Rural - Urban Differences in Function and Mortality Among Older Adults in China: Why Do Rural Chinese Have Poorer Health?

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STUDY FOCUS

- Do rural/urban differences in social and economic environment spill over to influence disparities among the older population?

- Analysis 1: Examine difference in LE and ALE across rural and urban sample

- Analysis 2: Test a multivariate transition model to explain rural/urban differences
BACKGROUND

- **In developed countries:** Studies report a rural advantage in mortality and health.

  The mortality advantage is sustained after adjusting for socioeconomic and demographic characteristics (e.g. Hayward, Pienta and McLaughlin, 1997; Smith et al. 1995).

- **In developing countries:** The subject has received less attention.

  General understanding is health profiles differ, urbanites have lower mortality and prevalence of disease (e.g. Montgomery et al 2003).
CHINESE CONTEXT

- Dismantling cooperative medical system in rural China has had hurt health care (e.g. Beach 2001; Cook and Dummer 2003; Shi 1996)

- The crisis in rural health care would lead one to hypothesize that urbanites have a health advantage (e.g. Meng et al. 2000; Yi et al. 2002; Zimmer and Kwong 2004)

- Only a small number of examinations of China in past REVES meetings. All use Sullivan method
Data: Beijing Longitudinal Study on Aging

- Beijing Municipal area
- One district chosen per region
  - urban- Xuan Wu
  - suburban- Da Xing
  - mountainous- Huai Rou
- N = 3,257 in 1992
- Follow-ups in 1994 and 1997
Determining Active Life Expectancy

- Definition of ‘active’: Ability to do the following:
  - Eat
  - Dress
  - Get on/off bed
  - Bathe
  - Walk 300 meters
  - Walk up/down stairs

- LE and ALE estimated for rural and urban areas, adjusting for age and sex

- Software: IMaCh version 0.96d
Life Expectancy Estimates by Residence, Age and Sex

Women
- URBAN
- RURAL

Men
- URBAN
- RURAL
Active Life By Residence, Age, and Sex
Percent Of Life In Active State by Residence, Age, and Sex

Women

Men

Age

Percent

URBAN

RURAL

Percent
Multivariate Maximum Likelihood Estimation of Cross-Sectional Model

**Functional Status Outcome**

No functional limitation, Wave 1, 1992
No functional limitation, Wave 2, 1994
VERSUS
Has functional limitation, Wave 1, 1992
Has functional limitation, Wave 2, 1994
Base Cross-Sectional Model for Having a Functional Limitation

Log odds ratio

Urban residence\textsuperscript{,} -.687**
Age\textsuperscript{,} +.130**
Is Female\textsuperscript{,} +.759**
Year of observation is 1994\textsuperscript{,} -.491**

** p < .01     * p < .05     ^ p < .10
Multivariate Maximum Likelihood Estimation of Transition Model

Data at origin

Wave 1, 1992
- Has no functional limitation
- Has a functional limitation

Outcome at follow-up

Wave 2, 1994
- Has no functional limitation
- Has a functional limitation
- Died prior to follow-up

Wave 2, 1994
- Has no functional limitation
- Has a functional limitation
- Died prior to follow-up

Wave 3, 1992
- Has no functional limitation
- Has a functional limitation
- Died prior to follow-up
### Base Transition Model for Having a Functional Limitation and Mortality (Log Odds Ratios)

<table>
<thead>
<tr>
<th></th>
<th>Has limitation versus No limitation</th>
<th>Died versus No limitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban residence</td>
<td>-.888**</td>
<td>-.630**</td>
</tr>
<tr>
<td>Age</td>
<td>+.073**</td>
<td>+.106**</td>
</tr>
<tr>
<td>Is Female</td>
<td>+.374**</td>
<td>-.408**</td>
</tr>
<tr>
<td>Year of origin is 1994</td>
<td>+.728**</td>
<td>+.612**</td>
</tr>
<tr>
<td>Has limitation at origin</td>
<td>+2.214**</td>
<td>+2.229**</td>
</tr>
<tr>
<td>Urban X Has limitation at origin</td>
<td>+.988**</td>
<td>+.846**</td>
</tr>
</tbody>
</table>

** p < .01     * p < .05     ^ p < .10
Five Domains and Their Indicators

1. **Support**
   - Marital status
   - Living arrangement
   - Has a harmonious family
   - Has a confidant

2. **Socioeconomics**
   - Education
   - Income
   - Occupation
   - Work status

3. **Behaviors**
   - Smoking
   - Drinking
   - Eating fruits and vegetables

4. **Access**
   - Has insurance
   - Difficulty paying medical expenses
   - Health care satisfaction

5. **Conditions**
   - Life threatening
   - Debilitating
## Selected Distributions by Rural/Urban Residence

<table>
<thead>
<tr>
<th></th>
<th>Rural (N=2954)</th>
<th>Urban (N=3004)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lives alone</td>
<td>35%</td>
<td>27%</td>
</tr>
<tr>
<td>Has education</td>
<td>27%</td>
<td>74%</td>
</tr>
<tr>
<td>Eats fruits and vegetables</td>
<td>28%</td>
<td>64%</td>
</tr>
<tr>
<td>Has insurance</td>
<td>11%</td>
<td>90%</td>
</tr>
<tr>
<td>Has life threatening condition</td>
<td>27%</td>
<td>45%</td>
</tr>
</tbody>
</table>
## Urban Log Odds Ratios for Different Models

<table>
<thead>
<tr>
<th></th>
<th>Having limitations vs. Having no limitations</th>
<th>Dying vs. Having no limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>-.888**</td>
<td>-.630**</td>
</tr>
<tr>
<td>Base + Support</td>
<td>-.868**</td>
<td>-.546**</td>
</tr>
<tr>
<td>Base + Socioeconomics</td>
<td>-.649**</td>
<td>-.236</td>
</tr>
<tr>
<td>Base + Behaviors</td>
<td>-.851**</td>
<td>-.542**</td>
</tr>
<tr>
<td>Base + Access</td>
<td>-.672**</td>
<td>-.455**</td>
</tr>
<tr>
<td>Base + Conditions</td>
<td>-1.026**</td>
<td>-.822**</td>
</tr>
<tr>
<td>Full model</td>
<td>-.590**</td>
<td>-.281</td>
</tr>
</tbody>
</table>
Marginal Effects Of Urban Residence For Those Originating *Without* Functional Limitations

<table>
<thead>
<tr>
<th></th>
<th>Base Model</th>
<th>Full Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>No limitations at</td>
<td>-0.075</td>
<td>-0.050</td>
</tr>
<tr>
<td>follow-up</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limitations at</td>
<td>-0.050</td>
<td>-0.025</td>
</tr>
<tr>
<td>follow-up</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Died prior to</td>
<td>-0.025</td>
<td>-0.050</td>
</tr>
<tr>
<td>follow-up</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Summary/Conclusion

1. There is an urban advantage in mortality and function

2. Findings consistent with expectations if availability of health care drives health outcomes

3. Socioeconomic status and access explain much of the influence of urban residence

4. Social support and health behaviors explain effect on mortality but not function

5. Residual effects may be a function of community-level characteristics
Thank you for your attention
Marginal Effects Of Urban Residence For Those Originating With Functional Limitations

- No limitations at follow-up
- Limitations at follow-up
- Died prior to follow-up

Base Model
Full Model