GETTING IT RIGHT FIRST TIME

Improving the Quality of Orthopaedic Care within the National Health Service in England

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The Problem

The annual budget for musculoskeletal disease is £10 billion. The new health reforms, aimed at commissioning, empower General Practitioners and the National Commissioning Board with £80 billion of health care spending. With a projected NHS savings requirement of £20 billion by 2015, against a background of an ageing population with an increasing requirement for orthopaedic treatment, there must be an attempt to address provision of care which accounts for 80% of the total cost.

The Solution

By appropriate referral with closer working between the primary and secondary sector, getting it right first time, using evidence based treatments and gold standard prostheses, reducing complications, and by coupling this with different modes of working, the quality of care for patients can be significantly improved leading to greater patient satisfaction and outcomes and reduced litigation costs. This will also deliver significant annual savings to the NHS and reduce waiting times.

Foreword

As highlighted by this report, the key lies in working together and understanding professional strengths. As a surgeon, I would not know where to begin in the commissioning of community podiatry. I expect my GP colleagues would find it equally challenging to commission the highly specialised cancer services provided in the organisations that I work in. We need more integrated care, not more division in our health service. We need a health service that harnesses the talents of all its professionals with a focus on integration and quality above all else.

I welcome this report from Professor Timothy W.R. Briggs as it begins to set out some clear recommendations where changes can be made within orthopaedics to improve the pathways to care, patient experience, outcomes and costs. All clinical professionals would benefit from taking time to reflect in this way.

Professor Lord Ara Darzi
Due to the economic downturn, the NHS is faced with having to make savings of up to £20 billion over the next five years. Whilst some can be achieved by efficiencies, the majority can only be achieved by working “smarter” if we are not to affect quality. The pressure on GPs to refer increasing numbers of patients for orthopaedic care will dominate the health agenda. The drivers for this are: the expectancy of an active retirement in an aging, longer living population; the overall increase in BMI; and the advances in new technologies that underpin increasing surgical sub-specialisation.

Already over 25% of surgical interventions within the NHS are for the treatment of musculoskeletal disease and this is set to rise significantly over the next ten years. Currently there are over 8,000 orthopaedic breaches within the NHS per month and of the 391,000 patients on orthopaedic waiting lists at any one time, 50,000 wait for more than 18 weeks and 21,713 for more than six months. In 2010 over 179,000 THRs and TKRs were carried out, an increase of nearly 300% compared to six years ago. Further, over the last five years there has been a 92% rise in revision TKR and 49% rise in revision THR. With 35% of hip and knee replacements now carried out in patients below the age of 65, and 12% below the age of 55, this revision burden, which is expensive, complex, and time consuming in theatre usage, will grow exponentially. This increases the pressure on spending and waiting times.

Complications following orthopaedic surgery are costly to the patient and the NHS. Infection alone in THR and TKR can cost £70,000 per patient to treat, yet varies in incidence between NHS providers. If the lowest infection rates could be achieved throughout the NHS, current annual savings would be £200 – £300 million. This would allow an extra 40,000 – 60,000 joint replacements to be undertaken annually at no extra cost and no requirement for potential rationing by commissioners. Large variations in orthopaedic outcomes for similar procedures exist, with many different types of prostheses being used, many of which have little data on long-term effectiveness.

In the last ten years there has been an explosion of sub-specialisation and treatments offered in orthopaedics, but sometimes with little evidence of clinical efficacy. For example, in shoulder surgery there has been a 746% increase in the number of patients undergoing arthroscopic subacromial decompression in the last ten years with no long-term data on outcomes.

General Practitioners often have little orthopaedic training due to limited exposure at medical school, yet up to 30% of GP appointments are filled by patients seeking help for musculoskeletal disorders. In patients over the age of 75 this increases to more than 50%. Past studies have shown up to 43% of subsequent musculoskeletal referrals are low value. Failure to address these issues will result in the musculoskeletal budget being overwhelmed, longer waiting lists, and rapidly decreasing patient satisfaction.

Guidelines for referral and treatment pathways are essential to contain costs and ensure patients receive the most appropriate and effective treatment, whilst providing value for money for the taxpayer. This massive and increasing workload and disparity in service provision needs to be tackled by a medium-term action plan. Changes must be implemented that will benefit the whole population. We need to have orthopaedic surgeons and GPs working closely together in both the primary and secondary care setting to ensure the best, most cost-effective care for our patients.

Professor T.W.R Briggs  
September 2012  
Head of the training programme; Vice President Elect of The British Orthopaedic Association
The Problem

- At £10 billion, musculoskeletal disease has the third largest budget after mental and cardiac health. Musculoskeletal disorders are the leading cause of disability and time off work for sickness worldwide. With an ageing population (23% of the population will be over 65 by 2035), and increasing life expectancy, as well as other factors such as obesity, there will be an ever increasing demand from patients requesting orthopaedic care.

- The new health reforms will give General Practitioners and the National Commissioning Board responsibility for £80 billion of health care spending. With a projected savings target of £20 billion by 2015, there must be an attempt to address provision of care, which accounts for 80% of the total cost.

- Litigation within the health service is rising. Currently there are potential claims of £15.5 billion. In 2010 payments to patients by the NHS Litigation Authority totalled £863 million. This is unsustainable. Of all claims, 15% are orthopaedic related and account for 9% of the total in monetary value. The total cost of orthopaedic claims has risen by 60% over the last three years compared to a 12% rise in overall NHS litigation claims during the same time period.

- General Practitioners are facing an ever increasing workload in musculoskeletal disorders which accounts for up to 30% of their appointment times. During training they may only have five weeks of specialist orthopaedic teaching, which may be a factor in why there are low value orthopaedic referrals of up to 43%. Evidence shows year-on-year increases in referrals for orthopaedic care, in both outpatients and inpatients. In 2004, 47,000 hip and knee replacements were registered with the National Joint Register; by 2010 this had risen to 179,000.

- In the last ten years there has been an explosion of sub-specialisation in orthopaedics with many more interventional treatments available. For example, in shoulder surgery there has been a 746% increase in arthroscopic subacromial decompression and 544% increase in rotator cuff repair. The long-term results are however less clear and results need to be properly evaluated.

- Primary Care Trusts have developed their own individualised lists of ‘procedures of limited benefit’. The evidence suggests that these are based on the driver to save money rather than the clinical evidence. Inappropriate interpretation of data will result in patients, many of them elderly, being denied access to life-changing surgery.
The Solution

• By developing clinical pathways that begin in primary care, but that involve a seamless transition across the secondary care sector, will ensure best value, high quality outcomes for patients.

• High quality clinical leadership and the focused partnership of the British Orthopaedic Association, its specialist societies, frontline hospital specialists, together with GPs in Commissioning Consortia, is the way forward to provide the population with access to high quality care at the right time whilst ensuring the best use of taxpayers’ money.

• Appropriate nationally developed guidelines for referral and subsequent treatment are essential to contain cost and ensure patients receive the appropriate and effective treatment. A lead GP for musculoskeletal disease in each practice, linked to the local orthopaedic provider, would streamline referrals and ensure patients are seen for treatment by the right specialist at the right place at the right time.

• Instead of orthopaedic departments and clinicians acting alone they will form part of a network of hospitals and treatment centres forming Specialist Orthopaedic Units with an appropriate critical mass, with ring-fenced elective beds, and working to quality assurance standards which will include measures of outcome. This will generate standardised protocols for prostheses and treatment pathways across the NHS benefiting patients, thereby improving outcomes and reducing complications. Protocols will be based on either their own accrued evidence or from the published literature or registries. All providers of orthopaedic care to NHS patients will be required to work to these nationally agreed standards.

• The cost of orthopaedic implants, with the same functional outcome, varies considerably between trusts with significant cost implications for The NHS. By negotiating as a network/specialist orthopaedic unit implant prices will be reduced. Using implants that demonstrate survival rates of at least 90% at ten years should be the “gold standard”. Offering patients more expensive implants with little or no added benefit denies other patients orthopaedic care.

• The development and introduction of new technologies, implants and procedures into the NHS is important for the whole population who can gain significant benefits. Initially, however, early clinical trials should take place in “accredited” Specialist Units with a proven track record of translational research, taking on a leading role in their evaluation. Once appropriate data has been accrued demonstrating the added benefit to patients it can be cascaded down into the wider NHS.

• Specialist services, such as revision hip and knee arthroplasty, should only be done in specialist units with an appropriate critical mass, or as part of a specialist network, all aspects of which should be subject to regular performance review.
“By appropriate referral, getting it right first time, using evidence based treatments, gold standard prostheses, reducing complications, and different modes of working, quality of care for patients can be significantly improved, leading to greater patient satisfaction and outcomes. This will also deliver significant annual savings to the NHS and reduce waiting times.”

Abbreviations

American Society of Anaesthesiologists (ASA)
Body Mass Index (BMI)
British Orthopaedic Association (BOA)
Department of Health (DOH)
EuroQol-5D (EQ-5D)
General Practitioner (GP)
General Practitioners with a Special Interest (GPwSI)
Independent Sector Treatment Centre (ISTC)
Magnetic Resonance Imaging (MRI)
Musculoskeletal Triage Service (MTS)
National Health Service (NHS)
National Institute for Clinical Excellence (NICE)
National Joint Registry (NJR)
Orthopaedic Data Evaluation Panel (ODEP)
Payment by Results (PbR)
Physiotherapist (PT)
Primary Care Trust (PCT)
Patient Outcome Reported Measures (PROMS)
Rotator Cuff Repair (RCR)
Royal National Orthopaedic Hospital (RNOH)
Subacromial Decompression (SAD)
Total Hip Replacement (THR)
Total Knee Replacement (TKR)
United Kingdom (UK)
United States of America (USA)
Introduction

The National Health Service (NHS), faces the problems of an ageing population with increasing needs, and a financial squeeze. In the long-term disease prevention must be at the heart of any strategy. However, in the short to medium-term it is essential for frontline clinicians to provide the best value for every pound spent by “getting it right first time”, thereby reducing the cost to both patients and the NHS. The new health reforms aimed at commissioning, in which General Practitioners (GPs) will be responsible for £60 billion in health spending, is projected to need to achieve £20 billion of savings by 2015. Due to the political discussions about these reforms and the revision of the proposals, up to 10% of these potential savings are now in jeopardy, resulting in possible recruitment freezes, longer waiting lists and more redundancies.

GPs need the correct and validated information on which to base their commissioning decisions. Further, these changes in themselves do not address provision of care, which accounts for 80% of the total cost, see figure 1 [1]. “Getting it right first time”, reducing complications and using “evidenced based

**Figure 1: The distribution of the Department of Health’s resources for 2009-2010**

- Expenditure within NHS bodies £88.5bn
- PCT announced opening allocation £80bn
- Dentistry £2.3bn
- Central strategic health authority allocations £1.3bn
- Training (allocated through strategic health authorities) £4.8bn
- Strategic health authority running costs £0.1bn
- Centrally managed budgets £9.7bn
- NHS Litigation Authority £1.1bn
- Research and development £0.9bn
- Ophthalmology £0.5bn
- Departmental administration £0.2bn
- NHS Next Stage Review £0.1bn
- Technical £0.1bn
- Other central £1.7bn
- European economic area medical costs £0.6bn
- Personal social services funding £1.5bn
- Connecting for health £1.1bn
- Arm’s length bodies £0.7bn
- Substance misuse £0.4bn
- Pharmacy £0.7bn
- Vaccines £0.4bn
- Welfare food £0.1bn
- Contingency £0.7bn

Most orthopaedic funding streams originate from the PCT allocation, with a small amount from centralised funding.
treatments” will improve efficiency and produce the cost savings required, whilst at the same time improving the quality of care provided to patients and keep waiting times down.

The current NHS budget for musculoskeletal disease is £10 billion, the third largest after mental health and cardiac. The pressures on orthopaedic services continue to rise. Orthopaedic Consultant episodes increased by 23% and hospital admissions by 14% from 1998 to 2004 and continue to grow with annual increasing referral rates of 7-8% not unusual. Over the last six years there has been a steady 4% increase in hip replacements and 10% increase in other joint replacements. Currently there are over 8,000 orthopaedic breaches per month within the NHS. Orthopaedic Surgeons must engage and play their part in managing this demand and improving outcomes.

The population of the United Kingdom is ageing, over the last ten years the average age has risen from 38 to 40 as life expectancy has steadily risen [2]. Over the last 25 years the percentage of the population aged 65 and over has increased from 15% to 17% and is predicted to reach 23% by 2035 (graph 1) [2].

Ageing is not a direct cause of osteoarthritis but the ageing processes increases the risk of developing arthritis and musculoskeletal disorders [3]. Although we are seeing a significant increase in joint replacement in the young population, it continues to be the older population that is most reliant on orthopaedic services and driving the increasing workload.

The number of joint replacements registered in the National Joint Registry (NJR) in England and Wales has risen from 47,000 in 2004 to 179,000 in 2010, an increase of 280% [4].

| Table 1: Change between 2004 & 2010 in Orthopaedic Service provision in England & Wales [4] |
| 2004 | 2010 | Percentage Increase |
| Total | 346 | 413 | 19.4% |
| NHS Hospitals | 168 | 224 | 33.3% |
| NHS Treatment Centres | - | 11 | - |
| Independent Hospitals | 166 | 164 | -1.2% |
| Independent Treatment Centres | 12 | 14 | 16.7% |

This dramatic increase has many drivers including patient demand, increased number of providers, as well as the more accurate collection of data.

In 2004 there were a total of 346 orthopaedic service providers in England and Wales with an overall NJR compliance rate of 83.7%. These included NHS hospitals, private hospitals and treatment centres. In 2010 there were a total of 413 units, an increase of 19.4%, with 97% overall NJR compliance (Table 1). However, this does not take into account the increase in the number of orthopaedic consultants in each unit where there has been considerable expansion over the last ten years. Current figures suggest one orthopaedic consultant for 25,000 of the population. The aim has always been to reduce this ratio to one consultant to 15,000 of the population.
The proportion of the population who are classified as clinically obese, i.e. those with a Body Mass Index (BMI) of equal to or greater than 30, has been substantially rising, as can clearly be seen in graph 2. The link between raised BMI and knee osteoarthritis has been well demonstrated. This increase in BMI is indicative of the general increase seen throughout the general population, increasing the number of musculoskeletal problems. By 2050, 60% of men and 50% of women could be clinically obese. Without action, obesity-related diseases will cost the UK £46 billion per year.

The BMI of the average orthopaedic patient has been rising, showing an increase from 29.3 to 30.7 and 27.4 to 28.5 in knee and hip replacement patients respectively between 2004 and 2010. The percentage of patients operated on with a BMI greater than 30 has also substantially increased. In knee patients this has increased from 44% to 54% and in hip patients from 29% to 37% between 2004 and 2010.

The expectations and perceptions of patients have also been changing, with many wanting to maintain their active lifestyle. With the publicity and advertising of implants and their techniques by implant companies, patient demand for replacement is increasing. Many implants can now demonstrate high survival rates of over ten, fifteen or twenty years, which influences patients to undergo joint replacement at an earlier stage. This is confirmed by the falling average age from 70.6 in 2004 to 67.5 in 2010 for knee arthroplasty patients and from 68.0 in 2004 to 67.2 in 2010 for hip arthroplasty patients, even though the population overall is ageing. Currently 35.4% of patients undergoing joint replacement are under 65 years of age, whilst 12.2% are under the age of 55.

Ultimately all of these factors lead to an increase in the number of primary joint replacements and subsequently an increased number of revision joint procedures. During the five years between 2005 and 2010, the number of revision knee replacements rose from 3,035 to 5,829 (92.1% increase / 18.4% per year), and the number of revision hip replacements rose from 6,169 to 9,200 (49.1% increase / 9.8% per year), an average increase of 71% in revision arthroplasty surgery. This is costly to the patient and the taxpayer. Conversely, conditions affecting younger patients, for example bone and soft tissue malignancy, have not seen such an increase in admissions. The cost of total joint replacement and subsequent revision surgery for infections is extremely high.

In a recent article written from the United States of America, the huge financial burden of revising infected knee replacements was reported. In 2005, US$1.27 billion was spent on knee revision surgery for infection alone; this is approximately equivalent to £160 million in the UK. This burden can only get larger as the number of revision hip and knee procedures increases. The cost of the revision procedure itself is also on the increase, have shown a 12.3% increase over two five year periods, (1997-2001 to 2002-2006). If the infection rate in primary hip and knee arthroplasty could be reduced to the level achieved by the Specialist Orthopaedic hospitals namely 0.2%, (compared to a national average infection rate of 1-4%), then a predicted saving of over £300 million per annum could be made.

The ever increasing demand and increased referrals have invariably led to a strain to meet government waiting time targets. In a recent Department of Health (DOH) report, published in January 2012, detailing referral to treatment times for patients in hospital care, it was shown that orthopaedics
performed poorly, especially in admitted waiting times, seen in Table 2 \cite{15}. Trauma and orthopaedics had the largest number of completed pathways, the longest average wait and the lowest percentage of patients within the 18 week target, at only 83.8%.

Currently 2.47 million people are on hospital waiting lists. Approximately 391,000 patients are on an orthopaedic hospital waiting list at any one time, 15% of the total figure \cite{15}. Out of the 2.47 million total, 236,155 have been waiting for more than 18 weeks and 107,551 for more than six months \cite{16,17}. Orthopaedics is an area of care where people wait the longest, with 50,000 waiting for more than 18 weeks, (21% of overall), and 21,713 for more than six months, (20% of overall) \cite{16,17}.

Table 2: Admitted Referral to Treat Times – Split into specialties, November 2011 \cite{15}

<table>
<thead>
<tr>
<th>Speciality</th>
<th>Completed Pathways</th>
<th>Average Wait (weeks)</th>
<th>Percentage within 18 weeks</th>
</tr>
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<tbody>
<tr>
<td>Trauma &amp; Orthopaedics</td>
<td>60,379</td>
<td>12.1</td>
<td>83.8%</td>
</tr>
<tr>
<td>Neurosurgery</td>
<td>2,576</td>
<td>9.0</td>
<td>83.9%</td>
</tr>
<tr>
<td>Ear Nose &amp; Throat</td>
<td>18,524</td>
<td>9.4</td>
<td>89.6%</td>
</tr>
<tr>
<td>Oral Surgery</td>
<td>18,469</td>
<td>10.7</td>
<td>89.9%</td>
</tr>
<tr>
<td>General Surgery</td>
<td>43,875</td>
<td>8.0</td>
<td>90.2%</td>
</tr>
<tr>
<td>Cardiotoracic Surgery</td>
<td>1,957</td>
<td>6.4</td>
<td>91.6%</td>
</tr>
<tr>
<td>Urology</td>
<td>22,096</td>
<td>6.6</td>
<td>92.0%</td>
</tr>
<tr>
<td>Plastic Surgery</td>
<td>12,077</td>
<td>6.9</td>
<td>92.6%</td>
</tr>
<tr>
<td>Ophthalmology</td>
<td>43,576</td>
<td>9.8</td>
<td>92.7%</td>
</tr>
<tr>
<td>Gynaecology</td>
<td>28,559</td>
<td>6.7</td>
<td>94.1%</td>
</tr>
<tr>
<td>Cardiology</td>
<td>9,887</td>
<td>5.9</td>
<td>95.7%</td>
</tr>
<tr>
<td>Dermatology</td>
<td>7,482</td>
<td>6.8</td>
<td>95.9%</td>
</tr>
<tr>
<td>Rheumatology</td>
<td>1,607</td>
<td>2.8</td>
<td>97.8%</td>
</tr>
<tr>
<td>Gastroenterology</td>
<td>11,507</td>
<td>4.0</td>
<td>98.4%</td>
</tr>
<tr>
<td>Neurology</td>
<td>1,149</td>
<td>2.4</td>
<td>98.7%</td>
</tr>
<tr>
<td>General Medicine</td>
<td>5,634</td>
<td>3.2</td>
<td>98.7%</td>
</tr>
<tr>
<td>Geriatric Medicine</td>
<td>216</td>
<td>0.9</td>
<td>99.1%</td>
</tr>
<tr>
<td>Respiratory Medicine</td>
<td>1,745</td>
<td>2.8</td>
<td>99.1%</td>
</tr>
<tr>
<td>Other</td>
<td>34,888</td>
<td>5.8</td>
<td>92.8%</td>
</tr>
<tr>
<td>Total</td>
<td>326,203</td>
<td>8.1</td>
<td>91.0%</td>
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Musculoskeletal disorders are the leading cause of disability and time off work for sick leave worldwide \cite{18, 19}. In the UK between 1999 and 2000, 206 million working days were lost for arthritis and related illnesses, at a cost to the economy of £18 billion \cite{20}. Nearly 1.1 million people receive disability living allowance as a result of musculoskeletal disorders, representing 34.5% of all claims. This is more than the total for mental health, cardiovascular disease, stroke and respiratory disease combined \cite{21}.

The current NHS budget for 2011/12 is approximately £110 billion and musculoskeletal disease is the third largest cost behind mental health and cardiovascular disease. As already demonstrated from the 2010 statistics \cite{15}, musculoskeletal disease has on average the largest number of patient episodes. This results in musculoskeletal disease being the leading cause of worldwide disability and the most common area of hospital referral, yet it only ranks third in NHS funding. The NHS budget has a separate section for acute trauma and injuries, including the funding for the Trauma Centres and other trauma specialities. But this does not include costs for the long-term effects of these traumatic injuries. These fall within the budget of the musculoskeletal system.

Litigation in the NHS is on the increase and has been rising year-on-year since the NHS Litigation Authority scheme began in April 1995, with the most recent figures seen in table 3 \cite{22, 23}. The current potential liability is greater than £15 billion and in the year 2010/2011 the NHS Litigation Authority paid out £863 million, a 54% rise in five years, (this does not include property expenses and third party liabilities). This is clearly unsustainable in the medium and long-term.

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<tr>
<td>Total (£million)</td>
<td>560</td>
<td>579</td>
<td>633</td>
<td>769</td>
<td>786</td>
<td>863</td>
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Table 3: Payments by NHS Litigation Authority in respect of negligence claims against the NHS \cite{22}.

Graph 3: Total number of reported Clinical Negligence Scheme for Trusts claims by specialty, 1995-2011, excluding “below excess” claims handled by trusts \cite{23}.
When broken down into individual specialties, the surgical specialties have at least double the number of claims of any other specialty, equating to 40% of the total number, as shown in Graph 3 [22]. Out of these claims, approximately 15% are specifically orthopaedic accounting for 9% of the total in monetary value, shown in Table 4 [22]. The total cost of orthopaedic claims has also been steadily rising, with a 60% rise over the past three years compared with a 12% rise in overall NHS litigation claims over the same time period.

This litigious culture, which has spread from the US to the UK over the past few decades, will continue to grow and is unsustainable, especially in the current economic climate. Orthopaedics has always been a highly litigious speciality given the volume of work undertaken and the subsequent problems if mistakes or complications occur. This risk is shown in medical indemnity insurance with most companies classifying orthopaedics as the third riskiest speciality after obstetrics and neurosurgery. However, specialist orthopaedic services, when focused in a high critical mass, have a very low litigation rate despite undertaking some of the most complex orthopaedic procedures carrying the greatest risks.

### Table 4: Numbers of surgical claims and damages paid that are specifically orthopaedic [22]

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<tr>
<td>Number of all surgical claims</td>
<td>6,091</td>
<td>6,656</td>
<td>8,649</td>
</tr>
<tr>
<td>Of which orthopaedic</td>
<td>953 (15.6%)</td>
<td>1,035 (15.6%)</td>
<td>1,232 (14.2%)</td>
</tr>
<tr>
<td>Surgical damages paid</td>
<td>£527 million</td>
<td>£558 million</td>
<td>£645 million</td>
</tr>
<tr>
<td>Of which orthopaedic</td>
<td>£40 million (7.6%)</td>
<td>£58 million (10.4%)</td>
<td>£64 million (9.9%)</td>
</tr>
</tbody>
</table>

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### Summary Box 1

- Large increase in musculoskeletal disorders
  - Ageing population
  - Increasing BMI
- Increasing primary and revision hip & knee joint replacement
- Budget and service provision increases not matching workload increase
- 54% rise in NHS litigation pay-outs
  - £863 million paid out 2010-2011
  - Un-sustainability
Orthopaedics is an exceptionally niche medical speciality. At medical school there is very limited exposure to orthopaedics, with most students only receiving one placement in orthopaedics. This is generally combined with a rheumatology rotation and can last for as little as five weeks. Once qualified from medical school, junior doctors may never work in an orthopaedic speciality before embarking on their chosen career path. The model from the DOH shows that 6,000 medical students move into Foundation Year One per annum. Following successful completion of this early training, 50% of these young doctors move into General Practice and 50% into Hospital disciplines. Doctors who become GPs can expect over 15%-30% of their outpatient workload to consist of musculoskeletal problems.

It takes three years to become a fully qualified GP after completion of Foundation Training. During this time orthopaedics is rarely one of the rotations chosen or available. So in effect, a qualified GP may have as little as five weeks orthopaedic training, which takes place in medical school as a student. This does not prepare them adequately for a career where 15%-30% of their time will be spent dealing with musculoskeletal disorders. This problem will invariably become more pronounced as the population ages and the number of modern GPs increases. As age increases, so does locomotor disability, with 50% of patients over 75 years old presenting to their GP with musculoskeletal disorders. A more recent small study (12 practices), from the Keele GP Research Partnership has shown that 21% of the registered practice population attended with musculoskeletal disorders, which equates to 12% of all consultations labelled with a diagnosis of musculoskeletal disorders. A randomised trial published in the British Journal of General Practice, Baker et al. it was found that there was no difference between the outcomes of patients seen by GPwSIs, whether they were seen in a hospital or GP practice setting. Another published audit of MTS, Rogers et al., demonstrated that patients had to wait significantly longer for their orthopaedic outpatient appointment; 62 days via direct referral and 140 days via the MTS, (P < 0.05). They also demonstrated that patient confusion over who they were...
actually being seen by was very common. Only 46% knew they were seeing a GPwSI; 36% thought they were seeing an orthopaedic consultant; 20% a PT and 2% believed they were seeing a nurse. Another review of a MTS service, Maddison et al [32], showed a reduction in the number of orthopaedic referrals, with a reduction in clinic waiting times. They did however reveal an overall increase in the total number of referrals, (which almost doubled), namely to rheumatology and pain management services.

Some PCTs have allowed GPs direct access to Magnetic Resonance Imaging (MRI) scanning for specific joints, most commonly for knee and spine disorders. This service is provided in approximately 60% of NHS departments offering MRI [33]. The Direct Access to MRI: Assessment for Suspect Knees trial has demonstrated several important conclusions: patients were referred to see an orthopaedic surgeon either with or without a MRI scan having been performed beforehand and the trial showed no significant difference in physical functioning of the patients (SF-36) [34]. It also demonstrated that having an MRI result beforehand significantly increased the confidence of the GPs referral [34, 35]. But it has shown an increase in the overall NHS cost, with early MRI being approximately £294 more expensive per patient [36].

Another simple method of dealing with the increase in musculoskeletal referrals is the utilisation of physiotherapists. They can be used in general practice surgeries where they have been shown to reduce the referral rate to orthopaedics by as much as 8% [37]. Physiotherapists have also been used in orthopaedic outpatient departments in conjunction with clinicians. A good example of this is the use of Extended Scope Practitioners in spinal clinics, but they also have been used successfully in all types of orthopaedic clinics [38]. They are part of the Allied Health Professions Service Improvement Project, which commenced in September 2009. A recent DOH report published in January 2010 found no robust studies available on how best to triage or prioritise patient assessment [39]. It has been demonstrated that prompt access to the appropriate service is known to improve the effectiveness of an intervention and to have a positive impact on a patient [39].

The numbers of musculoskeletal referrals have been criticised, as it is felt that many are inappropriate. Roland et al in 1991 [40] demonstrated that up to 43% of referrals were inappropriate and 17% of patients found the appointment unhelpful. This can sometimes be more prevalent in the sub-specialities where under-diagnosis could have disastrous consequences. In 2001 The National Institute for Clinical Excellence (NICE) released guidelines for GPs about referral to specialist services [41]. In an attempt to keep the document to a working readable length, specific problems, which were thought to be common conditions, were chosen and which encompassed areas where there is uncertainty about which patients might benefit from specialist services. Orthopaedic conditions included in this publication were osteoarthritis of the hip and knee. Unfortunately the advice is targeted at differentiation between immediate, urgent and routine referrals, rather than specific guidelines for when and when not to refer, and does not cover any other orthopaedic condition other than osteoarthritis of the hip and knee.

In order to move forward and plan the orthopaedic services in England, primary and secondary care need to work together, rather than separately. The orthopaedic community working with GPs and PCTs will help improve efficiency and ensure that only appropriate referrals are made, which in turn will ease the demand on the musculoskeletal services at the secondary care level. Commissioning Consortia will have a large impact on how NHS services are funded and therefore the availability of the services provided. Originally, Practise Based Commissioning was going to allow GPs to have finite control in the decision-making process for secondary services. This was not an ideal situation as the decisions of service provision would be made by only the GPs without any input from the hospital specialists. This has now been changed and the Commissioning Consortia are to have input from hospital specialists in order to give a more rounded view on the services that can be provided.
However, to date there has been no formal approach to the British Orthopaedic Association (BOA) the Orthopaedic Specialist Societies, or the British Orthopaedic Directors Society, who are ready to engage fully and help solve these problems.

Procedure lists have been generated by PCTs and circulated to GP practices with advice on “procedures of limited benefit”. Again lists vary and demonstrate very little consensus or joined up thinking. These include procedures such as THR and TKR, two of the most effective surgical procedures in all the surgical disciplines. Again these lists have been generated without discussion with the orthopaedic community, leaving some patients, especially the elderly, confused and disadvantaged.

In April 2009 the DOH introduced Patient Outcome Reported Measures (PROMs) for a number of surgical procedures. These included THR and TKR as well as surgery for inguinal hernia and varicose veins. PROMs are measures of a patient’s health status or health-related quality of life and are typically short, self-completed questionnaires, which measure the patient’s health status or health related quality of life at a single point in time. They contain both condition-specific (Oxford Hip and Knee Score) and general health questionnaires (EQ-5D). Using the results from these questionnaires it has been suggested that THR and TKR are not as effective as they clearly are. Much of this was derived from selective use of the EQ-5D data results. What must be clearly understood is that patients, who suffer from multiple co-morbidities such as multiple joint degenerative arthritis, or heart disease and diabetes, may not see a huge increase in their overall quality of life following these procedures. However when asked specific questions about the joint replaced, patients find the results very satisfactory indeed. Spinning disinformation about joint replacement in this way confuses patients and puts them at a disadvantage in the future for it is well known that earlier intervention for osteoarthritis of the hip and knee using THRs and TKRs results in better outcomes for patients [42].

### Summary Box 2

- Many GPs may have as little as five weeks Specialist Orthopaedic Training
- 15-30% of GP workload is musculoskeletal
- 50% of patients over 75 present with musculoskeletal disorders
- Large numbers of inappropriate referrals (up to 43%)
- PCTs have list of “procedures of limited benefit” based on little data and no orthopaedic involvement
- GPs to have full control of budget and subsequent services provided
- Earlier surgical intervention for osteoarthritis using TKR and THR results in better outcomes
There are 171 acute NHS trusts in England, 151 of which provide orthopaedic services \(^{[43]}\). However, there are only five Specialist orthopaedic hospitals in England, which are listed in table 5.

Orthopaedic treatment has grown steadily over the last few years both in actual numbers of patients seen per year and the number of interventions per head of population. At the same time treatments are becoming more complex and more conditions can now be treated. The implications of this increased orthopaedic workload are huge. The total budget for the NHS in England between 2010 and 2011 was £98.7 billion \(^{[44]}\). The average THR procedure costs £5,100, with the average TKR costing £5,500 \(^{[45]}\). Hip and knee arthroplasty combined cost the NHS approximately £730 million per year in England.

The previous government attempted to effect change in health care through a target-driven culture. Over the last decade health reforms reduced waiting times for elective procedures to 18-weeks from referral to start of treatment and also reduced the length of hospital inpatient stay. This reduction in access times and inpatient stay was largely achieved by increasing turnover with little emphasis on quality of care. This culture was also blamed for the rising hospital re-admission rates, because patients were being discharged prematurely to free-up beds.

Currently the NHS is moving towards a framework where a trust’s performance is based on patient outcomes. For example, by withholding additional payments for treatment during re-admissions it is believed that hospitals will focus more on successful initial care, only discharging patients when it is safe to do so. A holistic approach is being adopted to look at the entire patient pathway and change is evolving to create a culture which is more responsive to patients, with their safety paramount. Increasingly patients will be given the opportunity to provide feedback, reflecting their experience of care and comparative data of outcomes will be provided to drive up standards. An example of this has been the introduction of PROMs for those patients undergoing THR and TKR, as well as those patients undergoing hernia and varicose vein surgery.

The concept of “getting it right first time” is to identify and administer the correct treatment at the appropriate time, to a high standard with minimal complications. Not only will this reduce mortality and morbidity rates, but also reduce the need for often expensive revision surgery. Another component of “getting it right first time” is earlier intervention. This can sometimes prevent the development of severe deformities which can make surgery more complex. Moreover, living with a painful joint can increase the loads put through other joints and cause significant disability, in turn leading to depression and increased time off work.

It is believed that these improvements in orthopaedic hospital care will lead to better quality of life for patients, significantly reduced health care costs in the long-term and reduced state dependence. This is essential for tackling the increasing orthopaedic workload in the years to come.

<table>
<thead>
<tr>
<th>NAME</th>
<th>LOCATION</th>
</tr>
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<tbody>
<tr>
<td>Royal National Orthopaedic Hospital</td>
<td>Stanmore, Middlesex</td>
</tr>
<tr>
<td>Royal Orthopaedic Hospital</td>
<td>Northfield, Birmingham</td>
</tr>
<tr>
<td>Nuffield Orthopaedic Centre</td>
<td>Headington, Oxford</td>
</tr>
<tr>
<td>Robert Jones and Agnes Hunt Orthopaedic Hospital</td>
<td>Oswestry, Shropshire</td>
</tr>
<tr>
<td>Wrightington Hospital</td>
<td>Wigan, Lancashire</td>
</tr>
</tbody>
</table>

Table 5: List of Orthopaedic Specialist Hospitals
Establishing Effectiveness of Interventions:

THR and TKR make up a significant proportion of the orthopaedic operative workload. The NJR uses pre- and post-operative PROMs to quantify the effectiveness of treatments from the patient’s perspective. Both condition-specific outcomes via an Oxford Hip or Knee Score and generic outcomes pertaining to the patient’s health status and quality of life are assessed. Questions to monitor complications, reoperation, hospital readmissions and rehabilitation are also included. Data from the NJR has revealed hip and knee arthroplasty to be particularly effective procedures. It has been shown that 95.7% and 91.5% of patients experience joint related improvements following their hip or knee replacement respectively (based on Oxford Hip and Knee Scores) [4]. Similarly 87.1% of hip replacement patients report an improvement in their general health compared to 78% of knee replacement patients (EQ-5D Index score). This data needs careful interpretation because patients with associated co-morbidities such as angina, or chronic obstructive airways disease may see no improvement in their overall general health score but will see an improvement in their local knee and hip scores. Inappropriate interpretation of this type of data may lead some purchasers to suggest that hip and knee replacement are procedures of low clinical effectiveness resulting in the elderly population being denied access to life-changing surgery.

Regarding long-term outcomes, studies examining the early Charnley hip arthroplasties reveal that the 25 year rates of survivorship, free of revision or removal of the implant, are approximately 80% [46]. Long-term studies of TKR have also demonstrated good results, one reporting a clinical survivorship of 94% at 15 year follow-up [47]. Furthermore, both THR and TKR have proven to be cost-effective. One recent paper has estimated the mean cost per quality-adjusted life year gained during a one year period was £5,870 for primary hip replacement and £12,240 for primary knee replacement [48].

In the same way that lower limb surgical procedures have dramatically increased over the last ten years there has also been a significant rise in upper limb orthopaedic procedures. This in part probably reflects a greater understanding of upper limb pathology, a previous under provision of care and the development of treatment options that enable patients to remain independent and self-caring rather than becoming dependant on the state.

The application of arthroscopy to shoulder surgery has in particular changed the face of shoulder surgery. As a result in the last ten years there has been an increase of 164% in the number of specialist shoulder surgeons. Modern surgical techniques mean that rotator cuff repairs, shoulder decompressions, stabilisation procedures and the treatment of labral abnormalities can all now be managed arthroscopically usually as day cases. This compares with patients previously having to undergo open surgery with greater scarring and at least a 24 hour hospital stay. With these advances there has been an increase in arthroscopic subacromial decompressions SADs, (with a reduction in open procedures) of 746% between 2000-1 and 2009-10. During the same period rotator cuff repair (RCR) increased by 544%. This study from Oxford has stressed the importance of the diagnostic indications for these procedures and evaluating their long-term outcomes so that patients can be adequately informed when contemplating surgical treatment [49]. By working together with the British Orthopaedic Association and the Specialist Societies questions such as these can and must be answered.
PROMs are being introduced into other areas of the orthopaedic specialty. For example, a new PROMs based pilot system, “Health Unlocked”, has been unveiled at the Royal National Orthopaedic Hospital to allow spinal patients to record their post-operative recovery journey [50]. This iPad based health tracker will allow clinicians to assess patient progress. Some interventions such as facet joint injections and spinal fusion, for degenerative back pain, are controversial as there is a lack of evidence supporting their usage, yet referral of patients with low back pain to orthopaedic surgeons for management is common and increasing. In fact, facet joint and epidural injections have been termed, ‘procedures of limited clinical value’, which Primary Care Trusts are attempting to stop funding in order to reduce costs. This may be correct, but we need to collect the hard evidence in order to inform purchasers and patients. It may be advisable that such procedures are undertaken only at licensed hospitals where systems such as “Health Unlocked” can be used to quantify the benefits and draw more definite conclusions on clinical effectiveness. The annual prevalence of back pain is between 25% and 60% in most industrial countries [51-53], thus the practice of cost-effective evidence based medicine particularly in the field of spinal surgery is essential.

A good example of where this falls down would be the use of vertebroplasty in vertebral compression fractures. The reduction of pain has been well documented especially acutely after intervention [54-56]. The long-term results are however less clear. Less satisfactory results after two years have been demonstrated, with up to 29% of patients having recurrent pain [57]. This was further complicated by two studies in the New England Journal of Medicine where vertebroplasty was compared to a sham procedure and showed no difference between the two groups in pain and disability at all stages of follow-up [58,59]. Specialist opinion is also divided, showing this to be a good example of an intervention which needs further evaluation by recognised centres before widespread usage is rolled out.
Getting It Right First Time

In addition to improving our understanding of which treatments are most effective, it is also important to undertake orthopaedic operative treatment under optimal conditions. Experience from waiting list initiatives reveals that up to 35% of patients waiting for joint replacement are removed from the list either because the patient is unsure of treatment or because they are not fit for surgery and steps have not been undertaken to get them fit [45]. Furthermore the experience of clinicians at one of the specialist centres is that 30% of patients referred as part of a waiting list initiative did not require surgery. As running costs for an average operating theatre are approximately £1,200 per hour [60], the loss per year accrued in cancelling patients is estimated to be greater than £1 million per trust. Suggestions to improve efficacy in this area include ensuring detailed pre-operative assessment and communication with patients about their procedure. Often pre-operative assessments take place a week or two before surgery. It has been recommended that undertaking this approximately six weeks before admission can reduce the postponement rate from 35% to 5% [61]. Any health problems can be identified at an early stage and referred back to the GP for appropriate investigation and treatment. If GPs also routinely screened their patients who were being referred for possible surgery, cancellations could be reduced even further. The patient can also be removed from the waiting list at this stage with minimal disruption. Another way to improve theatre usage involves the appointment of an orthopaedic theatre scheduler. A 10% improvement in session utilisation has been estimated to generate a £4 million saving per year for the average trust [62].

Improving Orthopaedic Theatre Utilisation:

In addition to improving our understanding of which treatments are most effective, it is also important to undertake orthopaedic operative treatment under optimal conditions. Experience from waiting list initiatives reveals that up to 35% of patients waiting for joint replacement are removed from the list either because the patient is unsure of treatment or because they are not fit for surgery and steps have not been undertaken to get them fit [45]. Furthermore the experience of clinicians at one of the specialist centres is that 30% of patients referred as part of a waiting list initiative did not require surgery. As running costs for an average operating theatre are approximately £1,200 per hour [60], the loss per year accrued in cancelling patients is estimated to be greater than £1 million per trust. Suggestions to improve efficacy in this area include ensuring detailed pre-operative assessment and communication with patients about their procedure. Often pre-operative assessments take place a week or two before surgery. It has been recommended that undertaking this approximately six weeks before admission can reduce the postponement rate from 35% to 5% [61]. Any health problems can be identified at an early stage and referred back to the GP for appropriate investigation and treatment. If GPs also routinely screened their patients who were being referred for possible surgery, cancellations could be reduced even further. The patient can also be removed from the waiting list at this stage with minimal disruption. Another way to improve theatre usage involves the appointment of an orthopaedic theatre scheduler. A 10% improvement in session utilisation has been estimated to generate a £4 million saving per year for the average trust [62].
Outcomes following surgery can vary greatly between sites, particularly between the specialist and non-specialist hospitals. For example, data from the NJR reveals the national mortality rate to be 0.22% and 0.27% within the first 30 days following primary knee and hip arthroplasty respectively [4]. These figures are 4 to 4.5 times greater than those observed at Wrightington, a specialist centre. Similarly in the specialist hospitals infection rates following primary hip and knee arthroplasty are 0.2% compared to the national infection rate of 1-4%. These figures are more compounding, given the fact that much of the surgery undertaken at specialist hospitals is extremely complex.

Other discrepancies in outcomes are seen between NHS hospitals and Independent Sector Treatment Centres (ISTCs). The ISTC programme was introduced in 2003 to reduce waiting lists. Through this programme operations deemed to be straightforward are undertaken at ISTCs which are run by the NHS or the independent sector. Concern has arisen that outcomes at some of these centres maybe worse than in NHS hospitals. A paper in 2009 reviewed 258 Kinemax TKR performed at an ISTC, revealing a revision rate at three years of 22% using further surgery as an endpoint and 15% using aseptic loosening [62]. These rates are ten times higher than survival data for this prosthesis from previously published results. The cost of revision surgery for these patients, if undertaken, could be greater than total cost for the initial contract for all the 258 patients treated. If results like this occurred nationally arthroplasty would become economically unviable since revision operations cost at least two to three times the cost of the primary replacement.

However, in a report from CEU unit of The Royal College of Surgeons published in 2011 [72] NHS patients who underwent elective operations in a dedicated independent unit reported better outcomes than those seen by NHS Hospitals treating both emergency and elective patients. However, the researchers found that those patients treated in independent units tended to be younger and in better health and from more affluent areas than those seen by NHS Hospitals. For hip and knee replacements they found that NHS Hospitals dealt with double the proportion of sicker patients and took a higher proportion of patients with two or more co-morbidities. Across all units and procedures they reported a huge increase in patient satisfaction with their condition following the operation compared to before. This may suggest some possible cherry picking of the younger and fitter patients by the independent sector leaving the NHS to deal with the more complex cases. Further, following joint arthroplasty medium to long-term outcome results are necessary in order to truly measure outcome and value for money.

If joint replacements fail early or complications arise such as infection there is then a greater financial burden on the taxpayer, NHS and social services, when these patients return to hospital for more complex operations with longer inpatient stays, possible requirement for antibiotics and expensive orthopaedic revision implants. Moreover, patients may be left with an adverse outcome with pain worse than the arthritis that led to the initial operation. This will boost the long-term costs with social care packages being required in the long-term.

These two examples demonstrate that in an era where orthopaedic demand is increasing, patient safety must be upheld and greater overall costs to the NHS will be incurred where the standards set by the best units/hospitals are not met by other providers. Suggestions to improve care could involve “accrediting” hospitals to undertake certain procedures such as arthroplasty. To obtain such “accreditation” hospitals would need to meet certain criteria, e.g. low infection rates <1% and demonstrate that they use enhanced recovery pathways and audit their results. Within this group of hospitals, the best units would set the standard of care which would filter down to others and drive
out poor outcomes. More complex operations, such as revision surgery, should be undertaken at suitably accredited specialised units with the appropriate critical mass, by surgeons with a special interest in this field. For example, peri-prosthetic infections, which are often particularly challenging to eradicate, should be treated in dedicated infection units such as the Nuffield Orthopaedic Centre\(^{[63]}\). Rare conditions such as sarcoma are an excellent example where treatment occurs in super specialised units with experienced tumour surgeons working within an efficient multidisciplinary team. The outcomes from these units are audited on an annual basis to ensure world-class outcomes for patients.

Other suggestions to improve elective practice are outlined in a paper by the NHS Institute for Innovation and Improvement produced in 2006 to improve the quality of care of patients undergoing THR\(^{[61]}\). The BOA in the same year also revised their recommendations for good practice for THR\(^{[64]}\). Recommendations can be applied to other types of elective orthopaedic surgery and include employing dedicated staff to coordinate admissions and ensure equipment availability and optimum theatre conditions to minimise postoperative risk of infection and thromboembolism.

In keeping with these recommendations, rapid recovery programmes have recently been developed within the NHS, whereby arthroplasty patients follow standardised protocols and pathways before, during and after surgery aiming to improve outcomes whilst reducing hospital stay. Through education and teamwork, the patient is well informed, better prepared and motivated for the recovery process. There is scope to apply these principles to a wider range of orthopaedic procedures to benefit more patients. Other examples where clinical guidelines aimed at improving elective orthopaedic practice have been produced are listed in Table 6.

### Table 6: Recent clinical guidelines in elective orthopaedic practice

<table>
<thead>
<tr>
<th>YEAR</th>
<th>ORGANISATION</th>
<th>GUIDELINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>BOA</td>
<td>Knee Replacement: A guide to good practice</td>
</tr>
<tr>
<td>2000</td>
<td>NICE</td>
<td>Hip Disease – replacement prostheses</td>
</tr>
<tr>
<td>2001</td>
<td>BOA</td>
<td>Metastatic bone disease: A guide to good practice</td>
</tr>
<tr>
<td>2003</td>
<td>BOA</td>
<td>The Management of spinal deformity in the UK: A guide to good practice</td>
</tr>
<tr>
<td>2005</td>
<td>NICE</td>
<td>Autologous Chondrocyte Implantation for the treatment of cartilage injury</td>
</tr>
<tr>
<td>2009</td>
<td>BOA</td>
<td>Best Practice for Primary Isolated Anterior Cruciate Ligament Reconstruction</td>
</tr>
<tr>
<td>2010</td>
<td>NICE</td>
<td>Venous thromboembolism – reducing the risk</td>
</tr>
</tbody>
</table>
A large number of prostheses are used within the NHS in Britain. These differ widely in price and very few have had proper evaluation. All new implants have to be CE marked and fulfil essential safety and performance requirements before they are marketed. However, pre-market investigations and short-term use does not predict long-term performance reliably.

Through post market surveillance, the Medicines and Healthcare Products Regulatory Agency can be notified by manufacturers and clinicians of any adverse outcomes that may be related to the implant. These may include mechanical failure or aseptic loosening within the expected life of the implant or systemic side effects. One problem with this system is that Trusts may not understand exactly what kind of outcomes they should be reporting. For example, it is sometimes difficult to recognise whether a complication is due to the skills and experience of the surgeon or the device itself. Another concern is that many prostheses of the same type may be implanted before problems are recognised.

A well-known example involves the DePuy ASR bearing surface which has recently been withdrawn from the market; it was part of either the ASR Resurfacing system or the ASR XL THR. It was first implanted in 2004 and has been associated with a revision rate at five years of 13% [65]. This implant was extended for general orthopaedic use without any pilot studies demonstrating added benefit to patients or survivorship at five years comparable with the gold standard cemented THRs. Overall there have been 9,960 of these implants used in the UK, (53.2% ASR XL and 46.8% ASR Resurfacing), with an overall failure rate of approximately 30%. The estimated cost of revision surgery for this group of patients is £120 million.

To prevent this happening again, yet maintain the UK’s interest in “cutting edge” technologies, it would be advantageous for new implants and technologies to be assessed in units with a track record for translational research. Once a reasonable follow-up has been achieved and benefit has been demonstrated to patients, it could be released to the wider NHS. A good example of this is autologous chondrocyte implantation of the Knee. This was introduced to the UK in 1998 and has been extremely successful in treating painful knee cartilage defects. The evidence shows that the repair is durable up to ten years and the added costs are reasonable in terms of improving quality of life.

In order to target new treatments to specific patients whilst maintaining their safety, as far as possible, innovative technologies should be made available in a few specialist hospitals or specialist units where the implant quality evidence can be objectively reviewed and any long-term complications or implant resilience issues can be acted upon quickly. To improve confidence in implant safety further, new technologies such as high precision radiostereometric analysis should be utilised at Academic Health Science centres. This can detect micro-motion at the implant-bone interface which can be a strong predictor of long-term implant loosening [66]. The combined partnership of Academic Health Science centres and specialist units would therefore develop, assess and monitor the implementation of new implant technology and create effective protocols to optimise patient outcomes and safety.

NICE guidelines provide a sensible rationale for the treatment for some orthopaedic conditions [67]. They recommend that wherever possible, hip prostheses that have demonstrated long-term success should be used. A revision rate of 10% or less at ten years is regarded as the current benchmark. Prostheses with a minimum of three years revision rate experience may be considered if the evidence suggests that this prosthesis is on target to meet the ten year benchmark. Particularly in younger patients, only prostheses which have been shown to have long-term, low revision rates and are easy to revise, should be used. Based on the NICE recommendations for implant selection, the Orthopaedic Data Evaluation Panel (ODEP) was set up in 2001 [68].

Choice and Costs of Implants:
The aim was to establish a transparent process for collecting and evaluating the evidence of prosthetic hip revision rates. Manufacturers are requested to keep the ODEP informed of all commercially available prostheses involved in post-market clinic follow-up studies. Study details and results are provided to give ratings. These ratings can therefore inform Trusts about which implants are safe to use and allow them to make cost-effective decisions. If the PbR tariff paid a “best practice” supplement for Trusts using 10A rated implants this would resolve some of the current issues. However, if Surgeons insisted on using an implant with a rating less than 5a without being part of a recognised trial, a financial penalty would discourage this practice. Following the success in hip prostheses, it may well be advisable to include other types of orthopaedic implants so that only tried and tested implants are used throughout routine clinical practice.

The NJR data is also useful in guiding implant selection. For example, the cost of the Stanmore THR, a widely used cemented implant, is £650, whereas the cost of an uncemented implant is £1650 or more. The NJR, as well as all the international joint registries, has demonstrated more evidence of the long-term survival of the cheaper cemented prostheses, yet currently uncemented THRs account for 40% of the implanted prostheses in the NJR. By replacing them with cemented prostheses in 70% of operations, for example, £14 million could be saved annually. There is a place for uncemented implants but this needs to be carefully defined by the orthopaedic profession. The unicordylar knee replacement provides another example. Some designs have demonstrated an 11% failure rate at three years. As the cost of each revision is £10,000-15,000, significant savings running into millions of pounds per year could be made if some of these designs were discontinued and implantation of others restricted to surgeons expert in the surgical technique. Evaluation of the NJR and ODEP data is essential in order to provide a cost-effective service.

Using this information, Trusts would be able to benchmark the prostheses they use and ensure that patients of appropriate age received a prosthesis to provide them with long-term function. They could also negotiate price discounts based on the large volume of purchases. At a time when the NHS is required to deliver £15-20 billion of savings by 2014 - 2015, this is a key area of expenditure for review. For example, the bulk purchasing of spinal implants alone would be likely to save the NHS over £30 million per year. Other methods of reducing costs include tendering for the supply of implants, reducing the number of suppliers or purchasing prostheses through NHS Supplies. However, to make this work there must be clinical involvement in all steps of the process. It is also hoped that a greater transparency on prices being paid to suppliers by individual Trusts will allow standard product bar coding. It may also be possible to negotiate implant costs regionally or nationally, further driving down the prices and saving more money. For example, the Pan-London Framework was established in 2008 to ensure that the prices Trusts paid for implants was low enough to enable them to recover the costs of procedures through standard NHS tariff rates. In 2009 - 2010 the contract generated savings of £1 million on purchases of almost 6,000 hip and knee implants, a total spend of £11.5 million after savings. In early 2010, 18 out of the 24 Trusts in London which carry out orthopaedic surgery had joined the contract.

The Specialist Hospitals

Currently there are 24 specialist hospitals who play a vital role within the NHS in specific areas of expertise in respect of patient care, training, and research and development. Specialist hospitals carry out 250,000 procedures and provide 2.5 million outpatient appointments a year. They provide specialist training for a new generation of doctors and allied health workers. With their extensive experience they are able to provide multidisciplinary teams and leading-edge treatments for patients with a range of conditions, from the common to the rare, or with complications arising from treatment elsewhere. Further, they often provide the benchmark for excellence for routine procedures that should be adopted by the wider NHS. In the 2008 inpatient hospital survey, specialist
hospitals were in the top ten in all categories, highlighting their quality of care. In part this was because of the high numbers of specific conditions treated allowing the development of specific expertise, resulting in improved outcomes.

There are currently five specialist orthopaedic hospitals of which three remain independent, two of which are foundation trusts. Between them they perform over 56,000 surgical procedures per annum, much of which is complex and rare. Over 90% of bone and soft tissue sarcomas and 50% of scoliosis are treated in these centres. They also provide a comprehensive musculoskeletal service for patients with more mainstream orthopaedic conditions and carry out approximately 50% of revision knee replacement surgery and 20% of revision hip replacement.

When 30, 60, and 90 day patient mortality rates results from the NJR are reviewed, for both primary and revision knee and hip replacement, irrespective of ASA grade, there is a fourfold reduction in patients undergoing these procedures at Wrightington, one of the orthopaedic specialist hospitals. If the NJR data is further interrogated and actual revision rates versus expected for THR are investigated, results from Wrightington Hospital again demonstrated a 50% reduction in actual revisions against expected. Further patient satisfaction rates remain high and litigation rates remain very low, despite the complexity of the work undertaken.

These hospitals demonstrate that by bringing together appropriate expertise better quality and improved care for patients can be delivered whilst significantly reducing costs over the life cycle of the procedure prior to further revision. Whilst there are examples of excellent orthopaedic departments in both teaching and district general hospitals this is by no means universal for many reasons.

If orthopaedic services, within a certain geographical area and with an appropriate critical mass were brought together, either onto one site or within a network, especially in the rural areas, and worked within agreed quality assurance standards, not only would patient care improve but billions of pounds could be saved. These hospitals or networks would receive recognition as “Specialist Units”, and have agreed ring-fenced elective beds allowing efficient throughput of patients treated to the highest standards. This would in itself allow different models of working to be introduced with six or indeed seven day working and allow for much more efficient guaranteed training for young orthopaedic surgeons. More importantly, with this model, patients would feel confident with the treatment being proposed and clinicians again feeling empowered to deliver the best possible care for their patients. The model must be flexible to accommodate different geographical areas but at its heart agrees to work to the agreed quality standards set by the profession. This will include a discussion on appropriate numbers and types of procedures carried out per annum to maintain expertise. For example Sarcoma units in England are only recognised if they treat a minimum of 100 cases per annum. There is also evidence that demonstrates that increasing numbers of cases results in better outcomes and lower complications [70, 71].

It is also imperative that these networks develop formalised links with primary care to ensure smooth appropriate pathways for patients. At present no such co-ordinated strategy exists but some trusts have independently started to move in this direction. In Leicester, for example, there is recognition that in order to deliver the highest quality of care to patients and maintain training standards orthopaedic surgeons should be on one site. After discussion at hospital and Strategic Health Authority level, thirty two orthopaedic surgeons have moved from other hospital sites onto The Leicester General Hospital site. As a result the full range of specialist care is available on one campus and allows clinical interaction and shared decision making between the sub-specialists where appropriate.
Summary Box 3

- Earlier surgical intervention to prevent disease progression and better functional outcomes
- Universal pre-operative assessment six weeks before admission to identify and treat co-morbidities earlier, prevent cancellations and optimise theatre usage. This should involve dedicated pre-operative nursing staff and theatre schedulers to improve theatre usage
- Extend the enhanced recovery programme model principles to a wider range of orthopaedic procedures to improve patient outcomes and reduce hospital stay
- Create and follow clinical guidelines from the BOA and NICE to “get it right first time”
- Accredit hospitals/units to offer surgical procedures, provided they meet certain quality assurance standards, e.g. ring-fenced elective beds and low infection rates in keeping with the results achieved at centres of excellence
- Complex operations, such as revision THR and TKR, to be offered at specialised units/centres and utilise dedicated infection units to treat periprosthetic infections. Rare conditions such as sarcoma, spinal injuries, and scoliosis should only be treated in specialist centres
- Procedures with limited evidence for effectiveness carried out in assessment units to enable clinical evaluation
- Encourage innovation but ensure new technologies assessed at specialist accredited units. A partnership between specialist units and academic health science centres should be used to develop, assess and monitor the implementation of new technology, responding quickly if poor outcomes are identified
- Use data from the NJR and ODEP to ensure that the majority of patients are implanted with cost-effective prostheses which have demonstrated a low revision rate of 10% or less at ten years
- Drive clinical involvement in prosthesis bulk procurement
- Ensure that all patients receive appropriate follow-up to detect complications and disease recurrence early
- Continue to roll out PROMs and other evidence honestly to demonstrate the effectiveness of orthopaedic interventions
Orthopaedics in the United Kingdom has been neglected even though it is one of the most referred to specialities, and this will continue to increase as the population ages. There are vast differences in orthopaedic care in both the primary and secondary care sector. The three main areas that need addressing to move forward in orthopaedics in the UK, are:

1. Appropriate primary care pathways with a referral system designed to allow the right patient to be seen by the right specialist at the right place at the right time
2. In Secondary Care by “getting it right first time”, thereby improving patient outcomes and satisfaction and reducing complications which will deliver significant annual savings
3. Appropriate patient follow-up

To meet the increasing demand and patient expectations in a challenging economic climate we need to recognise the value of improving the quality of patient outcomes and the role that the front-line specialists can play. In a perfect society, there would be no limit on healthcare spending to ensure the best possible treatments were available to maintain the health of its population regardless of cost. The expectation of patients is increasing and will continue to do so into the future. In order to fulfill these expectations, the NHS has been forced to change. Recently it did this by setting targets, backed up by a managerial team to enforce the changes. The laudable aim was to reduce waiting times for outpatients and inpatient procedures. However, these were sometimes unobtainable and often not based on patients’ expectations or outcomes. This has led the NHS to overspend, which is now unsustainable as there has to be a balance between funding and service provision, especially in an economic downturn. The focused partnership of the British Orthopaedic Association, its specialist societies, frontline hospital specialists together with GPs in Commissioning Consortia, is the way forward to provide the population with access to high quality care at the right time whilst ensuring the best use of taxpayers’ money. There has to be a new open and honest relationship between senior management within the NHS and orthopaedic clinicians to ensure this. If this fails then changes made may not be in the best interest of the patients and will ultimately lead to rationing of health care as demand becomes unaffordable.

As has been shown with certain recent implant designs, laboratory success is not always followed by improved clinical performance. This has led to scepticism by patients, which has been exacerbated by poorly informed internet websites and media reports. The introduction and use of new implants within the NHS will need further regulation with appropriate Specialist Units, with a proven track record of translational research, taking on a leading role in their evaluation. This will also require a close working relationship with implant companies who will have to sign up and agree to these changes. Together they will assess the clinical outcome of new designs for up to five years before allowing generalised usage throughout the NHS.

Instead of orthopaedic departments and clinicians acting alone, they will form part of a network of hospitals and treatment centres forming specialist orthopaedic units, with ring-fenced elective beds, working to quality assurance standards. This will generate standardised protocols for prostheses and treatment pathways across the NHS benefiting patients, thereby improving outcomes and reducing complications. Protocols will be based on either their own accrued evidence or from the published literature or registries. Standardisation of tried and tested prostheses for patients of different ages, based on evidence from the NJR, will result in a more competitive market as prices will be negotiated on a national level, thereby driving down costs.

This plan is similar to the hub and spoke design first suggested by Sir Robert Jones in 1924, but with more integration, as shown in figure 2. The existing specialist orthopaedic centres and newly created specialist orthopaedic units will act as the hub, not only for specialist services, but for setting of standards for the more common procedures that are expected to be achieved by the NHS as a whole.
Figure 2: Diagrammatic representation of Specialist Orthopaedic conglomeration
Specialist services, such as revision hip arthroplasty, should only be undertaken in either a specialist unit, or as part of a specialist network following agreed quality assurance standards, all aspects of which should be subject to regular performance review including audit, and clinicians should welcome this.

The NJR, founded in 2003, has been a great success. It is the largest in the world with over 1.15 million episodes currently registered. Current evidence shows that in patients over the age of 65, cemented hip replacements perform better than uncemented prostheses, yet the trend is for the increasing use of uncemented prostheses, despite the increased cost implications. Further, there is no evidence that functional outcome is any better for the different types, but there is a higher revision rate in uncemented implants. If national protocols were available and based on this level of evidence, significant cost savings would be made.

Submitting data to the NJR is now mandatory and a compulsory requirement for all hospitals wishing to carry out joint replacement. This has already allowed us to report and understand the successes and failures of these procedures. There is still no register for all implants and very little in the way of standardisation between implant technology and price. This could be easily accomplished by using the National Joint Registry and expanding its current role to include all implants. This could be funded by a levy on each prosthesis implanted and paid for by the implant companies as currently happens with THR and TKR. This would provide a more structured system enabling audit and translational research to take place more easily and synergistically with clinical care. This is a form of centralisation but will still allow all the centres to have input into the progression of the speciality and still keep their independence.

Finally, the avalanche of increasing orthopaedic workload that is set to engulf us needs to be tackled by all who work in the NHS, including orthopaedic surgeons who are responsible for delivering care directly to the patients. Already over 25% of surgical interventions within the NHS are for musculoskeletal disease and this is set to rise [11]. Only by working together through a medium to long-term action plan can we make changes that benefit the whole population and do not disadvantage some vulnerable groups. We need to have orthopaedic surgeons and General Practitioners working closely together in both the primary and secondary care setting to ensure the best, appropriate, most cost-effective care for our patients.
11. Hospital episode statistics online: www.hesonline.nhs.uk
16. www.bbc.co.uk/news/health-14111452
17. www.bbc.co.uk/news/health-14407753


60. NHS Institute for Innovation and Improvement - The Productive Operating Theatre: http://www.institute.nhs.uk/quality_and_value/productivity_series/the_productive_operating_theatre.html

61. NHS Institute for Innovation and Improvement www.institute.nhs.uk. Delivering Quality and Value. Focus on: Primary Hip and Knee Replacement


63. Nuffield Orthopaedic Centre – Bone infection unit www.noc.nhs.uk/boneinfection

64. British Orthopaedic Association: Primary Total Hip Replacement: A Guide to Good Practice

65. British Orthopaedic Association: Withdrawal of DePuy ASR Resurfacing and XL metal on metal bearings – Information for and Advice to Surgeons


67. www.nice.org.uk/TA2

68. ODEP website. www.supplychain.nhs.uk/odep


The Following Associations, Groups and Individuals have offered their support for this report

British Orthopaedic Association
Royal College of Surgeons of England
The Patients Association
Specialist Orthopaedic Alliance
Federation of Specialist Hospitals
The Right Care Team – Professor Sir Muir Gray
British Orthopaedic Directors Society

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The School of Surgery London
Professor Lord Ara Darzi
Lord Bernie Ribeiro – Past President RCS(Eng)
Lord Herbert Laming
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Getting It Right First Time 31
I would like to thank the following for their help in the preparation of this report:

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- Consultant Orthopaedic Surgeon / Member of Council Royal College of Surgeons of England
- Consultant Orthopaedic Surgeon / Member of Council British Elbow and Shoulder Society
- Consultant Orthopaedic Surgeon / Secretary of BOA
The UK’s ageing population will place an increasing burden on orthopaedic care services. Irrespective of this, patients have a right to be treated in a timely manner to give them the best results. Despite numerous initiatives the orthopaedic community is struggling to meet the treatment targets laid out in the NHS Constitution, with the NHS failing to treat thousands of patients within 18 weeks. The College welcomes this comprehensive and in-depth analysis and importantly the potential solutions. We hope this report will kick start the discussions between all parties to redefine a service that delivers the best care for patients.

Professor Norman S Williams  President, Royal College of Surgeons of England

This report provides an achievable vision of the future for orthopaedic practice – a vision that will enhance both value and quality. Its implementation in London is something that we are actively pursuing...

Dr Andy Mitchell  Medical Director NHS London

I have recently recommended a package of reforms to reduce the legal costs of claims against the National Health Service: see Review of Civil Litigation Costs, Final Report (TSO, 2010), chapter 23 “Clinical Negligence”. These reforms are now in the process of implementation. Litigation is, however, a matter of last resort. There is a huge need to prevent claims arising in the first place. That is by far the most effective way to reduce legal costs and to promote patient satisfaction.

I therefore welcome the theme which runs through the whole of Professor Briggs’ report, namely that those who deliver orthopaedic care should “get it right first time”. If this approach is followed, as Professor Briggs recommends, the substantial savings in terms of damages and costs can be re-allocated to primary health care, where those monies are desperately needed.

Rupert Jackson  The Rt Hon Lord Justice Jackson

If we are to train a world-class professional workforce for a world-class healthcare system then changes are required to the interface between service and training. ‘Getting it Right First Time’ would deliver a Trauma and Orthopaedic service of the highest standards to the NHS and we could then deliver the surgeons of the future by integrating training in a planned and coherent fashion, not as an add-on. It is clear, evidence based and should be widely discussed as the way forward.

Professor Nigel Standfield  Professor of Vascular Surgery and Surgical Education, Imperial College
Head of the Postgraduate School of Surgery, London
“Getting it Right First Time is a landmark publication that could potentially improve patient outcomes and provide more cost effective care for those people requiring surgery for musculoskeletal conditions.

Many papers tend to highlight problems – Professor Briggs’ report is brimming with solutions.

Moreover, its ethos fits directly with the core tenets of the British Orthopaedic Association’s practice strategy entitled Restoring Your Mobility, namely that:

- Clear principles must guide the provision of high quality patient care, together with the clearest possible vision of the patient pathway.
- Effective collaboration is fundamental to the delivery of high quality outcomes – especially between specialists and generalists to ensure a seamless patient experience.

Difficult economic times demand a paradigm shift in clinical care: this report explains how the orthopaedic profession will engage to lead this transformation to the benefit of patients and taxpayers alike. ”

Martyn Porter  Incoming president of the BOA for 2012-2013