Stroke and Active Life Expectancy in Beijing: Effects and Trends

Xinghua Fang, Capital Univ. of Medical Sciences
Toshiko Kaneda, Population Reference Bureau
Zachary Zimmer, Population Council
Zhe Tang, Capital Univ. of Medical Sciences

This research is supported by a grant from the National Institute on Aging,
Grant Number R01 AG20063-01.
The proportion of Chronic diseases among the elderly (60+) in China 1998

- Other: 19%
- HBP: 15%
- Stroke: 7%
- Heart Dis: 13%
- COPD: 13%
- Digestive Dis: 11%
- Movement Dis: 14%
- Diabetes: 3%
- Eye: 5%

Data source: Annals of Chinese Hygiene
The trend of mortality of stroke in China (1983----2000)

Data source: Annals of Chinese Hygiene
Mortality of stroke in Beijing

/100 000

1957: 20
1996: 167
1998: 162
1999: 155
The incidence of stroke event in Beijing
(Sino-MONICA, 1984-1999)

/100,000

Incidence of stroke by age and sex in Beijing, 1984-99

(/100,000)

Data source: Wenhua Wang, Dong Zhao  Chinese J Epidemiology 2001; 22(4):269
Prevalence of stroke by age and sex in China, 1991

/100,000

Age
Purpose of Current Study

1. Look at stroke prevalence over time among a sample of older adults in Beijing
2. Compare LE and ALE among those with and without stroke
3. Examine whether effect of stroke on ALE has been changing over time as Beijing experiences rapid socio-economic development
Beijing Multidimensional Longitudinal Study on Aging

- Eighteen administrative areas, divided into 3 categories according to the degree of urbanization and economic status:
  - 8 urban districts,
  - 5 suburban counties,
  - 5 mountain counties.

- One district/county chosen at each category:
  - HuaiRuo (mountain).
  - XuanWu (urban),
  - DaXing (suburban)

Data weighted to be representative of the three areas.
Results of follow-up surveys

1992

N=3227

- Died: 777
- Interviewed: 2039
- DNR: 411

2000

N=2783

- Died: 404
- Interviewed: 1783
- DNR: 596

1997

- Died: 411
- Interviewed: 2039
- DNR: 777
Methods

• Estimate rates for transitions shown below using hazard rate models (SAS LIFEREG)

  ![Transition Diagram]

  - Inactive
  - Active
  - Death

• Use the hazard rates to construct status based multistate life tables using SAS macro developed by Mark Hayward

• Conduct these procedures using 2 sets of transitions
  a. 1992 to 1997 data
  b. 2000 to 2004 data

Calculating separate transition rates for each period
Definition of active and inactive

• **Active**  Can do all of the following
  – Walking 300 meters
  – Getting on/off bed
  – Eating
  – Dressing
  – Bathing
  – Walking up stairs

• **Inactive**  Needs assistance with any one of the above
Finding and Definition of Stroke

• Self-report

• Question: Did a doctor ever tell you that you had a stroke?
Prevalence of stroke by age, 1992 versus 2000
Proportion who died by whether they had a stroke at start of period

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>39.45</td>
<td>26.23*</td>
</tr>
<tr>
<td>With stroke in 1992</td>
<td>39.45</td>
<td>26.23*</td>
</tr>
<tr>
<td>Without stroke in 1992</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Percent inactive for those with and without stroke, 1992 and 2000
Percent inactive for those with and without stroke, by age and sex, 1992 and 2000

![Bar chart showing percent inactive for those with and without stroke, by age and sex, 1992 and 2000.](image-url)
Status based ALE and IALE for those with stroke at baseline, 1992-1997

Active at baseline

Inactive at baseline
Status based ALE and IALE with and without stroke at baseline

### With Stroke at baseline

**Active at baseline**

- ALE
- IALE
- LE

**Inactive at baseline**

### Without Stroke at baseline

**Active at baseline**

- ALE
- IALE
- LE

**Inactive at baseline**
## Ratio in LE and ALE of stroke versus non-stroke by originating status

<table>
<thead>
<tr>
<th>Age</th>
<th>Active LE</th>
<th>Active ALE</th>
<th>Inactive LE</th>
<th>Inactive ALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>55-0</td>
<td>0.80</td>
<td>0.74</td>
<td>0.72</td>
<td>0.20</td>
</tr>
<tr>
<td>60-0</td>
<td>0.76</td>
<td>0.71</td>
<td>0.60</td>
<td>0.20</td>
</tr>
<tr>
<td>65-0</td>
<td>0.74</td>
<td>0.69</td>
<td>0.64</td>
<td>0.17</td>
</tr>
<tr>
<td>70-0</td>
<td>0.72</td>
<td>0.67</td>
<td>0.69</td>
<td>0.16</td>
</tr>
<tr>
<td>75-0</td>
<td>0.71</td>
<td>0.64</td>
<td>0.73</td>
<td>0.14</td>
</tr>
<tr>
<td>80-0</td>
<td>0.68</td>
<td>0.61</td>
<td>0.75</td>
<td>0.13</td>
</tr>
<tr>
<td>85-89</td>
<td>0.63</td>
<td>0.55</td>
<td>0.75</td>
<td>0.11</td>
</tr>
</tbody>
</table>
Summary of 1992-1997 data

- Strokes reduce both LE and ALE
- LE and ALE in inactive elderly are shorter than in active elderly people
- The proportion of reduction is more greater in ALE than in total LE in those inactive and with stroke
- What about comparing trends over time in the effects of stroke?
Net change in years of ALE and IALE, 1992-1997 to 2000-2004, by originating state, for those with stroke at baseline
Net change in years of ALE and IALE, 1992-1997 to 2000-2004, by originating state and stroke

With Stroke

active

inactive

Without Stroke

ALE
IALE

55- 60- 65- 70- 75- 80- 85- 89

55- 60- 65- 70- 75- 80- 85- 89
Summarizing changes over time

• Life expectancy increased for each group over time
• Most of the increase is active life
• The increase in active life is greatest for those with stroke beginning the period inactive
• The reason for the increase in life and active could be improvement in medical conditions, but this is speculative