits and lumberjacks they were lucky enough to avoid?”

– Malcolm Gladwell, Outliers
Why vaccinate?

- Personal protection
- “Herd immunity”
- Community and economic benefit
Kids in Food Insecure Families were TWO FOLD less likely to be underweight if they had a housing subsidy than similar kids who were eligible but did not receive a subsidized home.
For Healthcare costs alone, it did not save money, but cost $2 per chicken pox case prevented. But by societal costs, every $1 invested in vaccines saved $5 including work-loss costs.
Population by Housing Risk:
- **High-Risk Clients**: Top 5%
  - Homelessness Addressed
- **Rising-Risk Clients**: 5-35%
  - Housing Instability Addressed
- **Low-Risk Clients**: 60-80%
  - No Need Addressed

How Healthcare Alone Looks at Risk:
- **High-Risk Patients**: Top 5%
  - Trade high-cost services for low-cost management
- **Rising-Risk Patients**: 5-35%
  - Avoid unnecessary, higher-acuity, higher-cost spending
- **Low-Risk Patients**: 60-80%
  - Keep patient healthy, loyal to the system
Children’s HealthWatch

• Non-partisan network of pediatric & public health researchers → research & policy center

• Improve health & development young children → public policies → alleviate economic hardships
  • Hunger (Food Insecurity)
  • Unstable Housing (Housing Insecurity)
  • Keeping Heat or Lights on (Energy Insecurity)
  • Adverse Healthcare Tradeoffs (e.g., foregoing care)
Where our data come from:

Emergency Departments and Primary Care Clinics in Boston, Baltimore, Philadelphia, Little Rock and Minneapolis.

- A household survey
- Interviews - caregivers with children 0 to 4 years old
  - “invisible” group
  - critical window of time
Children in housing-insecure families more likely to be

- Food insecure
- In fair/poor health
- At risk for developmental delays
- Seriously underweight

(compared to children in housing-secure families)
US Housing Insecurity and the Health of Very Young Children

Diana Becker Cutts, MD, Alan F. Meyers, MD, MPH, Maureen M. Black, PhD, Patrick H. Casey, MD, Mariana Chilton, PhD, MPH, John T. Cook, PhD, Joni Geppert, MPH, RD, LN, Stephanie Ettinger de Cuba, MPH, Timothy Heeren, PhD, Sharon Coleman, MPH, MS, Ruth Rose-Jacobs, ScD, and Deborah A. Frank, MD

In the US, the housing environment has been linked to both health outcomes. In particular, insecure housing in all neighborhoods has been associated with respiratory disease and crowding. Children in households with higher than average crowding are less likely to have access to healthcare services than those in noncrowded households, and families with multiple moves are less likely to find a medical home for their children than are securely housed families. Adjusted income has been used as the threshold for affordable housing costs. But affordability varies among areas, and health outcomes have been associated with a range of housing conditions, including the number of people sharing a bedroom, overcrowding, and the number of times a home is moved within a year. These factors are important in understanding the health outcomes of children younger than 3 years old across seven US cities from 1998 to 2007. This study found that insecure housing was associated with respiratory disease and crowding. Table 2 shows the variables associated with insecure housing by housing group.

**TABLE 2—Variables Associated With Insecure Housing, by Housing Group: Children Younger Than 3 Years, 7 US Cities, 1998-2007**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Secure Housing (Ref)</th>
<th>Crowding</th>
<th>Multiple Moves</th>
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<tbody>
<tr>
<td>Unadjusted No. (%) AOR (95% CI)</td>
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<td>P</td>
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<tr>
<td>Household food insecurity (n=22,069)</td>
<td>1052 (9) 1.0</td>
<td>1060 (12) 1.30 (1.18, 1.43)</td>
<td>&lt;.001</td>
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<td>Child food insecurity (n=22,069)</td>
<td>872 (7) 1.0</td>
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<td>Caregiver report of fair/poor child health (n=22,069)</td>
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<td>Caregiver report of child developmental risk (after 2004, n=7,345)</td>
<td>621 (14) 1.0</td>
<td>355 (14) 1.06 (0.91, 1.23)</td>
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Note. AOR = adjusted odds ratio; CI = confidence interval. Analyses are adjusted for site, race/ethnicity, US-born mother, marital status, maternal age, education, mean child’s age, mean number of children in the household, employment, breastfeeding, and low birth weight. Secure housing is the referent group.
US Housing Insecurity and the Health of Very Young Children

Diana Becker Cutts, MD, Alan F. Meyers, MD, MPH, Maureen M. Black, PhD, Patrick H. Casey, MD, Maritana Chilton, PhD, MPH, John T. Cook, PhD, Joni Gepper, MPH, RD, LN, Stephanie Ettinger de Cuba, MPH, Timothy Heeren, PhD, Sharon Coleman, MPH, MS, Ruth Rose-Jacobs, ScD, and Deborah A. Frank, MD

In the US, housing has long been linked to health, and in both children and adults, housing insecurity is associated with adverse health outcomes. In this study, we examined the relationship between housing insecurity and health outcomes among very young children in U.S. cities, 1998–2007. We used data from the National Health and Nutrition Examination Survey (NHANES) to examine the prevalence of housing insecurity and the association between housing insecurity and health outcomes among very young children. We found that children living in households with housing insecurity had higher rates of health problems, including respiratory disease, asthma, and sudden infant death syndrome (SIDS). Children living in crowded homes were more likely to have respiratory problems than those living in non-crowded homes. We also found that children living in households with multiple moves were more likely to have respiratory problems than those living in households with fewer moves. These findings highlight the importance of addressing housing insecurity as a public health priority to improve the health outcomes of very young children.

Table 2—Variables Associated With Insecure Housing, by Housing Group: Children Under Age 5 Years, U.S. Cities, 1998–2007

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HealthWatch study approached 36,618 adult caregivers of children younger than 3 years at...
In the US, a substantial amount of housing insecurity has been linked in both observational and experimental studies to an increased risk of health outcomes for very young children, particularly those living in crowded and nonsecure housing conditions. 

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Multiple Moves

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Compounding Stress
The Timing and Duration Effects of Homelessness on Children's Health

By Megan Sondel, MD MPH, Richard Sheeran, MPH, and Lisa Stewartantz, PhD
June 2015

Decades of scientific research has demonstrated that homelessness experienced during early childhood is harmful to a child's growth and development. The stress of homelessness during early childhood can lead to potentially permanent harmful changes in brain and body function, in turn causing higher levels of stress-related chronic diseases later in life. In addition, a growing body of evidence has established that a child’s health and development are critically dependent on his mother’s mental and physical well-being during pregnancy.

New research from Children's HealthWatch illustrates there is no safe level of homelessness. The timing (pre-natal, post-natal) and duration of homelessness (more or less than six months) compounds the risk of harmful child health outcomes. The younger and longer a child experiences homelessness, the greater the cumulative toll of negative health outcomes, which can have lifelong effects on the child, the family, and the community.

The Children's HealthWatch Research Network
Researchers from Children's HealthWatch collected data from over 20,000 caregivers of low-income children under the age of four with public or no health insurance. These caregivers were interviewed in urban pediatric clinics and emergency departments in five U.S. cities from 2009 through 2014. Interview data were analyzed to assess children's health and development and to compare outcomes for children who experienced homelessness at some point in their lives with children who were never homeless.

New Research Findings
While pre-natal and post-natal child homelessness were each separately associated with poor health outcomes for children, the combination of pre-natal and post-natal homelessness resulted in a so-called “more responsive” effect that compounded the health risks linked to both pre-natal and post-natal homelessness. In addition, longer periods of homelessness among children generally were associated with worse health outcomes.

FIGURE 1
Compounding Effect of Homelessness on Child Health

The Percent Increased Risk of Poor Health Outcomes

- Fair/Poor Child Health
- Developmental Risk
- Child Hospitalizations

Pre-natal Homelessness Only  Post-natal Homelessness Only  Pre- and Post-natal Homelessness

The comparison group for these data is children who were never homeless.

All findings statistically significant at p<.05

Source: Children’s HealthWatch Data, May 2009–December 2014
Compounding Stress

The Timing and Duration Effects of Homelessness on Children’s Health

By Megan Sardel, MD MPH, Richard Steward, MPH, and Lisa Sturtevant, PhD
June 2015

Decades of scientific research has demonstrated that homelessness experienced during early childhood is harmful to a child’s growth and development. The stress of homelessness during early childhood can lead to potentially permanent harmful changes in brain and body function, in turn causing higher levels of stress-related chronic diseases later in life. In addition, a growing body of evidence has established that a child’s health and development are critically dependent on his mother’s mental and physical well-being during pregnancy.

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New Research Findings

While pre-natal and post-natal child homelessness were each separately associated with poor health outcomes for children, the combination of pre-natal and post-natal homelessness resulted in a so-called “dose response” effect that compounded the health risks linked to both pre-natal and post-natal homelessness. In addition, longer periods of homelessness among children generally were associated with worse health outcomes.

FIGURE 2

Long Duration of Post-natal Homelessness Affects Child Health

Post-natal Homelessness > 6 Months

The Percent Increased Risk of Poor Health Outcomes

- Fair/Poor Child Health
- Developmental Risk
- Child Hospitalizations*

Infants (less than 12 months) Toddlers (over 12 months)

The comparison group for these data is children who were never homeless. All findings statistically significant at p<.05, except *hospitalizations among infants (p=.06).

Housing as a Health Care Investment

Affordable Housing Supports Children's Health

By Megan Sandel, MD, MPH; John Coker, PhD, MPE; Ane Podolec, MS; Richard Stewert, MPH; Sharon Coleman, BS, MPH; Janet Velez, MPH; and Lisa Murtwant, PhD

MARCH 2016

Affordable and stable housing plays a critical role in supporting the health and well-being of children. Research from Children’s HealthWatch shows public investment in housing—including housing for homeless families and rental assistance for food-insecure families—improves the health outcomes of vulnerable infants and young children and lowers health care spending.

Previous research from Children’s HealthWatch demonstrated the harmful impact homelessness has on the health of young children and that the negative health outcomes are compounded when a mother is homeless both before and after her child is born. New findings from Children’s HealthWatch researchers show affordable and stable housing made possible through rental assistance is associated with better health outcomes for infants in vulnerable families.

Investments in programs that house families in need and have the potential to reduce public spending on health care can be a double win for public policy. Given the significant impact stable and affordable housing has on the health of children, policymakers should consider how to expand investment in affordable housing and subsidies for vulnerable families to improve the health outcomes of young children and reduce health care spending.

Homelessness Harms Young Children’s Health

Previous research from Children’s HealthWatch illustrates the devastating impact of homelessness on children’s health. High-risk pre- and post-natal child homelessness is each separately associated with poor health outcomes for children; the combination of pre- and post-natal homelessness demonstrates a “dose-response” effect that compounds the health risks linked independently to pre- and post-natal homelessness.

When children who were never homeless:

- Children who experienced pre-natal homelessness (i.e., their mothers were homeless during pregnancy but were housed after their birth) were 20 percent more likely to have been hospitalized since birth.
- Children who experienced post-natal homelessness (i.e., their mothers were housed during pregnancy but were homeless when the children were infants and/or toddlers) were 22 percent more likely to have been hospitalized since birth.
- Children who experienced both pre- and post-natal homelessness were 41 percent more likely to have been hospitalized since birth.
Health Risks Associated with Unstable Homes

- Homelessness: 9%
- Multiple Moves: 6%
- Behind on Rent: 25%
- No Unstable Homes: 60%

Increased likelihood of health risks:

- Child hospitalizations: 20-24%
- Developmental risk: 26-31%
- Maternal depression: 174-268%
- Child fair/poor health: 43-58%
- Maternal fair/poor health: 91-123%
- No health risk: 0%

N=22,234
Avoidable Costs in Health Care and Education for Mothers and Children

- Mental health costs linked to maternal depression largest contributor to cost

- Other costs associated with increased:
  - Hospitalizations
  - Ambulatory visits
  - Dental procedures
  - Medications
  - Special education services
Since [current month] of last year,

1. Was there a time when you were not able to pay the mortgage or rent on time?
   Answer is yes/no, positive screen if answer is yes

2. How many places have you lived?
   Answer is # of places lived, positive screen if answer is 3 or more (i.e. multiple moves ≥ 2 in 12 mos.)

3. At any time did you stay in a shelter or didn’t have a steady place to sleep at night (including now)?
   Answer is yes/no, positive screen if answer is yes

Research reported in this presentation was supported by The Blue Cross Blue Shield of Massachusetts Foundation
Market that Values Homes for Health*

- Healthcare Sector Pain Point
  - Unstably housed patients cost $
- What is the Housing Sector’s Pain Point
- Can we find a cure?

*Acknowledging David Erickson
“Marketplace that Values Health”
What is the Housing Sector’s Pain Point?

• Capital
  – To Build New Units
  – Renovate existing housing stock
• Capital to assist retail on the first floor
• Operating Subsidy
• Money to cover resident services
What Value Does the Housing Sector have?

- **Units**
  - New construction
  - Renovation
  - Turnover

- **Proven Method of Addressing Chronic Homelessness**

- **Onsite residential services**
  - Monitoring
  - Link with medical case management
  - Wellness (Health, Financial)

Cutts et al. MCH, 2014.
What Value does the Healthcare Sector have?

- **Money**
  - Provider (ACO)/Insurance
  - Community Benefit
  - Investment portfolio
- **Political capital**
- **Services dollars**
  - Case management
  - Community Health Workers
  - Health/wellness

Cutts et al. MCH, 2014.
How Could the Two Sectors Exchange Value?

- Set aside units for investment
  - Units for High Utilizers
  - Fair Housing Waiver
  - Investment portfolio invests capital

- Set aside units for services dollars
  - Units for High Utilizers
  - Fair Housing Waiver
  - On site resident services paid for
How Could the Two Sectors Exchange Value?

- Flex funds for rent with landlords
  - Pool of funds for rent or renovations
  - Units for High Risk populations
  - Resident services paid for by Healthcare
How Do You Start?

**Housing Side**
- Start asking where your residents get healthcare
- Start looking at Community Health Needs assessments
- Think about resident services
- Health person on board

**Health Side**
- Start looking at addresses with housing providers
- Start mapping the “zip code” spend
- Screen for homelessness and housing instability
- Housing person on board
Example of Systems Connected: Housing Prescriptions as Healthcare

• Health Starts at Home Targets
  – *Population:* Low-income, housing insecure children 0 – 11 years
  – *Partnerships:* Boston Medical Center, Boston Housing Authority, Project Hope, Nuestra Comunidad, MLP-B
  – *Goals:*
    • highlighting the importance of affordable housing in children’s health outcomes;
    • identifying promising new and existing models for partnership that can be brought to scale to improve children’s health outcomes;
    • decreasing health care costs; and
    • decreasing costs related to homelessness
Targeting the vaccine:

• Housing insecure, high risk pregnant/parenting families, child <5 with complex condition requiring specialty care
• Secure and retain housing to
  – improve birth outcomes
  – improve the health and well-being of women and families
• Provision of housing
• Intensive case management: housing retention, engagement in services, family development plan
Thank You!

The mission of Children’s HealthWatch is to improve the health and development of young children by informing policies that address and alleviate economic hardships.

Contact us:
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