The Nottingham Hip Fracture Score: What, why and how?

Kent, Surrey Sussex AHSN
Conflicts of Interest

- I am intimately involved in the development and continuing validation of the NHFS
- I have research funding from NIHR, BJA, AAGBI for hip fracture related research
  - I get no personal remuneration for either
- I am on the editorial board of the BJA
- I am on the research council of the NIAA
Conflicts of Interest

- I get no personal remuneration for any of these, but they do keep me in gainful employment!
Session Plan 14:30 – 15:00

Old codger at the front...
• What is NHFS?
• How was it developed?
• Is it valid?
• Are there alternatives?
• What’s the point?
Session Plan 15:00 – 15:30

Young folk on the floor...
- How might NHFS be used within KSS?
- How might NHFS be used within your hospital?
  - Communication
  - Planning of care
  - Audit
What is the Nottingham Hip Fracture Score?

- A weighted scoring system to predict outcome following hip fracture
- Admission variables
- Nasty equation to give an estimated risk (30-day)
What is the Nottingham Hip Fracture Score?

A short form frailty score
What is the Nottingham Hip Fracture Score?

<table>
<thead>
<tr>
<th>Factor</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age: 66-85</td>
<td>3</td>
</tr>
<tr>
<td>Age &gt;85</td>
<td>4</td>
</tr>
<tr>
<td>Sex: Male</td>
<td>1</td>
</tr>
<tr>
<td>AMTS: &lt;7</td>
<td>1</td>
</tr>
<tr>
<td>Admission Hb: &lt;100 g/L</td>
<td>1</td>
</tr>
<tr>
<td>Residence: Living in institution</td>
<td>1</td>
</tr>
<tr>
<td>Co-morbidities: &gt;=2</td>
<td>1</td>
</tr>
<tr>
<td>Malignancy: &lt;20 years, (not SCC / BCC)</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>Max 10</td>
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\[
p = \frac{100}{1 + e^{(4.718 \ (NHFS/2))}}
\]

2012
\[
p = \frac{100}{1 + e^{(5.012 \ (NHFS*0.481))}}
\]

2015
\[
p = \frac{100}{1 + e^{(5.569 \ (NHFS*0.508))}}
\]
2008  \[ p = \frac{100}{1 + e^{4.718 (NHFS/2)}} \]

2012  \[ p = \frac{100}{1 + e^{5.012 (NHFS*0.481)}} \]

2015  \[ p = \frac{100}{1 + e^{5.569 (NHFS*0.508)}} \]
How was NHFS developed?

- Nottingham Hip Fracture Database
  - Can we predict outcomes?
  - Likely suspects
  - Development and validation sets (50:50)
  - Routine regression analysis
  - Rounded coefficients
What is the Nottingham Hip Fracture Score?

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How was NHFS developed?

- Not in...
  - Independence of ADLs
  - Urea
  - Cardiovascular, cerebrovascular and renal alone

- Not looked at...
  - Acute illness
Validation

• Initial validation ok...
  – ROC – 0.72
  – Calibration – Hosmer-Lemeshow – p = 0.7

• But...
  – Soon recognised to over-estimate mortality
More validation

- One year mortality...

![Graph showing cumulative survival over days for all patients versus 30-day survivors, with high and low risk categories distinguished.](image-url)
More validation

- Discharge home...

![Graph showing correlation between Nottingham Hip Fracture Score and probability of discharge home. The graph indicates a strong negative correlation with an R² value of 0.9486.]
More validation

• Multi-centre...

**Nottingham Hip Fracture Score: longitudinal and multi-centre assessment**

I. K. Moppett\(^1\)*, M. Parker\(^3\), R. Griffiths\(^4\), T. Bowers\(^3\), S. M. White\(^5\) and C. G. Moran\(^2\)

• International...

**Predicting 30-day mortality following hip fracture surgery: Evaluation of six risk prediction models**

Julian Karres\(^*\), Nicole A. Heesakkers, Jan M. Ultee, Bart C. Vrouwenraets
What the NHFS isn’t…

- Perfect
- Set in stone
- Sensitive to acute illness
- A replacement for patient-centred care by educated, supported, caring teams
Why bother?

- Communication
  - Patient
  - Family
  - Colleagues
- Risk management
- Discharge planning
- Benchmarking
  - Internal
  - External
Predicting outcome after hip fracture: using a frailty index to integrate comprehensive geriatric assessment results

Manju Krishnan, Sue Beck, Will Havelock, Eamonn Eeles, Ruth E. Hubbard, Antony Johansen
What is the Nottingham Hip Fracture Score?

A short form frailty score
Variable life-adjusted display – blue; Weighted average - grey
Summary

- NHFS is
  - A validated risk score
  - A frailty scale
  - A tool to enhance communication
- NHFS isn’t perfect
Your turn...

- How might NHFS be used within KSS?
- How might NHFS be used within your hospital?
  - Communication
  - Planning of care
  - Audit