International variations in rates of selected surgical procedures across OECD countries

Klim McPherson and Giorgia Gon

October 3, 2011
A follow up from 2008…

International variations in rates of a range of medical and surgical procedures
Data period 2004

Report for the Foundation of Informed Medical Decision Making

Maggie Scott, Klim McPherson, Ian McKenzie, Jonathan Meakins and Jeremy Fairbank
Reasons for

- National health systems face an increasing pressure to prove their efficiency and cost-effectiveness.
- Similarly to intra-national variations, international variations for several discretionary surgical procedures seem to be driven by factors other than population structure or clinical need.
- Recognised the importance of detecting such variation to inform health policy.
Methods

- Procedures of interest: caesarean sections, hysterectomy, prostatectomy, hip replacement, and appendectomy

Analysis

- For all OECD countries for which data were available
  - Crude rates between 1990 and 2010
    - Source: the OECD Health Dataset
- For Australia, England, Northern Ireland, Scotland, Wales, Germany, Italy, New Zealand, Portugal, Spain, Ireland, Norway, Sweden, Denmark, Iceland and Finland. The number of countries considered is going to increase: Slovenia, Switzerland, (France, Canada, US?)
  - Age and sex specific rates for 2008
    - Source: individual countries databases
  - Age standardised rates for 2008
    - Source: individual countries databases
Explaining variations

- Patterns of Illness
- Health System Structure
- (Stochastic effect)
- Demand and Individual preferences
- Incentive System
- Supply
- Culture

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<table>
<thead>
<tr>
<th>Country</th>
<th>Crude rates per 100 000 population 1990-2010</th>
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Caesarean per 1000 live births

Hysterectomy (vagina only)

Hip Replacement

Appendectomy
Age-specific rates per 100 000 population
Data period around 2008
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International variations in rates of selected surgical procedures across OECD countries
Age standardised rates per 100 000 population
Data period around 2008
Standardised rates of Caesarean

Approx: 2.4

Standardised rates of Hysterectomy

Approx: 3.3
Standardised rates of Transurethral and Open Prostatectomy

Approx: 4.6

Approx: 12.7

Can I see Quebec 2004/05, Denmark, England, Finland, France, Germany, Iceland, Ireland, Italy, New Zealand, Northern Ireland, Norway, Portugal, Scotland, Spain, Sweden, Switzerland, United States-2004, Wales.
Log ratio of Transurethral to Open Prostatectomy arithmetically labelled

- 0.3
- 0.2
- 0.1
- 0
- 0.1
- 0.2
- 0.3
- 0.4
- 0.5
- 0.6
- 0.7
- 0.8
- 0.9
- 1

Australia: 10 times
Canada (ex Quebec) 2004/05: 30 times
Denmark: 3 times
England: 10 times
Finland: 3 times
France: 10 times
Germany: 30 times
Iceland: 10 times
Ireland: 10 times
Italy: 3 times
New Zealand: 3 times
Northern Ireland: 3 times
Norway: 10 times
Portugal: 10 times
Scotland: 3 times
Spain: 10 times
Sweden: 10 times
Switzerland: 3 times
United States 2004: 10 times
Wales: 10 times

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Standardised rates of Hip replacement

Approx: 3.3

Approx: 3.2

Standardised rates of Appendectomy

Approx: 2.8

Approx: 2.1

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Standardised rates of Hysterectomy: comparison with previous research (rates for 1989 are not standardised)
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Cumulative risk of Hysterectomy

- Italy
- New Zealand
- Wales
- Scotland
- Northern Ireland
- England
- Spain
- Australia
- United States NHDS 2004
- Canada 2004
- Ireland
- Portugal
- Norway
- Sweden
- Iceland
- Finland
- Denmark
- Norway
- Switzerland
- France

%
Extent of the variations between procedures
Variation between countries
Log (standardised rates per 100,000 men)
Males

Greatest standard deviation

Least standard deviation

Non-transurethral (open) prostatectomy
Transurethral prostatectomy
Prostatectomy (All)
Hip replacement
Appendicectomy

Australia
Canada (exc Quebec) 2004/05
Denmark
England
Finland
Germany
Iceland
Ireland
Italy
New Zealand
Northern Ireland
Norway
Portugal
Scotland
Spain
Sweden
Switzerland
United States 2004
Wales

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Variation between countries
Log (standardised rates per 100,000 women)
Females

Greatest standard deviation

Least standard deviation

Australia
Canada (exc Quebec) 2004/05
Denmark
England
Finland
Germany
Iceland
Ireland
Italy
New Zealand
Northern Ireland
Norway
Portugal
Scotland
Spain
Sweden
Switzerland
United States 2004
Wales

Hysterectomy
Hip replacement
Caesarean Section
Appendicectomy

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Limitations

- Differences between health systems affect
  - The extent to which data can be gathered
  - Quality and comparability of the data
- A full understanding of the reasons for, and consequences of different utilisation rates demands a detailed understanding of the following factors that affect comparability: clinical reasons, stochastic effect, artefacts, culture (preferences), supply, health system structure, payment structure
Conclusions

- The preliminary findings support evidence from previous work on the topic.
- There are substantial international variations in these rates but there are also striking similarities between countries.
- Using these data alone, there is no way of knowing which rate is the “right” one, nor understand its causes.
- Data accuracy remains a possible limitation.
- Variations across countries and time are “loud”. It seems that elective procedures are most affected by the incentive system, individual preference as well as the health system structure; whilst, those less elective: by culture and supply.
- These findings aim to encourage further enquiry and understanding.
- Hypothesis should be investigated with e.g. multilevel modelling.
Thank you

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