Objective Crime Data and Walking for Physical Activity

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Physical Activity variables

**SES**
- Income
- Race
- Education

**HEALTH**
- Physical activity
- Perception of own health

**CRIME**
- Property
- Violent

**BUILT ENVIRONMENT**
- Parks
- Sidewalks
- Grocery-restaurant-retail cluster
- Density
Hypotheses

Higher violent and property crime rates are associated with less walking.

Relationships between crime rates and walking are stronger for women and will differ between rural and urban areas (density).
Study Area: Washington State

5 Counties in Washington State

Seattle
Study Area: 5 Counties

- Kitsap
- Snohomish
- King
- Pierce
- Thurston
Scale of Measurement

Crime rates 1998-------------------Sheriff, police precincts
Seattle crime rates 1998----------------Census tracts
Built environment data---------------Census tracts, buffer
On-going study, 1995-2001-----------Study subjects

Mean 64 years
61% female
86% white
46% retired
Study Subjects Distribution
Analysis Methods

Relative Risk Regression Model
Crime variables used to predict if subjects walk

Adjustment for Potential Confounders
- age
- race, income, education
- percent park coverage, density

Stratification by Sex
Washington State violent crime average in 1998 = 16 per 1,000 persons.
Washington State property crime average in 1998 = 53/1,000 persons
### Study Subjects by Crime Type/Level

<table>
<thead>
<tr>
<th>Variables</th>
<th>Violent crime LOW</th>
<th>Violent crime HIGH</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>N = 988</td>
<td>N = 879</td>
</tr>
<tr>
<td>Sex, male, %</td>
<td>42</td>
<td>35</td>
</tr>
<tr>
<td>Age, mean</td>
<td>63</td>
<td>65</td>
</tr>
<tr>
<td>Race, white, %</td>
<td>90</td>
<td>83</td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;$25,000/yr, %</td>
<td>21</td>
<td>28</td>
</tr>
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<td>Income &lt;$25,000/yr, %</td>
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</table>
Crime and Walked Any

Percent Reported Any Walking

- Violent Crime High: 61%
- Violent Crime Low: 60%
- Property Crime High: 60%
- Property Crime Low: 59%

The graph shows the percent reported for walking in areas with different levels of violent and property crime.
## Built Environment Variables by Crime Areas

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Sidewalks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mean length, km*</td>
<td>8</td>
<td>19</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>Commercial Centers:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>grocery, restaurant,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>retail, mean</td>
<td>0.3</td>
<td>0.8</td>
<td>0.5</td>
<td>0.6</td>
</tr>
<tr>
<td>Parks, % coverage</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

* King County only
Adjusted Results: All Study Subjects

<table>
<thead>
<tr>
<th>Exposure</th>
<th>Outcome</th>
<th>Adjusted RR</th>
<th>CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate violent crime</td>
<td>Any walking</td>
<td>.99</td>
<td>.97-1.01</td>
</tr>
<tr>
<td>Rate property crime</td>
<td>Any walking</td>
<td>1.00</td>
<td>.97-1.03</td>
</tr>
</tbody>
</table>
## Adjusted Results

### Men / Women

<table>
<thead>
<tr>
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<th>Outcome</th>
<th>Adjusted RR</th>
<th>CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate violent crime</td>
<td>Any walking</td>
<td>1.01</td>
<td>.99-1.03</td>
<td>insignificant</td>
</tr>
<tr>
<td>Rate property crime</td>
<td>Any walking</td>
<td>1.03</td>
<td>.99-1.07</td>
<td>insignificant</td>
</tr>
</tbody>
</table>

### Men Only

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<th>Adjusted RR</th>
<th>CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate violent crime</td>
<td>Any walking</td>
<td>.97</td>
<td>.94-1.00</td>
<td>.05</td>
</tr>
<tr>
<td>Rate property crime</td>
<td>Any walking</td>
<td>.97</td>
<td>.94-1.02</td>
<td>insignificant</td>
</tr>
</tbody>
</table>
Other Approaches

- Linear regression: predict hours walked per week
- Seattle only
- King County only
- Urban/rural stratification
Limitations to Study

- Crime data at various levels
- Issues affecting crime reporting
- Self-reported physical activity
- Recall issues
- Generalizability
Conclusions

Higher violent and property crime rates are associated with less walking.  

*FALSE*

Relationships between crime rates and walking are stronger for women and will differ between rural and urban areas (density).

*FALSE*

*Men --- protective, significant for violent crime*

*Density --- no difference, Seattle, King Co.*
Acknowledgements

- Cardiovascular Health Research Unit, University of Washington
- Group Health Cooperative
- Department of Geography, University of Washington
- Royalty Research Fund, University of Washington
Hypotheses (still remaining)

- Higher violent/property/total crime rates = lower neighborhood walkability scores.

- The association between neighborhood walkability scores and higher hours of walking per week will be in stronger in lower crime areas.
Multivariate Analysis

- Run relative risk regression model to predict crime rate, using
- This wasn’t a hypothesis…so maybe not run?
- It doesn’t make sense to run this because more sidewalks do not produce crime, living in the city produces more sidewalks and more crime.
Extra Info

- total crime mean = 62.9
- We also ran the models for rural and urban areas and the results were almost identical to those from the entire sample, adjusted for age and all potential confounders.
- Victims & offenders age, race, gender
- Single family residential
- ORs were transformed to describe a 2-fold increase in crime rates and odds of walking.
Study Subjects

- Age range: 33-79 years
- Age mean: 64 years
- 24% had household income $\leq$ $25,000
- 86% felt good, very good or excellent health
- 31% retired
- 63% female
- 84% white