The use of linked registries to assess long-term mortality of ICU patients

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Mortality is an important quality indicator

- Case-mix adjusted in-hospital mortality

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Mean Age</th>
<th>Co-morbidity</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>50</td>
<td>80%</td>
<td>35%</td>
</tr>
<tr>
<td>2.</td>
<td>30</td>
<td>50%</td>
<td>15%</td>
</tr>
<tr>
<td>3.</td>
<td>40</td>
<td>30%</td>
<td>20%</td>
</tr>
</tbody>
</table>
Introduction (2)

In-hospital mortality
- Clinical database

Long-term mortality
- Administrative database
- True goal of ICU care
Data (1)

- **NICE**
  - Clinical data
    - January, 1st 2007
    - October, 1st 2010
  - 207,988

- **Insurance claims**
  - Administrative data
    - January, 1st 2007
    - January, 1st 2011

Vital status at January, 1st 2011
Deterministic linkage

- **NICE registry**
  - Hospital of admission
  - Gender
  - Date of birth

- **Insurance claims database**
  - ICU admission date
  - ICU discharge date
  - Declared ICU days/declared hospital period
Long-term mortality

3, 6, and 12 months after ICU admission

Patients groups
- Elective surgery
- Urgent surgery
- Medical/non-surgical

Cox regression analyses → Hazard ratio
71.6% of the patients could be linked

<table>
<thead>
<tr>
<th></th>
<th>Number of linked patients</th>
</tr>
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<tbody>
<tr>
<td>Total</td>
<td>148,862</td>
</tr>
<tr>
<td>Elective surgery</td>
<td>59,294</td>
</tr>
<tr>
<td>Urgent surgery</td>
<td>23,242</td>
</tr>
<tr>
<td>Medical</td>
<td>66,326</td>
</tr>
</tbody>
</table>
## Results (2)

<table>
<thead>
<tr>
<th>Time after ICU admission</th>
<th>3 months</th>
<th>6 months</th>
<th>12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality %</td>
<td>20.3</td>
<td>22.9</td>
<td>26.6</td>
</tr>
</tbody>
</table>

![Adjusted Hazard Ratios Chart](chart.png)

- **Medical**: Adjusted Hazard Ratio (1.6)
- **Urgent surgery**: Adjusted Hazard Ratio (1.1)
- **Elective surgery**: Adjusted Hazard Ratio (0.6)
Discussion

- Deterministic linkage

- 28.4% non-linked records → mainly cardiac surgery patients with low mortality risk
Future research

- Improve linkage
  - Analysis of non-linked patients
  - Probabilistic linkage
  - Social security code
Conclusion

- Linkage
  - Source to obtain long-term mortality of hospitalized patients
  - Mortality in the first months after ICU admission is substantial