Does greater subjective survival affect future health behaviour patterns of older English adults: analysis of ELSA?

Carol Jagger, Jean Adams, Elaine Stamp, Daniel Nettle, Eugene MG Milne
Unhealthy behaviours are costly

• Unhealthy behaviours are key determinants of morbidity and mortality
• Smoking, not engaging in regular physical activity, excess alcohol consumption, alcohol and unhealthy diet infers 3.5 times higher risk of death over a 20-year period
• Costs to the UK health care system of these behaviours estimated to be £13.3bn per annum
• Worldwide, elimination of these 4 unhealthy behaviours could prevent
  – up to 80% of cardiovascular disease and type 2 diabetes
  – one third of cancers (WHO 2008-2013 Action Plan)
Unhealthy behaviours remain common

• 1/5 adults are current smokers
• 1/3 consume more than recommended levels of alcohol
• 2/3 do not meet physical activity recommendations
• 3/4 consume less than the recommended five 80g portions of fruit and vegetables per day

• WHY???????????
Rationale

• Previous work in this cohort (JECH 2014;68:818-825) showed subjective survival correlated well with actual survival BUT
  – Only in those 65 years of age and younger
  – Only higher income group

• Subjective survival could be assumed to be a measure of an individual’s assessment of their health risks

• Individuals may decide rationally not to engage in healthy behaviours, based on their assessment of the benefits
  – they weigh up the likely benefits of any particular health promoting behaviour against their assessment of the health risks they are exposed to
Aims

• To assess whether greater subjective survival:
  – is associated with healthier behaviours
  – increases the probability of improved health behaviours
  – decreases the probability of worsening health behaviours
Methods

• Data:
  – English Longitudinal Survey of Ageing (ELSA)
  – wave 1 (2002-03) and wave 5 (2010-11)
  – N=6242

• Subjective survival
  – “What are the chances [from 0-100] that you will live to be x years or more?”.
  – Target age, x, varied with participants’ age, ranging from 1-25 years older than current age
  – Due to response spikes at 25%, 50%, and 75%, responses were grouped into tertiles for analysis: low (0-33% chance of survival), medium (33-66%), high (66-100%).
Measures

• Health behaviours (self-reported):
  – cigarette smoking (no/yes)
  – physical activity level (moderate or high/low or sedentary)
  – alcohol consumption (<1-2 times per week/more)

• Covariates:
  – Demographic (sex, age group, marital status)
  – Health (IADL/ADL disability, self-rated health, depression)
  – Socio-economic status (income)
Analysis

• Cross-sectional (wave 1):
  – Ordinal logistic regression models of each health behaviour (outcome) by anticipated survival
  – Unadjusted
  – Adjusted for: sex, age group, marital status, IADL/ADL disability, self-rated health, depression, income

• Longitudinal (waves 1 and 5):
  – Multinomial logistic regression of change in healthy behaviour between waves 1 and 5 (outcome) by anticipated survival
  – Unadjusted
  – Adjusted for baseline health behaviour
  – Additionally adjusted for: sex, age group, marital status, IADL/ADL disability, self-rated health, depression, income
# Baseline health behaviour by subjective survival

<table>
<thead>
<tr>
<th>Baseline variable</th>
<th>Level</th>
<th>All participants, N (%)</th>
<th>Health behaviours at wave 1 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Non-smoker</td>
</tr>
<tr>
<td>All participants</td>
<td>--</td>
<td>6128</td>
<td>5121 (83.6)</td>
</tr>
<tr>
<td>Anticipated survival</td>
<td>Low</td>
<td>761 (12.6)</td>
<td>613 (80.6)</td>
</tr>
<tr>
<td>(N=6051)</td>
<td>Moderate</td>
<td>3101 (51.3)</td>
<td>2555 (82.4)</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>2189 (36.2)</td>
<td>1889 (86.3)</td>
</tr>
</tbody>
</table>
Baseline health behaviour by socio-demographic and health variables

- Women
  - more likely to be ‘healthy’ consumers of alcohol
  - less likely to have ‘healthy’ physical activity levels
- Older individuals
  - more likely to be non-smoking
  - more likely to have ‘healthy’ alcohol consumption
  - Less likely to have ‘healthy’ physical activity levels
- Individuals with better health (self-rated health, limitations with ADL and IADL, clinical depression) and greater affluence
  - less likely to smoke
  - more likely to have ‘healthy’ physical activity levels,
  - less likely to be ‘healthy’ consumers of alcohol
Baseline health behaviour and subjective survival

*Hypothesis that greater anticipated survival is cross-sectionally associated with healthier behaviours*

- confirmed, in fully adjusted analyses, for smoking and physical activity
- no relationship seen for alcohol consumption

*adjusted for sex, age group, marital status, ADL, IADL, CES-D Depression Scale, income*
## Baseline subjective survival and change in health behaviour

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Anticipated survival</th>
<th>Adjusted for baseline behaviour*</th>
<th>Fully adjusted**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>RRR (95% CI)</td>
<td>RRR (95% CI)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Change to less healthy versus no</td>
<td>Change to more</td>
</tr>
<tr>
<td></td>
<td></td>
<td>change</td>
<td>healthy versus no</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>change</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cigarette smoking</td>
<td>Low</td>
<td><strong>2.05 (1.08-3.90)</strong></td>
<td><strong>2.42 (1.22-4.81</strong></td>
</tr>
<tr>
<td>(n=5998)</td>
<td>Moderate</td>
<td>-</td>
<td>0.89 (0.58-1.35)</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>1.07 (0.62-1.85)</td>
<td>1.14 (0.85-1.53)</td>
</tr>
<tr>
<td>Physical activity</td>
<td>Low</td>
<td>1.92 (1.59-2.32)</td>
<td><strong>0.67 (0.51-0.90</strong></td>
</tr>
<tr>
<td>(n=5978)</td>
<td>Moderate</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0.85 (0.74-0.97)</td>
<td>1.14 (0.96-1.35)</td>
</tr>
<tr>
<td>Alcohol consumption</td>
<td>Low</td>
<td>1.08 (0.83-1.41)</td>
<td>1.24 (0.98-1.58)</td>
</tr>
<tr>
<td>(n=5229)</td>
<td>Moderate</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>1.17 (0.99-1.37)</td>
<td>1.07 (0.92-1.24)</td>
</tr>
</tbody>
</table>

*adjusted for relevant health behaviour at wave1

**adjusted for sex, age group, marital status, ADL, IADL, CES-D Depression Scale, income
Strengths

• Data from a large, population-based cohort study - increases representativeness and generalisability of findings

• Cross-sectional and longitudinal analyses with a wide range of potential confounding variables
Limitations

• Some behaviour changes rare (particularly for smoking) - small numbers especially older ages

• Health behaviours self-reported
  – bias likely to be consistent over time
  – longitudinal analyses less susceptible to misclassification

• Variable target age for anticipated survival may mean like may not have been compared with like across participants.
  – Analyses repeated additionally controlling for the difference between target age and age at data collection but no change in conclusions

• Anticipated survival may not be good measure of perceived uncontrollable threats to health
  – But it does correlate well with actual survival in this cohort
Conclusions 1

Aims

• To assess whether greater subjective survival is associated with healthier behaviours
  – Greater anticipated survival was cross-sectionally associated with lower likelihood of smoking and higher physical activity levels, even after adjustment for confounders
  – No relationship with alcohol consumption though suggestion that greater anticipated survival associated with HIGHER alcohol consumption
Conclusions 2

• To assess whether greater subjective survival increases the probability of improved health behaviours and/or decreases the probability of worsening health behaviours
  – Individuals with low anticipated survival were more likely to take up a less healthy behaviour with regards to smoking and physical activity

• Individual assessments of uncontrollable threats to health (low survival probability) may be important determinants of change in some health behaviours, particularly smoking and physical activity
Acknowledgements

• British Medical Association Strutt and Harper Award
• AXA Research Fund
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### Inequalities UK local areas 2006-2011

<table>
<thead>
<tr>
<th></th>
<th>LE at birth</th>
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<th>DFLE at birth</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Men</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>77.7</td>
<td>78.7</td>
<td>62.8</td>
<td>63.2</td>
</tr>
<tr>
<td>0.10</td>
<td>75.3</td>
<td>76.5</td>
<td>58.2</td>
<td>58.6</td>
</tr>
<tr>
<td>0.90</td>
<td>79.7</td>
<td>80.7</td>
<td>66.9</td>
<td>67.6</td>
</tr>
<tr>
<td>10-90% range</td>
<td>4.4</td>
<td>4.2</td>
<td>8.8</td>
<td>9.0</td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>81.8</td>
<td>82.7</td>
<td>63.9</td>
<td>63.8</td>
</tr>
<tr>
<td>0.10</td>
<td>79.8</td>
<td>80.9</td>
<td>59.2</td>
<td>59.2</td>
</tr>
<tr>
<td>0.90</td>
<td>83.6</td>
<td>84.4</td>
<td>68.2</td>
<td>68.2</td>
</tr>
<tr>
<td>10-90% range</td>
<td>3.8</td>
<td>3.5</td>
<td>9.0</td>
<td>9.0</td>
</tr>
</tbody>
</table>

- Inequalities in LE and DFLE in the UK are large
- Differences in SES and health behaviours explain some of the variation
### Baseline health behaviour and subjective survival

<table>
<thead>
<tr>
<th>Anticipated survival</th>
<th>Cigarette smoking OR (95% CI)</th>
<th>Alcohol consumption OR (95% CI)</th>
<th>Physical activity OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unadjusted</td>
<td>Adjusted*</td>
<td>Unadjusted</td>
</tr>
<tr>
<td>Low</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Moderate</td>
<td>1.13</td>
<td><strong>1.45</strong></td>
<td>0.83</td>
</tr>
<tr>
<td></td>
<td>(0.92-1.38)</td>
<td>(1.15-1.83)</td>
<td>(0.68-1.02)</td>
</tr>
<tr>
<td>High</td>
<td>1.53</td>
<td><strong>1.94</strong></td>
<td>0.76</td>
</tr>
<tr>
<td></td>
<td>(1.23-1.90)</td>
<td>(1.50-2.50)</td>
<td>(0.62-0.94)</td>
</tr>
</tbody>
</table>

* Adjusted for age, sex, marital status, self-rated health, ADL/IADL, CES-D (Centre for Epidemiologic Studies Depression Scale), Index of Multiple Deprivation

- Hypothesis that greater anticipated survival is cross-sectionally associated with healthier behaviours
  - only confirmed, in fully adjusted analyses, for smoking
  - no relationship seen for alcohol consumption or physical activity.