Big Data
Prof Iain Moppett, Deputy Director HSRC, University of Nottingham
Artificial intelligence can be weapon in cancer fight, PM to say
‘We tend to overestimate the effect of a technology in the short run and underestimate the effect in the long run’

Roy Amara
Artificial intelligence can be weapon in cancer fight, PM to say
What is Big Data?

- Volume
- Variety & Variability
- Velocity
- Veracity
- Value
1.3 – 6.8 million surgical procedures annually

Most RCTs in 100s – 1000s

Variety & Variability

• Up to 20 ICD-10 codes / admission
  – Infinite granularity
  – Some non-existent (AAGA)

• Socioeconomic surrogates
  – Non-traditional data

• Perioperative data?
60 minutes public transport to QMC
The postcode lottery

• Life expectancy at 65
  – Rushcliffe
    • Men: 19.6
    • Women: 22.5
  – Nottingham
    • Men: 17.1
    • Women: 20.5
A postcode lottery?
NHS will be transformed digitally within 5 years

Prof Stephen Powis, Anaesthesia2018
Shared records

- Electronic regional records to cover every person in England within four years
- Industry can use anonymised patient data for research
- No plans to expand national patient data collection

Source: Health Services Journal 23 May 2018
Value
Using data

• **Data Mining:**
  
  – Discovery of **patterns of data**.
  
  – Extraction of **implicit** previously unknown and **potentially useful information** from data.
  
  – The goal of data mining is to **extract knowledge** from dataset in **human understandable structures**.
The Great Scone map of the United Kingdom and Ireland

(map by bezzleford)
$R^2 = 0.7$

Data sourced from: http://tylervigen.com/view_correlation?id=1279
But WHY?

• Understand
• Plan
• Intervene
Weekend effect

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Velocity?

• Data already existed

• **Before** previously published studies performed
## Veracity?

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Quality data?

• NAPs & SNAPs
  – Quality ++
  – Slow

• Administrative data
  – Quality improving
  – Hard to get
Quality data?

• Outcomes that matter
  – Quality **and** quantity
    • Patients
    • Healthcare professionals
    • Society
    • Tax payer
Limits

• Data sources
• Privacy vs. population benefit
• Reproducibility / reliability
• Local context
The big limit

• The human touch
Big Data and Healthcare

• It’s coming

• Velocity and veracity concerns

• Big opportunities for perioperative care