Poverty and Racial Disparities in Asthma in Miami/Dade County, Florida

It’s Complicated
Acknowledgements

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• Andy Dean, MD, MPH

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Background

• “Zip code” is as strong a determinant of health as “genetic code”
  • Geography of serious morbidity and mortality: sorting out the role of poverty from other factors in urban areas
  • “Syndemics” in urban low-income historically African-American neighborhoods
  • Asthma as allegory: “I can’t breathe”

• Divergence of national (Akimbami et al 2016 ) and Miami-Dade County trends in childhood asthma (Hibbit et al 2015)

• Needs assessment in high-prevalence schools showed high levels of poorly controlled and probably unrecognized asthma, and great parental interest in seeking help to address environmental factors (Page et al 2013)

Akinbami LJ, Simon AE, Rossen LM. Pediatrics. 2016 Jan;137(1)


% High School Students answered YES (Has a doctor/nurse told you that you have asthma?)
CDC YRBSS, United States, 2005-2013

% High School Students answered YES “(Has a doctor/nurse told you that you have asthma?)

CDC YRBSS, Miami/Dade County, 2005-2013

Asthma: Median Emergency Dept. (ED) Visits, and Median Hospitalizations, per 10,000 Children, 71 Miami-Dade County Zip Codes, Rolling 3-Year Averages (Ranges)
2008: School Nurse Asthma Survey (Map) and 2011: Parent Questionnaire Survey
Rates of HIV/AIDS in Women (Number of Female Adolescents and Adults per 100,000 Living with HIV), 2010
Infant Mortality and HIV/AIDS in African-Americans, 2010

The zip codes for the Liberty City include 33127, 33142, 33147, and 33150. The area covers 5.968 square miles (15.46 km²).
The Birth of “Liberty Square”

"This project will be one of the greatest blessings that Miami ever had. It will not only eliminate the possibility of fatal epidemics here, but also fix it so we can get a servant freed from disease." - John Gramling, October 17, 1934.

The only site on which a negro might live in the City of Miami is in what now is known as negrotown in the heart of Miami. That area consists of 343 acres of land and according to the United States census of 1930, there are 25,116 colored persons living in that area. This population is living in one-story negro shacks and there are from three to fifteen shacks on a city lot of 50' x 150'. The sanitary conditions are a menace to the whole city. The living conditions are inconceivable and are a shame and a disgrace to the responsible citizens of Miami. This area is principally owned by white people who have erected these small shacks and get exhorbitant rent from them so that they pay for themselves every two to three years... Many houses have no toilets connected with the house, no bathrooms, nor bathing facilities...
Liberty City Becomes the “Harlem Renaissance” of the South
“Coming to America!” I land in Miami to Start a New Life in Liberty City, September 1961
Liberty City Children 1961 displaying Statue of Liberty Drawing
The End of the “Liberty City” Renaissance

“The gradual dismantling of Overtown started in the 1960s with the construction of the I-95 highway that cut through the historic neighborhood, causing many residents to move to other neighborhoods like Liberty City.”
Former Overtown (Current Liberty City) Resident Recalls the End of the Era... Health Indicators in Liberty City Deteriorate...

were made out of wood."

Rolle, who now lives in Liberty City, is among thousands who were forced out of their homes in the 1960s to make room for Interstate 95 and later, Interstate 395.

Today, a concrete beam that holds up I-95 stands where Rolle’s front yard used to be.

Her home was razed to make room for the highway.

“I get choked up every time I talk about it, just like my dad used to get choked up,” said Rolle, 70. “In 1965 they ran him out of that house.”

For those who called Overtown home, theirs is a story of remembrance and loss.
Distribution of Wealth in Miami/Dade, by Zip Codes, 2010

How to sort out poverty vs. other factors?
One Strategy for Sorting Out Race vs. Poverty and Hyper-Segregation in “Syndemic” Situation

* CDC HIV Behavioral Surveillance System in Heterosexual

To characterize the HIV epidemic in impoverished urban areas of the U.S. ("Poverty areas"=>20% residents in poverty)

* Do impoverished urban areas meets the UNAIDS definition of a “generalized epidemic”

* National HIV Behavioral Surveillance System for Heterosexuals (NHBS-HET-1) was conducted with men and women aged 18-50 yrs. with an opposite-gender sex partner in the past year in 23 cities throughout the U.S. from September 2006

* ONLY those who denied MSM, SW, IDU, SW clients

http://www.cdc.gov/hiv/group/poverty.html
National HIV Behavioral Surveillance System for Heterosexuals – Round 1 (NHBS-HET-1)
National HIV Behavioral Surveillance System for Heterosexuals – Round 1 (NHBS-HET-1)

Of 18,430 NHBS-HET-1 participants, 9,078 (49%) met our analysis criteria and lived in urban poverty areas; 188 (2.1%) of whom had a positive HIV test result. This HIV prevalence rate is more than 20 times greater than the rate among all heterosexuals in the U.S. (0.1%).

HIV Prevalence Rate, by Country

HIV Prevalence Rate, by Income

Data Sources: NHBS-HET-1 2006–2007 and UNAIDS HIV Estimates 2007.1

When analysis was confined to those high-poverty urban areas, racial differences greatly diminished

• “Leveling” effect of poverty
• Most of the difference in risk of HIV among “Blacks”, “Hispanics” and “Whites” is due to the far higher likelihood of “Blacks” and “Hispanics” living in high-poverty urban areas...
But just how protective is NOT living in poverty?

In 2010 in the Liberty City zip codes 33127, 33142, 33147, 33150)

- Median household income was $18,809.87.
- The racial makeup of the neighborhood was
  - 94.69% Black,
  - 3.04% Hispanic or Latino of any nationality/race
  - 1.68% Other races (non-Hispanic), and
  - 0.59% White.
- The zip codes for Liberty City are all were in high Miami homicide/assault range (523.30 - 949.30/100,000)
Definitions: Asthma Zip Code Analysis 2013

• High Asthma ED zip code= rate>200 visits/10,000
• High Asthma Hospitalization zip code=rate >20 hospitalizations/10,000
• High Poverty zip codes=zip codes where >25% residents lived below FPL
• High African-American Residency=zip codes where >49% residents were African-American
• Older housing zip code=median age 50 years
% of Miami-Dade Zip Codes with high asthma ED visit and asthma hospitalization rates, by whether they were High Poverty, high African-American, or Older Housing Zip Codes

---High ED Visit Rates---------

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>High Poverty</th>
<th>&gt;49% African-American</th>
<th>&gt;50 Year Old Mean House Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has Characteristic</td>
<td>90</td>
<td>95</td>
<td>60</td>
</tr>
<tr>
<td>Does Not Have Characteristic</td>
<td>10</td>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>

---High Asthma Hospitalization-Rate------

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>High Poverty</th>
<th>&gt;49% African-American</th>
<th>&gt;50 Year Old Mean House Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has Characteristic</td>
<td>80</td>
<td>85</td>
<td>60</td>
</tr>
<tr>
<td>Does Not Have Characteristic</td>
<td>20</td>
<td>15</td>
<td>0</td>
</tr>
</tbody>
</table>
% of Miami-Dade Zip Codes with >200 ED visits, >20 Hospitalizations/100,000 Children, 2013 JUST in High Poverty Zip Codes, by Whether they were Majority African-American, or Older Mean House Age Zip Codes
% of Miami-Dade Zip Codes with >200 ED visits, >20 Hospitalizations/100,000 Children, 2013 JUST in Low Poverty Zip Codes, by Whether they were Majority African-American, or Older Mean House Age Zip Codes
Harlem Children’s Zone Asthma Initiative
Ben Ortiz, MD

- Started with a baseline community-based survey
  - 29.2% children had been diagnosed with asthma
  - 27% had ever had ER visit for asthma
  - 19.6% had smoker in home

- Intervention
  - Collaborative partnership
  - Interventions at different levels:
    - HOME-BASED
    - Environmental assessment and mitigation
    - Social/legal Interventions for improvement of home environments by landlords
    - Work with healthcare providers to improve asthma professional care
# Harlem Children’s Zone

### Asthma Initiative Findings

## Baseline and Follow-Up Results

<table>
<thead>
<tr>
<th>Asthma symptoms reported in the last 14 days</th>
<th>Baseline (n=950)</th>
<th>6 mos</th>
<th>12 mos</th>
<th>18 mos</th>
<th>24 mos</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child wheezing or chest tightness</td>
<td>64.0%</td>
<td>47.4%</td>
<td>40.0%</td>
<td>35.0%</td>
<td>29.1%</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Child with night asthma symptoms</td>
<td>53.6%</td>
<td>41.5%</td>
<td>36.8%</td>
<td>29.7%</td>
<td>29.1%</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Child missed school due to asthma</td>
<td>29.7%</td>
<td>21.2%</td>
<td>8.7%</td>
<td>7.2%</td>
<td>9.3%</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Asthma symptoms in the last 3 months:</th>
<th>Baseline (n=950)</th>
<th>6 mos</th>
<th>12 mos</th>
<th>18 mos</th>
<th>24 mos</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child made ER or unscheduled clinic visit</td>
<td>45.6%</td>
<td>19.9%</td>
<td>16.8%</td>
<td>12.2%</td>
<td>10.1%</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Child hospitalized</td>
<td>10.0%</td>
<td>3.8%</td>
<td>1.2%</td>
<td>1.2%</td>
<td>1.7%</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

## Environmental Findings: Pre & Post Intervention

<table>
<thead>
<tr>
<th>Living Room Triggers</th>
<th>Baseline (n=950)</th>
<th>6 months</th>
<th>12 months</th>
<th>18 months</th>
<th>24 months</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dust (Living Room)</td>
<td>64.0%</td>
<td>48.5%</td>
<td>47.3%</td>
<td>50.6%</td>
<td>58.2%</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bathroom Triggers</th>
<th>Baseline (n=950)</th>
<th>6 months</th>
<th>12 months</th>
<th>18 months</th>
<th>24 months</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mold (Bathroom)</td>
<td>15.0%</td>
<td>6.9%</td>
<td>6.8%</td>
<td>3.0%</td>
<td>3.3%</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pest Triggers</th>
<th>Baseline (n=950)</th>
<th>6 months</th>
<th>12 months</th>
<th>18 months</th>
<th>24 months</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mice</td>
<td>23.4%</td>
<td>18.0%</td>
<td>20.3%</td>
<td>15.6%</td>
<td>15.7%</td>
<td>0.01</td>
</tr>
<tr>
<td>Roaches</td>
<td>57.2%</td>
<td>62.3%</td>
<td>58.0%</td>
<td>63.3%</td>
<td>56.9%</td>
<td>0.14</td>
</tr>
<tr>
<td>Spray Bombs</td>
<td>6.7%</td>
<td>1.0%</td>
<td>2.5%</td>
<td>2.1%</td>
<td>2.0%</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other Triggers</th>
<th>Baseline (n=950)</th>
<th>6 months</th>
<th>12 months</th>
<th>18 months</th>
<th>24 months</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking</td>
<td>13.3%</td>
<td>7.2%</td>
<td>8.9%</td>
<td>5.1%</td>
<td>2.6%</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Perfume</td>
<td>14.2%</td>
<td>1.6%</td>
<td>3.6%</td>
<td>1.7%</td>
<td>2.0%</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>
Miami Children’s Initiative Asthma Community Impact Zone Ties/Innovation Network (MCI-ACTION): BASELINE

• **Adapted, pretest and pilot** the Harlem Children’s Zone Asthma Initiative program for use in the MCI’s “Impact Zone” in Miami’s Liberty City

• Complete baseline assessment of 22 asthmatic children in 10 homes during home visits
  • Interviews with parents/caregivers, healthcare providers
  • Examination of children
  • Home evaluation room by room
  • Air sampling (air traps)
Characteristics of 22 MCI IZ Asthmatic Children, June 2015

• Age ranged from 2-13 years (median=8.5 years)
• 6 (27%) had been hospitalized for asthma;
  • 15 (70%) have had ER visits in the last year
  • No asthma plans, inhaled corticosteroid, denied ever having FEV measurement

Examination
• 7 (32%) were overweight (5) or obese (2)
• 2 were wheezing
Caregiver Baseline Interview: Child Symptoms and Housing Issues

- Insects: 100%
- Mice/Rats: 10%
- Mold: 50%
- Water Damage: 50%
- Smoker in home: 40%
- Wheezing: 80%
- Rescue albut: 70%
Number of Occupants Per Home

Number of Occupants Younger Than 20 Years Old

Image 26 - Number of occupants younger than 20 years old
Image 29 - Evidence of cockroaches

Image 30 - Lack of pest control

Image 31 - Water damage on gypsum board walls

Image 32 - Water damage on gypsum board walls
Rotted Drywall, Water Damage, Mold
Exposed Wiring, Bare, Damaged Mattresses on Floor
Other Assessments

• Industrial hygiene assessment
  • Extremely high heat and humidity (High temperature/Humidity)
  • Indoor allergens (air traps):
    • Dust mite and cockroach allergens were detected in all homes.
    • 5 homes mouse allergen.
    • 4 had dog/cat allergen

• HUD meeting- Staff
  • Not too impressed
  • Indicated that findings reflected poor housekeeping

• Meetings with parents: Very open to visits and feedback
  • Nowhere else had reasonable rent
  • Better than shelters, better than “living outdoors”—afraid to complain (waiting list)
  • All had “Much bigger problems than asthma” (mostly fear of being injured or murdered)
  • None had heard of asthma plans, spacers, inhaled corticosteroids

• Meetings with pediatricians: Very open to visits and feedback
  • Did not feel that parents would understand asthma plans
  • Not aware of how to get spacers at no cost to patients
  • No peak flow measurements
  • Patients did not warrant inhaled corticosteroids
Integrated Pest Management/Environmental Control

- Foam treatment around pipes to reduce entry of insects
- Store all foods in tightly covered containers
- Clean/scrubbing/sanitizing/drying all surfaces
- **Reduce cockroach load by vacuuming heavily infested areas in kitchen** (refrigerator, washing machine, etc.), **bathrooms and bedrooms**
Preliminary Results

• Dramatic decline in:
  • Parental reports of asthma (also allergy) symptoms
  • Cockroach sightings(!!)

• Marked improvement in quality of life

• Interest on the part of pediatricians to collaborate in improvement of asthma management

• Enthusiasm on part of residents
  • Taking leadership on structural improvements
  • Interest in collaboration on community-led projects to address environmental issues
Thoughts... guiding Next Steps...

• Poverty is the main... but not the only issue
• Crime: more than just a distraction from health issues: it=a major health issue
  • Homicide rates increased 40% from 2011 to 2013. (Crime in Liberty City as a Public Health Problem: Roderick King, MD, MPH, 6/2015)
  • Strong associations between inner-city childhood asthma and:
    • Police-reported violent crime (Beck et al J Pediatr. 2016 Mar)
    • Community crime (Gupta Ann All Asthma Immunol 2010)
    • Violent crime and disorder (Shmool JL 2014)
    • PTSD after 9/11 (Shiratori 2012)
  • Despite other challenges, 100% of mothers cite crime as most important problem

• Environmental conditions in HUD homes are... a crime
• Other factors associated with race: Vitamin D deficiency, overweight/obesity
• Differences in QUALITY of care received even when ACCESS to care is good: African-Americans receive inferior:
  • Pediatric appendicitis care (<laparoscopic surgery, etc.) J Surg Res 2007 ;137:83-8
  • Pediatric pain control JAMA Pediatr 2015;169:996-1002
  • Adult immunization and linkage to mental health Med Care
  • ??? Pediatric asthma care