Assessing excess health service utilisation and direct medical costs following an index injury using linked, anonymised, datasets

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Aim of study

To estimate the extent of excess HSU and excess direct medical costs following the occurrence of an index injury, by utilising large scale anonymised datasets, linked via unique patient level identifiers.
Materials & methods

Design  – Longitudinal; Retrospective; Quantitative

Setting  – Swansea (population = 196,113 individuals)

Sample size – 30,387 injured individuals

Data sources  – Administrative register
  – ED, Inpatient, Outpatient records
  – Trust Financial Returns

{ ALF_E }
**Timelines**

Scenario 1: follow-up continues until end of investigative period

01/04/2004 01/04/2005 * 31/03/2007

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Scenario 2: follow-up ends due to death or new injury

01/04/2004 01/04/2005 * * 31/03/2007
‘Same injury’ or ‘New injury’?

- Individuals with multiple injury related healthcare events identified
- 1st and 2nd occurring events assigned to injury grouping
- No. of individuals with 2nd healthcare event starting within 1 day of 1st event counted
- % of above individuals with 1st and 2nd events part of same injury grouping calculated
- Process repeated incrementing interval between 1st and 2nd healthcare event 1 day at a time
- New injury defined when % < 50
‘Same injury’ or ‘New injury’?

Assume index injury is skull-brain injury and that after 100 days subsequent injury event more often than not isn’t skull-brain injury

- **Same injury** – If subsequent injury event occurs at point Y AND subsequent injury event is skull-brain injury
- **Different injury** – If subsequent injury event occurs at point Y AND subsequent injury event isn’t skull brain injury
  - If subsequent injury event occurs at point Z
Outcome measures

Excess HSU

Excess Direct Medical Costs

*Excess = Observed - Expected*
Observed = Number, length & medical costs of healthcare events during follow-up period (exc. Index injury event)

Expected = Number, length & medical costs of healthcare events during pre-follow-up period (exc. Index injury event)

$\times$

Length of follow-up relative to length of pre-follow-up

$\times$

Age & Dataset multipliers
Wakey Wakey!!!!!!!!!!!!!!!
On average per index injury:
- Excess ED count = 0.12 (0.11, 0.13)
- Excess Inpatient admission count = 0.07 (0.06, 0.08)
- Excess Inpatient LOS count = 1 (0.78, 1.23)
- Excess Outpatient count = 0.55 (0.52, 0.58)
Results – Direct medical costs (DMC)

On average per index injury:
- Excess ED DMC = £12 (11, 13)
- Excess Inpatient DMC = £492 (416, 569)
- Excess Outpatient DMC = £73 (68, 78)
- Excess Combined DMC = £578 (500, 655)
### ED summary

<table>
<thead>
<tr>
<th></th>
<th>HSU</th>
<th>Direct Medical Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.12</td>
<td>£12</td>
</tr>
<tr>
<td>Female</td>
<td>0.12</td>
<td>£12</td>
</tr>
<tr>
<td>Aged under 50</td>
<td>0.12</td>
<td>£12</td>
</tr>
<tr>
<td>Aged 50 or above</td>
<td>0.13</td>
<td>£13</td>
</tr>
<tr>
<td>Skull-brain injury</td>
<td>0.28</td>
<td>£28</td>
</tr>
<tr>
<td>Burns</td>
<td>0.03</td>
<td>£3</td>
</tr>
</tbody>
</table>
# Inpatient summary

<table>
<thead>
<tr>
<th></th>
<th>HSU admissions</th>
<th>HSU LOS</th>
<th>Direct Medical Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.06</td>
<td>0.60</td>
<td>£263</td>
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<tr>
<td>Female</td>
<td>0.08</td>
<td>1.49</td>
<td>£770</td>
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<tr>
<td>Aged under 50</td>
<td>0.04</td>
<td>0.28</td>
<td>£113</td>
</tr>
<tr>
<td>Aged 50 or above</td>
<td>0.19</td>
<td>3.74</td>
<td>£1,929</td>
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<tr>
<td>Hip fracture</td>
<td>0.31</td>
<td>13.10</td>
<td>£10,137</td>
</tr>
<tr>
<td>Upper extremity, other</td>
<td>0.04</td>
<td>0.05</td>
<td>£31</td>
</tr>
</tbody>
</table>
# Outpatient summary

<table>
<thead>
<tr>
<th></th>
<th>HSU</th>
<th>Direct Medical Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.54</td>
<td>£71</td>
</tr>
<tr>
<td>Female</td>
<td>0.56</td>
<td>£77</td>
</tr>
<tr>
<td>Aged under 50</td>
<td>0.45</td>
<td>£60</td>
</tr>
<tr>
<td>Aged 50 or above</td>
<td>0.92</td>
<td>£123</td>
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<tr>
<td>Burns</td>
<td>3.84</td>
<td>£548</td>
</tr>
<tr>
<td>Spine, vertebrae</td>
<td>-0.01</td>
<td>£-1</td>
</tr>
</tbody>
</table>
Overall Direct Medical Costs (DMC)

- Excluding index injury healthcare event
  - mean DMC per index injury = £578
  - overall DMC across all index injuries = £17,563,686

- Including index injury healthcare event
  - mean DMC per index injury = £948
  - overall DMC across all index injuries = £28,806,876
and the winner is ..........
Thanks……..

……..to my supervisors
- Professor Ronan Lyons
- Professor Ceri Phillips

…….to Dr Sinead Brophy for providing statistical advice

……..to you all for listening

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