Environmental Strategies for Disease, Violence, and Injury Prevention in Urban Areas

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The Compass (5/14); http://nextcity.org (Dave Brenner); http://thelensnola.org; http://greendevzone.org
Violence as a Public Health Issue

- In the US in 2015, 18,000+ victims of homicide, 1.5 million victims of non-fatal violent assaults
- Associated impacts
- Costs
- Gun violence estimated to cost over $48 billion in medical and work loss costs annually
The Role of Environments in Violence and its Prevention

- Antecedents: high-risk behaviors, access to the means of violence, and high-risk environments

- Environmental interventions may have a broader impact than individual interventions
Improving Urban Environments as a Public Health Strategy

Figure 1—The health impact pyramid.

Can urban sustainability programs reduce blight and improve public health and safety?

- Urban tree canopy
- Green stormwater infrastructure
- Vacant-lot greening
Green Stormwater Infrastructure as a Public Safety Intervention in Philadelphia 2000-2012
Geographic Levels of Analysis

- Tract
- Block group

Buffers:
- 1/8-mile buffer
- 1/4-mile buffer
- 1/2-mile buffer
Green Stormwater Infrastructure as a Public Safety Intervention in Philadelphia 2000-2012

- Significant reductions (up to 27%) in narcotics possession around GSI sites

- Trash dumping
- Rodents
- Pathogens
- Illicit activity
- Fear, anxiety, stress, depression
Contractor vs. Community Greening in Youngstown, OH 2011-2014

v1.0: “clean & green”

v2.0: “community reuse”

Contractor vs. Community Greening in Youngstown, OH

244 greened lots randomly matched with 959 control vacant lots


Photos: Youngstown Lots of Green Overview Report
Contractor vs. Community Greening in Youngstown, OH

- Reductions in burglaries and robberies (all lots & community reuse lots; reductions in assaults and violent felonies (community reuse lots)

- Spill-over crime-reduction effects into neighboring areas, especially with community reuse lots


Photos: Youngstown Lots of Green Overview Report
Crime incidents saw a relative increase between 1 and 2 percent. Based on the quantity of trees removed at each site, the loss of each additional tree was associated with a significant increase in theft, breaking and entering and property crime incidents ($p < 0.001$) and in simple assaults, felony assaults and violent crimes ($p < 0.01$) at EAB-infected block groups compared to in non-EAB infected block groups.

Does urban tree canopy reduce risk of gun assault?

Being under tree cover inversely associated with gunshot assault (OR=0.70; 0.55, 0.88), especially in low-income areas (OR=0.69; 0.54, 0.87). Case-crossover models confirmed this inverse association overall (OR=0.55, 95% CI=0.34, 0.89), and in low-income areas (OR=0.54; 0.33, 0.88).

Does urban tree canopy reduce risk of gun assault?

Everyday environments can influence health and safety

**Natural environment**
- Examples:
  - Type (e.g., urban park)
  - Quality (e.g., species diversity)
  - Amount (e.g., tree canopy near home)

**Contact with nature as such**
- Examples:
  - Frequency of contact
  - Duration of contact
  - Activity affordance (e.g., for viewing, for walking)

**Air quality**
- Examples:
  - Reduction of particulate matter
  - Increase in ozone
  - Increase in aeroallergens

**Physical activity**
- Examples:
  - Increased walking for recreation
  - Increased outdoor play

**Social contacts**
- Examples:
  - Increased interaction with neighbors
  - Increased sense of community

**Health and well-being**
- Examples:
  - Performance (e.g., academic, occupational)
  - Subjective well-being (e.g., happiness)
  - Persistent physiological changes (e.g., high cortisol levels)
  - Morbidity (e.g., CHD, depression)
  - Mortality (e.g., CVD, all cause)
  - Longevity

**Stress**
- Examples:
  - Reduction of stressor exposures
  - Acquisition of coping resources
  - Affective, cognitive, physiological restoration

**Effect modifiers 1**
- Examples: Distance, other accessibility factors, weather, perceived safety, societal/cultural context

**Effect modifiers 2**
- Examples: Gender, age, socioeconomic status, occupation, societal/cultural context

Vacant Lot Greening

Pennsylvania Horticultural Society’s LandCare Program

Photos: Pennsylvania Horticultural Society
Does vacant-lot clean & green impact stress levels of nearby residents?

Return on Investment

- Typical cost $1600, $180/year maintenance
- $26 in net benefits to taxpayers and $333 to society at large, for every dollar invested


<table>
<thead>
<tr>
<th>Assault Type</th>
<th>Vacant Lot Remediation, % (95% CI)</th>
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<tbody>
<tr>
<td>Firearm</td>
<td>-4.6 (-5.0, -4.2)</td>
</tr>
<tr>
<td>Nonfirearm</td>
<td>-0.4 (-0.7, 0.1)</td>
</tr>
<tr>
<td>All</td>
<td>-2.2 (-2.4, -1.9)</td>
</tr>
<tr>
<td>Period of sustained effect</td>
<td>45.8 mo</td>
</tr>
</tbody>
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Nature PHL: Go Out and Play
Where to Go?

- Park/trail audits (300+)

- Searchable database of neighborhood parks, trails, and green spaces
Research Partners:
CHOP, University of Pennsylvania, USFS, GSA Office of Evaluation Science

Outcomes of Interest:
• Adherence
• Utility/Success of the naturephl.org website
• Stress
• Physical activity