The Data Revolution.

An opportunity and imperative to define a new Culture of Data Collection in Orthopaedics

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Hon. Treasurer
Data, data everywhere!

**Thesis:**
The transparency agenda is to be supported.
The profession must collaborate to organise, collect and interpret quality outcome data
We need a change in culture for data collection
Data, data everywhere!

Issues:
Access and Interrogation
Validity
Context and Interpretation
Ownership (Mandate)
Example of issues: Use of “NJR data”

It appears that more THR patients died but a 'disproportionate' number of deaths occur in THRs when compared to Hip Resurfacing!

Thoughts?

Marketing Director Advanced Bearing Systems

Smith & Nephew Orthopaedics
1 Kingmaker Court
Warwick Technology Park
Gallows Hill
Warwick
CV34 6WG
+44 1926 482400

Survivorship with Death due to any reason after operation as end-point

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Total number</th>
<th>Number deceased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resurfacing</td>
<td>13853</td>
<td>249</td>
</tr>
<tr>
<td>Large Diameter MOM THA</td>
<td>8882</td>
<td>489</td>
</tr>
<tr>
<td>Hybrid THA</td>
<td>31662</td>
<td>2691</td>
</tr>
<tr>
<td>Uncemented THA</td>
<td>62937</td>
<td>4720</td>
</tr>
<tr>
<td>Cemented THA</td>
<td>99359</td>
<td>12420</td>
</tr>
</tbody>
</table>

98.2% Resurfacing
94.5% MoM THA
92.5% Cementless THA
91.5% Hybrid THA
87.5% Cemented THA
**cum hoc ergo propter hoc**

"with this, therefore because of this"

The fallacy that correlation proves causation:

- A fallacy in which it is assumed that because two things or events occur together, one must be the cause of the other

**e.g. Cement causes avoidable deaths**

Reducing unwarranted variation to increase value and improve quality

WESTMINSTER, EVERY TWO TUBE STOPS REPRESENT OVER ONE YEAR OF LIFE-EXPECTANCY LOST (DATA REVISED TO 2004–2008)³

Male life expectancy
78.5 (CI 75.5–81.6)

Male life expectancy
73.6 (CI 71.9–75.2)
• **There is** a correlation between proximity to a tube station and life expectancy

• Is it safer to travel by taxi to a tube station further west?
Mortality rate per 1000 population for 5 year age groups from UK Office of National Statistics

Mean age by fixation

- Cemented: 72.7
- Hybrid: 68.9
- Uncemented: 65.4
- Resurfacing: 54.9
Predictive Accuracy for All Data Collected By The NJR

- Age: p<0.001
- ASA grade: p<0.001
- Diagnosis: p<0.001
- Gender: p<0.001
- Provider type: p<0.001
- Hip type: P<0.001
- Surgeon grade: p<0.001
- Complexity: p<0.001

382 140 cases
Statistical sig. vs. Clinical sig.
Predictive Accuracy for All Data Collected By The NJR

Life Expectancy Factors
- Genetics
- Family History
- Health Deprivation
  - Vascular
  - Infective
  - Traumatic
- Autoimmune
- Metabolic
- Inflammatory
- Neurological
- Neoplastic
- Degenerative
- Environmental
- Idiopathic

Social Deprivation
- Income
- Employment
- Education & Skills
- Housing & Services
- Living environment
- Crime
- Behavioral factors
  - Smoking
  - Alcohol
  - Exercise
  - Attitude to risk
- Random events

All NJR Variables

Unknown Confounding Variables

Hip Replacement Survival Factors
- Age
- ASA grade
- Diagnosis
- Gender
- Provider type
- Hip type
- Surgeon grade
- Complexity

12.54%
80.46%
Example: Use of NJR data

Failed mechanisms:
Access and Interrogation
Validity
Context and Interpretation
Ownership (Mandate)
Patients will be able to see surgeons’ survival rates, says Jeremy Hunt

Patients will be able to compare the survival rates for different surgeons from this summer, the Health Secretary has said.
Patients will get clearer data on surgeons' death rates next year

Patients will be able to compare the death rates of surgeons at every NHS hospital by next year, the national medical director has said, amid criticism that data published so far does not allow the public to make a meaningful choice.

By Laura Donnelly, Health Correspondent
6:06AM BST 02 Jul 2013

Last night, Prof Sir Bruce Keogh, national medical director for NHS England, said changes will be made in future, so that the public could make clear comparisons between doctors.

He said: “The first thing was to get the data out - we had committed to doing this and this is pioneering work. Nowhere else in the world is doing this.”

Prof Sir Bruce said that from next year it will be made mandatory under the NHS Contract for every hospital to publish data listing the mortality rates of their surgeons, adjusted to take account of the risk profiles of the patients being treated.

Prof Keogh said he anticipates that national information will be published at the same time - so that the public can compare the rates of all NHS surgeons, wherever they work - but said an important debate lay ahead.
Data Sources in public domain

- NJR
- HES
- Quality Observatories
- RightCare Atlases of variation
- RCS Quality Dashboards
- National Registries
- PROMS
- Dr. Foster
- Individual Trusts
Welcome from the National Joint Registry of England, Wales and Northern Ireland

Hip, knee, ankle, elbow and shoulder joint replacements are common and highly successful operations that bring many patients relief from pain and improved mobility. Thousands of these joint replacement operations take place in the UK every year.

The National Joint Registry (NJR) was set up by the Department of Health and Welsh Government in 2002 to collect information on all hip, knee, ankle, elbow and shoulder replacement operations and to monitor the performance of joint replacement implants.
Revisions: UK Hospitals

Figure 4.1
Funnel plot of revision rates for hip units.

© National Joint Registry 2012
Quality Dashboards

CCG

NHS Newbury And District CCG
NHS Newcastle North And East CCG
NHS Newcastle West CCG
NHS Newham CCG
NHS North & West Reading CCG
NHS North Derbyshire CCG
NHS North Durham CCG
NHS North East Essex CCG
NHS North East Hampshire And Farnham CCG
NHS North East Lincolnshire CCG
NHS North Hampshire CCG
NHS North Kirklees CCG
NHS North Lincolnshire CCG

Dashboards

NHS North, East, West Devon CCG
Pathways

ENT Nose
ENT Throat
General Surgery Faecal Incontinence
General Surgery Groin Hernia
General Surgery Reflux
Orthognathic Orthognathic Treatment (Facial Deformity)
Orthopaedics Low Back Pain
Orthopaedics Painful Great Toe
Urology Lower Urinary Tract Symptoms
NHS Atlas of Variation in Healthcare Series

The NHS Atlas of Variation series is intended to support local decision making to increase the value which a population receives from the resources spent on their healthcare. It supports the search for unexplained variations, the identification and attention to unwarranted variation, helping clinicians to understand what is going on in their area and where to focus attention to improve the care they provide. The first NHS Atlas of Variation was published in November 2010 and was welcomed by the NHS and other stakeholders, with topics selected by clinicians as being important to their speciality. In December 2011 a second and expanded version of the Atlas, consisting of 71 maps, was published.

- Atlas of Variation 2010
- Atlas of Variation 2011

Themed Atlases..

Following the success of the publication of the first two NHS Atlases of Variation, work is underway to develop a series of themed atlases focusing on specific conditions or populations in more depth. These are to be released during 2012/13.

- Children and Young People
- Diabetes
- Kidney Disease
- Respiratory Disease
- Liver Disease
Map 53: Average patient reported health gain (Oxford Knee Score; OKS) from knee replacement procedures by PCT

2009/10

Domain 2: Enhancing quality of life for people with long-term conditions

- Lowest rate
- Highest rate
- No data

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One of the requirements outlined in High Quality Care for All (published in June 2008) was the necessity for each SHA to establish a formal Quality Observatory, building on existing analytical arrangements, to:

- enable local benchmarking
- development of metrics
- and the identification of opportunities to help frontline staff innovate and improve.
OHS gain by unit

Mean OHS gain

Number of THRs per year

Plot Area
The Power of Registries

• Defines
  – natural history of disease
  – Effect of interventions
  – Patient/surgical factors that define outcome
  – Unit/individual performance

• Drives up quality

• Allows choice
Professor Michael E. Porter, Harvard Business School, USA:

“With its strong tradition of quality registries, Sweden is poised to become the world's most advanced nation in measuring the actual outcomes of care across many diseases. This represents a major opportunity for Sweden to lead a global shift toward a new, value-based approach to health care delivery focused on improving patient health outcomes relative to cost.”
<table>
<thead>
<tr>
<th>National Healthcare Quality Registers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respiratory Diseases</strong></td>
</tr>
<tr>
<td>Swedevox – Respiratory Failure Register</td>
</tr>
<tr>
<td>Swedish Quality Register of Otorhinolaryngology</td>
</tr>
<tr>
<td><strong>Childhood and Adolescence</strong></td>
</tr>
<tr>
<td>BORIS – Childhood Obesity Register in Sweden</td>
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<tr>
<td>SWEDADKIDS – The Swedish Childhood Diabetes Register</td>
</tr>
<tr>
<td>PNQn – Perinatal Quality Register/Neonatology</td>
</tr>
<tr>
<td>SÖK – National Register of Suspected/Confirmed Sexual Abuse in Children and Adolescents</td>
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<tr>
<td><strong>Circulatory Diseases</strong></td>
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<tr>
<td>RiksSvkt – Heart Failure Register</td>
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<tr>
<td>SGCAAR – Swedish Coronary Angiography and Angioplasty Register</td>
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<tr>
<td>Swedish Heart Surgery Register</td>
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<tr>
<td>RIKS-HIA – Register on Cardiac Intensive Care</td>
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<tr>
<td>National Register on Out-of-Hospital Cardiac Arrest</td>
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<tr>
<td>Riks-Stroke – National Quality Register for Stroke</td>
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<tr>
<td>Swedvasc – Vascular Register in Sweden</td>
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<tr>
<td>GUCH – Grown-Up Congenital Heart Disease Register</td>
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<tr>
<td>SEPMA – Register on Secondary Prevention in Cardiac Intensive Care</td>
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<tr>
<td>National Catheter Ablation Register</td>
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<tr>
<td>AuriculA – National Register of Atrial Fibrillation and Anticoagulation</td>
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<tr>
<td><strong>Endocrine Diseases</strong></td>
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<tr>
<td>NDR – National Diabetes Register</td>
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<tr>
<td>Scandinavian Quality Register for Thyroid and Parathyroid Surgery</td>
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<tr>
<td>SOReg – Swedish Obesity Surgery Register</td>
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<tr>
<td><strong>Gastrointestinal Disorders</strong></td>
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<tr>
<td>Swedish Hernia Register</td>
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<tr>
<td>GallRiks – Swedish Quality Register for Gallstone Surgery</td>
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<tr>
<td>Swedish Quality Register for Ventral Hernia</td>
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<tr>
<td><strong>Musculoskeletal Disorders</strong></td>
</tr>
<tr>
<td>RIKSÖFT – National Hip Fracture Register</td>
</tr>
<tr>
<td>Swedish National Hip Arthroplasty Register</td>
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<tr>
<td>Swedish Knee Arthroplasty Register</td>
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<tr>
<td>National Pain Rehabilitation Register</td>
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<tr>
<td>Swedish Rheumatoid Arthritis Register</td>
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<tr>
<td>Followup in Back Surgery</td>
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<tr>
<td>Swedish Shoulder Arthroplasty Register</td>
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<tr>
<td>Swedish Cruciate Ligament Register – X-base</td>
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<tr>
<td>Swedish National Elbow Arthroplasty Register (SAAR)</td>
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<tr>
<td><strong>Diseases of the Nervous System</strong></td>
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<tr>
<td>SMS – Swedish Multiple Sclerosis Register</td>
</tr>
<tr>
<td>CPUP – Quality Register for Children with Cerebral Palsy</td>
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<tr>
<td>WebRehab Sweden – Quality Register in Rehabilitation Medicine</td>
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<tr>
<td>SweDem – Swedish Dementia Register</td>
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<tr>
<td><strong>Genitourinary Disorders</strong></td>
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<td>GYNOP – National Quality Register for Gynecological Surgery</td>
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<td>SRR – Swedish Renal Register</td>
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<tr>
<td><strong>Cancer</strong></td>
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<tr>
<td>National Prostate Cancer Register</td>
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<tr>
<td>National Breast Cancer Register</td>
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<tr>
<td>National Quality Register for Esophageal and Stomach Cancer (NREV)</td>
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<tr>
<td>Swedish Rectal Cancer Register</td>
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<tr>
<td>Swedish Gyn-Oncology Register</td>
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<tr>
<td>Swedish Colon Cancer Register</td>
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<tr>
<td><strong>Eye Disorders</strong></td>
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<tr>
<td>Swedish National Cataract Register</td>
</tr>
<tr>
<td>Swedish Corneal Transplant Register</td>
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<tr>
<td>Macula Register</td>
</tr>
<tr>
<td><strong>Other</strong></td>
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<tr>
<td>RIKSÅT – National Quality Register for Specialized Treatment for Eating Disorders</td>
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<tr>
<td>SIR – Swedish Intensive Care Register</td>
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<tr>
<td>PsorReg – Swedish Psoriasis Register</td>
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<tr>
<td>InfCare HIV</td>
</tr>
<tr>
<td>Swedish Therapeutic Apheresis Register</td>
</tr>
<tr>
<td>SkaPa – Swedish Quality Register in Caries and Periodontitis</td>
</tr>
<tr>
<td>Swedish National register of Palliative care</td>
</tr>
<tr>
<td>Senior Alert – National Register on Nutrition, Fall Prevention and Pressure Sores</td>
</tr>
<tr>
<td>Quality Register for Emergent Care</td>
</tr>
</tbody>
</table>

Source: "National Healthcare Quality Registries in Sweden 2007", Swedish Association of Local Authorities and Regions
8 Swedish Orthopaedic National Healthcare Quality Registers

RIKSHÖFT – National Hip Fracture Register
Swedish National Hip Arthroplasty Register
Swedish Knee Arthroplasty Register
National Pain Rehabilitation Register
Swedish Rheumatoid Arthritis Register
Followup in Back Surgery
Swedish Shoulder Arthroplasty Register
Swedish Cruciate Ligament Register – X-base
A peer in health care system quality

European health care quality
Results index, 18 indicators*

A lower index indicates better outcomes

World's largest per capita producers of medical publications

Publications per year and million inhabitants

Source: "Clinical Research in Finland and Sweden", Academy of Finland and Swedish Research Council, 2009
Expanding UK Orthopaedic Registers

- **National Joint Register (NJR)**
  - Hip arthroplasty
  - Knee arthroplasty
  - Shoulder/elbow arthroplasty
- **National Hip Fracture Database (NHFD)**
- **Trauma Audit and Research Network (TARN)**
- **PROMS 2**
- **Non Arthroplasty Hip Register (NAHR)**
- **British Spine Register (BASS)**
- **Knee ligament Register (BASK)**
- **Paediatric Register (BSCOS)**
- **MyClinicalOutcomes (mCO)**
- **Hand surgery (BSSH Audit Website)**
- **Soft tissue shoulder register**
- **Ankle surgery index**
Issues

• Consent
• Compliance
  – Levers:
    • BPT
    • NICE
    • Involve NCDs
    • Revalidation
• Data issues:
  – Data collection
  – Data cleaning and validating
  – Access to data and reporting of results
  – Managing output including outliers
A vision for the future in UK orthopaedics

- It could become the normal culture that *all* orthopaedic procedures are automatically entered onto a Registry
- There could be collaboration between Registries
- They can be a vehicle for multi-centre RCTs
- The BOA could co-ordinate between Specialist Societies and Registries
Our aim:
To drive up the quality of care for our patients.
Registries facilitate this

Coincidentally:
“The best way to protect the surgeon is to protect the patient”