Health implications of greening and green gentrification

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What’s health got to do with it?

In justifying resources for parks:

- A beautiful city with healthy air, water, trees and parks
  Residents strongly value the area’s natural assets and want to protect air quality, water quality and trees. Access to nearby parks is important for marketability and livability of neighborhoods.
  Ideal: The city’s natural resources are conserved and protected for current and future generations.
  - A core value from ForwardDallas! Comprehensive Plan, 2006

In defining “sustainability”:

- From City of Raleigh Sustainability Initiatives Plan, 2009
What is health?

Health is “a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity”

-World Health Organization, 1948

Public health concerns the health of populations, rather than the health of individuals.
Health outcomes are not equal

Health inequities occur **between** populations.

Health outcomes are not equal

Health inequities occur within populations.

From: https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6301a9.htm
Health outcomes are not equal

Those with social deprivation/lower socioeconomic status also suffer from worse health.

*from: https://www.k4health.org/toolkits/bangladesh-health-journalists/inequalities-health-key-issue
Green Space and Health

• Having access to green or open space is generally thought of to be beneficial for health

• Exposure to natural outdoor environments linked to:
  • Lower mortality (Donovan et al., 2013; Gascon et al., 2016; and others)
  • Improved perceived physical and mental health (Gascon et al., 2015; Triguero-Mas et al., 2015)
How does green space impact health?

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

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)

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

Annu. Rev. Public Health. 35:207–28
Interventions targeting more distal causes of poor health have a greater impact on the health of populations.

However, designing interventions at proximal levels is more straightforward.
Green Space as Public Health Intervention

- Targets a relatively distal cause of health (the built environment)
- May improve health through multiple pathways
  - Physical activity
  - Social interaction
  - Reductions in pollution
  - Reductions in stress
- Cost may be low per person, since many people may benefit from one intervention
Could gentrification be an unintended consequence?

However, an even more distal cause of poor health may be the social, policy, and economic context.
Gentrification and Health

• Aside from the health effects of displacement, little is known about how gentrification may affect health.

• Gentrification may adversely affect less advantaged residents.
  • While gentrification slightly improved health among residents, it lead to worse self-rated health among Blacks. (Gibbons and Barton, 2016)

• No studies have looked at the health effects of green gentrification.
How can we study this problem?

Our research question:

Does **green gentrification** change the relationship between access to green spaces and health outcomes?
In other words….

- We know that green space is good for health.

- If green space also leads to gentrification:
  - Does everyone’s health still benefit from the green space?
  - Could the process of gentrification cause worse health outcomes for some and better health outcomes for others?
Green Gentrification and Health Equity

Stakeholders and Context:
- Public policy
- Private investment
- Public/Private Intervention

New Greening Initiatives
- Parks
- Gardens
- Pedestrian Infrastructure

Dotted outline indicates North American context only

Gentrification

Affordability/Change in Amenities

Residential or Cultural Displacement, Disruption of Community Ties

Accessiblity of Healthy Foods
- Cost
- Availability

Stress

Social support/social interaction

Behaviors/Lifestyle
- Physical Activity
- Diet

Environmental exposures
- Air pollution
- Noise pollution
- Heat

Contact with Green/Open Spaces

Mental and Physical Health Outcomes, Residential Well-Being

Crime

Resident Characteristics (covariates)
- Socioeconomic Status (Education, Income, Employment)
- Gender
- Age
- Race/Ethnicity/Place of Origin/Nativity
- Language

Stakeholders and Context:
- Public policy
- Private investment
- Public/Private Intervention

Dotted outline indicates North American context only
Simplified…

Access to green space → Gentrification → Health
Study Design

• Pilot study of two cities
  • Barcelona
  • New York City

• Cross-sectional case-control design
  • Cases - individuals residing in “neighborhoods” with evidence of green gentrification
  • Controls - individuals residing in “neighborhoods” with new green amenities but no evidence of green gentrification
# Data Sources

- **Barcelona**

<table>
<thead>
<tr>
<th>Data</th>
<th>Source</th>
<th>Years</th>
<th>Area Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Outcomes</td>
<td>Barcelona Health Survey, Catalanian Health Survey</td>
<td>2006</td>
<td>x/y</td>
</tr>
<tr>
<td>Greening Data</td>
<td>City (See Anguelovski, et al, 2017)</td>
<td>1992-2004</td>
<td>x/y</td>
</tr>
</tbody>
</table>

- **New York City**

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<thead>
<tr>
<th>Data</th>
<th>Source</th>
<th>Years</th>
<th>Area Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Outcomes</td>
<td>NYC Community Health Survey</td>
<td>2009-2013</td>
<td>Zip Codes*</td>
</tr>
<tr>
<td>Gentrification Data</td>
<td>Furman Center (See Connolly, 2017)</td>
<td>2014/2015 (change from 1990)</td>
<td>Sub-borough areas</td>
</tr>
<tr>
<td>Greening Data</td>
<td>NYC Parks, Greenstreets program, NYC Dept of Environmental Protection, LivingLots (See Connolly, 2017)</td>
<td>1990- ?</td>
<td>x/y</td>
</tr>
</tbody>
</table>
## Outcomes

<table>
<thead>
<tr>
<th>Dimension of Health</th>
<th>Barcelona</th>
<th>NYC</th>
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</thead>
<tbody>
<tr>
<td>Mental Health</td>
<td>• Self-reported mental health (GHQ-12)</td>
<td>• Self-reported “Non-specific Psychological Distress”*</td>
</tr>
<tr>
<td></td>
<td>• Self-reported depression-anxiety (current or ever)</td>
<td>• Self-reported depression</td>
</tr>
<tr>
<td>Physical Health</td>
<td>• Self-reported asthma</td>
<td>• Self-reported asthma (current/ever)</td>
</tr>
<tr>
<td></td>
<td>• Self-reported high blood pressure</td>
<td>• Self-reported high blood pressure</td>
</tr>
<tr>
<td>General Health</td>
<td>• 5-point likert scale</td>
<td>• 5-point likert scale</td>
</tr>
</tbody>
</table>

*Non-specific psychological distress is a composite measure of 6 questions regarding symptoms of anxiety, depression, other emotional problems.
Classification of Cases/Controls

• Only areas with new green amenities identified

• Gentrification dichotomized based on:
  • Scale used in the Barcelona pilot study (0-4) (See Anguelovski, et al, 2017)
  • NYC- rent increases above the median between 1990 and 2014, and other demographic indicators including race, ethnicity, and income show significant change (see Connolly, 2017)
Analysis

• Regression models, re-run for each outcome

• Covariates
  • Age
  • Gender
  • SES (Employment, Education, Income)
  • Race/Ethnicity/Nativity

• Interaction terms to test effect modification:
  • exposure to green * gentrification
  • exposure to greening * (social stratification variable)
Next Steps for Us

• Continue research to understand how green gentrification affects health

• Identify policy interventions that may prevent green gentrification and protect urban residents from the effects of gentrification while still providing adequate green resources
Next Steps for You

• Be aware of the complex interactions between changing the build environment and neighborhood/community social environments

• Be thoughtful about the use of health in planning, and be aware of HOW changes to physical and social environments might impact the health of residents

• Consider the role of equity- do all residents benefit equally from new interventions?
Take Home Messages

• Cities DO need green/open space that is available to residents for recreation
• Having access to green/open space IS beneficial for health
• Green gentrification may be an unintended consequence of greening initiatives in cities, and this process may have health implications
THANK YOU!