Pathology and cognition: evolution of findings in early older recruits to Religious Orders Study

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Data Core Leader
ADC Meeting
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Disclosures

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  – Illinois Department of Public Health

• No conflicts
Concern

• Neuropathologic Cohort studies can contribute essential knowledge.
• Neuropathology requires death; being alive means autopsy data are missing
• Informative missingness is a Potential Statistical Disaster: How serious is it here?
• Religious Orders Study affords an opportunity to look at the missingness because enrollment began in 1994. Pictures are helpful.
Enrollment: Age vs. Year

Religious Orders Study, N=1317
Vital status (Blue: 701 alive; Red: 616 dead)
Enrollment: Age vs. Year

Religious Orders Study, N=1317
Vital status (Blue: 701 alive; Red: 616 dead)

Enrolled 1994-97: 583
Age 80+           : 201
Died              : 196
Alive             :     5
Autopsy         : 187

• 97.5 % of older early enrollers have died;
• 95.4% of deaths have autopsy data
ROS Early Enrolling Elders by epoch of death

- 1994-1998, n=65
- 1999-2002, n=67
- 2003-2015, n=67

Age at Death vs Age at Baseline
Global Cognition at Last visit

Global Cognition by group

Year of Death

Global Cognition at Last visit versus age

Global Cognition

Global Cognitive Composite

Age at death
Global Cognition at Last visit versus age

Global Cognition
Global Cognition at Last visit versus age
AD pathological burden (counts of dp, np, nft)
AD pathological burden (counts of dp, np, nft)
AD pathological burden (counts of dp, np, nft)
Did the data confess?

<table>
<thead>
<tr>
<th>Variable</th>
<th>Est (n=197)</th>
<th>p</th>
<th>Est (N=65)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age @ death</td>
<td>-0.04</td>
<td>0.006</td>
<td>-0.06</td>
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<tr>
<td>Sex</td>
<td>-ns-</td>
<td></td>
<td>-ns-</td>
<td></td>
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<tr>
<td>Educ</td>
<td>-ns-</td>
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<td>-ns-</td>
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<tr>
<td>anyE4</td>
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<td>0.03</td>
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<td>amylsqrt</td>
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<td>0.059</td>
<td>+0.10</td>
<td>0.53</td>
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<tr>
<td>Tangles</td>
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<td>$2 \times 10^{-5}$</td>
<td>-0.073</td>
<td>$6 \times 10^{-5}$</td>
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<tr>
<td>$R^2$ (adj)</td>
<td>0.26</td>
<td></td>
<td>0.33</td>
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</tbody>
</table>
Conclusions

• Gain in power as number of deaths increased (N, range of values)
• Gain in richness of hypotheses that can be addressed
• As time passed, the age at death shifted left and the overall burden of pathology tended to increase
• No important changes in associations between neuropathology and cognition
• Fears not substantiated--- Though there is no guarantee of protection...
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