Geographic Access to Hospice in the United States

Melissa D.A. Carlson, Ph.D., M.B.A.
Department of Geriatrics & Palliative Medicine
Mount Sinai School of Medicine
Background

- There has been dramatic growth in the number of hospices in the U.S., with more than 900 new hospices since 2000 (a 41% increase)
- However, only 39% of decedents in 2008 received hospice care and there is persistent evidence of disparities in hospice use by
  - Race/ethnicity (Han, 2006; Lackan, 2004; Greiner, 2003; Connor, 2002; Virnig, 2000)
  - Income (Lackan, 2004; Greiner, 2003; Virnig, 2000)
  - Education (Lackan, 2004; Greiner, 2003)
- Given that more than 90% of hospice care involves staff making home visits, proximity to a hospice is important in ensuring access to hospice services
Why Proximity to a Hospice Might be Related to Hospice Use

- Greater distance may…
  - may make it logistically more difficult for hospice staff to visit patients
  - community members may be less likely to serve as volunteers or employees which may increase language, trust or other cultural issues
  - may impede the diffusion of knowledge and understanding of hospice within a community
Existing Literature

- Existing studies of geographic access to hospices have documented limited access in rural compared with urban areas*
  - These studies do not reflect the recent growth in hospice
  - Do not evaluate if hospice availability varies by sociodemographic characteristics of communities (racial composition, income and education levels)
  - Do not evaluate state-specific Certificate of Need policies for hospice which were designed to manage the supply of hospices in a state

*Virnig, 2006; MedPac 2002
Objectives

- Provide a more comprehensive and up-to-date evaluation of geographic access to hospice services
- Determine the proportion of the U.S. population living in communities within 30 minutes and 60 minutes of a hospice
- Identify community characteristics associated with more limited geographic access to hospice services
Methods

- Cross sectional study of geographic access to U.S hospices using data from 2008: Medicare Provider of Service data, U.S. Census data
- Used a geographic information system (ArcGIS) to estimate the driving time between each community in the U.S. (N=64,260) and the nearest hospice (N=3306)
  - Translate each hospice’s address and the center of each community into sets of longitude and latitude coordinate points
  - Calculate the driving time between community centers and the nearest hospice as the product of estimated distances and travel speeds
- We used multivariate logistic regression to estimate the associations between hospice availability and sociodemographic characteristics of communities
Results

- As of 2008, 88% of the U.S. population lived within 30 minutes of a hospice; 98% lived within 60 minutes.

- Time to nearest hospice:
  - Mean = 15 minutes (s.d. 18)
  - Median = 9 minutes
  - Range = (less than 1 minute, 403 minutes)
Characteristics Associated with Greater Hospice Availability

- Some gaps in hospice availability remain (35 million individuals > 30 minutes from a hospice)
- Population per square mile strongest predictor of hospice availability:
  - More urban areas:
    - mean=6.5 minutes (s.d. 4.6 minutes)
  - More rural areas:
    - mean=33.1 minutes (s.d. 25.1 minutes)
## Community Characteristics Associated with Being Within 30 Minutes of a Hospice (adjusted for PPSM, region)

<table>
<thead>
<tr>
<th></th>
<th>Adjusted Odds Ratio</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Median Income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than $30,000</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>$30,000 to $39,999</td>
<td>1.44</td>
<td>(1.33, 1.55) *</td>
</tr>
<tr>
<td>$40,000 to $49,999</td>
<td>2.20</td>
<td>(2.00, 2.43) *</td>
</tr>
<tr>
<td>Greater than or equal to $50,000</td>
<td>3.84</td>
<td>(3.42, 4.33) *</td>
</tr>
<tr>
<td><strong>Percent with &lt; high school education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 10%</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>11% to 19%</td>
<td>0.62</td>
<td>(0.55, 0.69) *</td>
</tr>
<tr>
<td>20% to 29%</td>
<td>0.52</td>
<td>(0.46, 0.59) *</td>
</tr>
<tr>
<td>Greater than or equal to 30%</td>
<td>0.47</td>
<td>(0.41, 0.54) *</td>
</tr>
<tr>
<td><strong>Black Population Percentage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 1%</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>1% to 3%</td>
<td>1.44</td>
<td>1.31, 1.57) *</td>
</tr>
<tr>
<td>3% to 14%</td>
<td>1.39</td>
<td>1.27, 1.51) *</td>
</tr>
<tr>
<td>Greater than or equal to 15%</td>
<td>1.75</td>
<td>1.58, 1.93) *</td>
</tr>
<tr>
<td><strong>State has a Certificate of Need program</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0.49</td>
<td>(0.45, 0.52) *</td>
</tr>
</tbody>
</table>
# U.S. Population Nearest to a Hospice Established Since 2000

<table>
<thead>
<tr>
<th></th>
<th>N (in millions)</th>
<th>%</th>
<th>Minutes to Nearest Hospice Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>94.9</td>
<td>34%</td>
<td></td>
</tr>
<tr>
<td><strong>Population per Square Mile</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First quartile (more rural)</td>
<td>18.4</td>
<td>30%</td>
<td>32.2 (24.5)</td>
</tr>
<tr>
<td>Second quartile</td>
<td>25.0</td>
<td>34%</td>
<td>12.3 (11.0)</td>
</tr>
<tr>
<td>Third quartile</td>
<td>26.0</td>
<td>37%</td>
<td>7.5 (6.1)</td>
</tr>
<tr>
<td>Fourth quartile (more urban)</td>
<td>25.5</td>
<td>36%</td>
<td>5.9 (3.7)</td>
</tr>
</tbody>
</table>
Variation in Geographic Access by State

- Geographic access to hospice highly correlated with a state’s population density:
  - States with more than 90% of population within 30 minutes:
    - CT (100%) ; MA, NJ (99%) ; RI (98%) CA (95%)

- with some exceptions:
  - States with more than 90% of population within 30 minutes:
    - NH (95%), population density below national median
    - OH (94%), population density in third quartile
    - MI (90%), population density in third quartile
Limitations

- Analysis only includes Medicare certified hospices
- Estimates distance from community centers to nearest hospice and not each individual’s address
- Analyses do not include satellite offices of hospices which may improve availability of hospice in rural areas
Conclusions

- Growth in the U.S. hospice industry has been dramatic and there is now almost universal geographic access to hospice
  - There exists a small subset of communities where geographic access is a concern – tend to be more rural, lower income, less educated
- The hypothesis that disparities in hospice use by race are due to more limited geographic availability of hospice is not supported by these data
- Future research regarding variation in hospice use should focus on other potential barriers to hospice use including admission criteria, hospice size/capacity, patient level cultural and financial factors
Acknowledgements

Co-authors:
- Elizabeth H. Bradley, PhD, Yale University
- Qingling Du, Mount Sinai School of Medicine
- Sean Morrison, MD, Mount Sinai School of Medicine

Funding
- National Institute for Nursing Research
  - Career Development Award (K99/R00)
- National Palliative Care Research Center grantee
- Brookdale Foundation Leadership in Aging Fellowship