Temporal Trends in Age at Ischemic Stroke Onset by Ethnicity

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Introduction

- Incidence rate of stroke is declining overall
  - Not present in the population younger than 65 years
  - Modest yet significant increases found in those younger than 55 years
- Lower average age at stroke onset?
- Considerable public health implications
  - Greater years of disability, loss of income, more costs
- Data limited
Methods

- First-ever ischemic stroke cases: 1/1/2000 – 6/30/2012
  - The Brain Attack Surveillance in Corpus Christi (BASIC) Project

- Data collection
  - Medical records: age at onset of first-ever stroke, demographics and risk factors

- Statistical Analysis
  - Trends in age at stroke - Generalized additive models (GAMs)
    - Generalized linear model with sum of smooth functions of the covariates
    - Focus on data exploration and data visualization
  - Effect modification by ethnicity
Results

- 3,496 first-ever ischemic strokes ascertained
  - 244 excluded due to not Mexican American (MA) and non-Hispanic white (NHW)
  - 1,823 MA, 1,429 NHW

- Median age (years)
## Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>2000-2002</th>
<th>2010-2012</th>
<th>Mean change from 2000-2012</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y)</td>
<td>72.0</td>
<td>68.0</td>
<td>-2.44</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Female (%)</td>
<td>52.22</td>
<td>48.41</td>
<td>-4.13</td>
<td>0.152</td>
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<tr>
<td>MA (%)</td>
<td>52.57</td>
<td>59.33</td>
<td>9.85</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>NIHSS</td>
<td>3.0</td>
<td>4.0</td>
<td>1.26</td>
<td>0.002</td>
</tr>
</tbody>
</table>
## Results

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<thead>
<tr>
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<th>2000-2002 (%)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Diabetes Mellitus</td>
<td>37.49</td>
<td>45.37</td>
<td>9.77</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>High Cholesterol</td>
<td>18.68</td>
<td>44.61</td>
<td>33.41</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Hypertension</td>
<td>68.14</td>
<td>79.97</td>
<td>15.55</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Current/Ever Smoker</td>
<td>31.03</td>
<td>38.60</td>
<td>7.39</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Uninsured</td>
<td>6.00</td>
<td>11.99</td>
<td>6.74</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Atrial Fibrillation</td>
<td>10.06</td>
<td>15.48</td>
<td>6.35</td>
<td>0.001</td>
</tr>
<tr>
<td>CAD</td>
<td>31.02</td>
<td>26.86</td>
<td>-0.83</td>
<td>0.753</td>
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<tr>
<td>Excessive Alcohol</td>
<td>5.87</td>
<td>7.59</td>
<td>1.31</td>
<td>0.359</td>
</tr>
</tbody>
</table>
Temporal trends in age at stroke overall

Temporal trends in age at stroke by ethnicity
Conclusion

- Age at first-ever ischemic stroke declined significantly over time ($p = 0.004$)
- Ethnicity significantly modified this association ($p < 0.001$)
  - Greater declines were observed among NHWs compared with MAs
- Reasons for the declines in age at stroke onset should be further investigated
Limitations

➢ Potential confounders were not adjusted in the fitted models
  • Goal was to describe overall trends

➢ No point estimates using GAMs
  • Introduce less bias, give better visualization
Ongoing Research

- Adjusting for age of population at risk by ethnicity over time

- Studying the impact of increased use of MRI on such trends
  - Trends in stroke severity by age groups
Acknowledgement

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Thank you
for listening