D10/S/a

NHS STANDARD CONTRACT
FOR SPECIALISED ORTHOPAEDICS (ADULT)

SCHEDULE 2 - THE SERVICES A. SERVICE SPECIFICATIONS

Service Specification No.	D10/S/a
Service	Specialised Orthopaedics (Adult)
Commissioner Lead	
Provider Lead	
Period	12 months
Date of Review	

Interim for Adoption from 01/10/13

1. Population Needs

1.1 National/local context and evidence base

Scale of current and forecast demand

National context

According to current Department of Health definitions, musculoskeletal conditions include 200 different problems affecting the muscles, joints and skeleton.

Over 9.6 million adults and around 12,000 children, have a musculoskeletal condition in England today[1]. By 2031 the proportion of people in the UK aged 65–84 is projected to increase by 50%.

The proportion of those aged over 85 will increase 100% by 2031 and 300% by 2071[2]. As this happens alongside a growing range of treatments and drugs, the role of specialist services will be vital in ensuring the delivery and future development of effective affordable treatment. The table below (taken from The Burden of Disease and Illness in the UK: A preliminary assessment to inform the development of UK Health Research and Development Priorities) supports this concern regarding the likely impact of the ageing population.

[1] *Department of Health, A joint responsibility: doing it differently – the musculoskeletal services framework, 12 July 2006*

[2] *The Burden of Disease and Illness in the UK: A preliminary assessment to inform the development of UK Health Research and Development Priorities, by Dr Stephen Green and Dr Rebecca Miles, Oxford Healthcare Associates, Version 2 April 2007*

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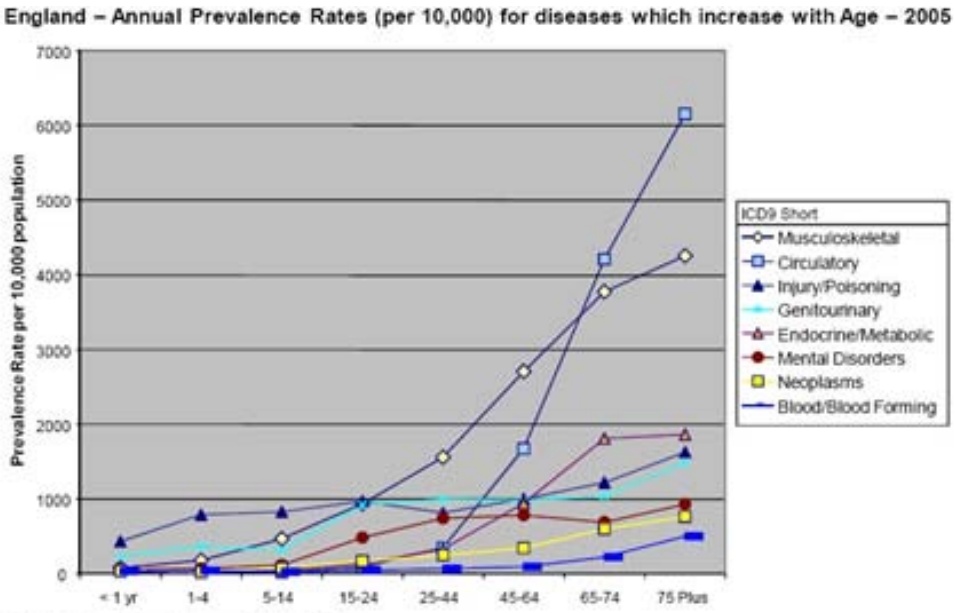

Source: RCGP, Birmingham Research Unit, 2006

The expectations and perceptions of patients have also been changing, with an expectation of maintaining their active lifestyle as they grow older, with the obvious benefits to society and the taxpayer. With the publicity and advertising of implants and their successful outcomes 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 influence 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 is ageing[3]. Currently 35.4% of patients undergoing joint replacement are under 65 years of age, whilst 12.2% are under the age of 55[4]. All these factors lead to an increase in the number of primary joint replacements. This will inevitably, in time, require 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); 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[5]. 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[6].

[3] *National Joint Registry: http://www.njrcentre.org.uk*

[4] *National Joint Registry: http://www.njrcentre.org.uk*

[5] *Briggs, T. Getting it right first time - Improving the Quality of Orthopaedic Care within the National Health Service in England. 2012.*

[6] *Hospital episode statistics online: www.hesonline.nhs.uk*

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Evidence base

This specification draws its evidence and rationale from a range of sources including:

- National Institute of Clinical Excellence (NICE)
- NHS Evidence
- National Joint Registry
- Patient Reported Outcome Measures (PROMS) data
- Hospital Episode Statistics
- Advice from the British Society for Surgery of the Hand

Infection

Infection is a devastating and expensive complication of total joint arthroplasty. If the infection rate for primary total hip replacement and total knee replacement alone could be reduced to 0.2% (which is the current rate for the specialist orthopaedic units compared with a national average infection rate of 1-4%), this would provide an annual cost saving to the NHS of up to £300 million[7].

A recent article from the USA reported the huge financial burden of revising infected knee replacements[8]. 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 (adjusted for relative number of procedures and exchange rate). This burden can only get larger as the number of revision hip and knee procedures increases[9][10] . The cost of the revision procedure itself is also increasing. Oduwole et al,[11] have shown a 12.3% increase over two five year periods, (1997-2001 to 2002-2006).

Affordable innovation

Currently, the NHS has two aspects to joint replacement surgery. Firstly, there is the need to service a huge workload in providing conventional procedures safely, promptly and at contained cost. Secondly, there is the challenge of advanced implant materials and surgical techniques.

Specialist orthopaedic centres are at the vanguard of these developments and their expertise will be increasingly important in addressing the needs of the ageing population and in driving the innovation that will help to improve outcomes and thereby ultimately reduce costs.

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[7] *Briggs, T. Getting it right first time - Improving the Quality of Orthopaedic Care within the National Health Service in England. 2012.*

[8] *Lavernia C, Lee DJ, Hernandez VH. The increasing financial burden of knee revision surgery in the United States. Clin Orthop Relat Res 2006;446:221-226*

[9] *National Joint Registry: http://www.njrcentre.org.uk*

[10] *Kurtz S, Mowat F, Ong K, Chan N, Lau E, Halpern M. Prevalence of primary and revision total hip and knee arthroplasty in the United States from 1990 through 2002. J Bone Joint Surg Am. 2005 Jul;87(7):1487-97*

[11] *Oduwole KO, Molony DC, Walls RJ, Bashir SP, Mulhall KJ. Increasing financial burden of revision total knee arthroplasty. Knee Surg Sports Traumatol Arthrosc 2010 Jul;18(7):945-8*

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Expense for the NHS

Complications following orthopaedic surgery are costly to both patient and NHS. Infection alone in total hip replacement (THR) and total knee replacement (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[12].

Large variations in orthopaedic outcomes for similar procedures exist. Poor outcomes will be expensive in terms of increased rehabilitation costs, the management of complications and the need for revision surgery.

Within the NHS, there are many different types of prostheses being used, many of which have few data on long-term effectiveness. There is a large variation in expense depending on the cost of the implant used (as well as the cost of managing any subsequent problems, as demonstrated by the metal-on-metal hip replacement).

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. In 2010 5,829 revision TKRs and 9200 revision THRs were undertaken. With many centres carrying out less than twenty such cases the one-off cost of hiring in appropriate implants and equipment at between £700-1000 per case becomes a significant waste of valuable taxpayers' money[13]. If this continues, not only will it challenge the capacity and expertise of orthopaedic units in some orthopaedic units but also increase costs at a time of increasing financial pressure.

The link between specialisation and outcome

The links between specialisation and the outcomes of care have been extensively studied for specific procedures or conditions[14],[15],[16],[17],[18],[19]. There have also been a number of systematic reviews.

Covering a wide range of procedures[20],[21],[22]. For example one systematic review of nearly 200 studies[23] confirms that there is usually a strong statistical relationship

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[12] *Briggs, T. Getting it right first time - Improving the Quality of Orthopaedic Care within the National Health Service in England. 2012.*
[13] *Briggs, T. Getting it right first time - Improving the Quality of Orthopaedic Care within the National Health Service in England. 2012.*
[14] *Katz et al. 2003*
[15] *Nguyen et al. 2004*
[16] *Bell et al. 2007*
[17] *Shervin et al. 2007*
[18] *Scarborough et al. 2008*
[19] *Wilt et al. 2008*
[20] *Helm et al. 2002*
[21] *Murray & Teasdale 2006*

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between the volume of cases carried out by a hospital or an individual clinician and the chances of a successful outcome. Together these reviews indicate that:

- hospitals and clinicians with higher volumes are likely to produce better than average results – for example these hospitals have much lower revision rates, reduced incidence of hospital infections, better outcomes for patients with multiple co-morbidities; and also high patient satisfaction scores, high staff satisfaction scores.
- hospitals and individual clinicians treating very low numbers of patients (in any category) are not likely to produce the best outcomes[24] and therefore not provide best value for financial resources. The minimum numbers required for high quality care for some procedures may be low[25] but even for common conditions there is evidence that outcomes continue to improve even when annual treatment volume exceeds a thousand cases[26].

In addition, the more complex a procedure is, the more important it is, in terms of outcome for patients, that it is carried out by clinicians and hospitals with significant experience of similar cases[27].

Therefore in terms of specialist orthopaedics it makes clinical and financial sense to focus high volumes of complex procedures in specialist hubs that can provide the right type of experience, multidisciplinary teams and leading- edge treatment that are vital for patients with a range of very rare conditions or serious complications. This is also the most cost effective way to provide access to scarce skills and equipment.

2. Scope

2.1 Aims and objectives of service

The aim of the service is to provide specialist treatment and rehabilitation for adults (it is presumed that a complementary set of care objectives is being drawn up for specialist paediatric orthopaedic care) with complex and/or rare orthopaedic conditions with the aim of aiding patients to either return to work/their normal lives with improved mobility and reduced or eliminated discomfort. This approach is based on a national drive to ensure specialised orthopaedic services are delivered by the appropriately trained and resourced multi-disciplinary team at the appropriate provider and/or through a network model provides an opportunity to improve outcomes for patients and reduce avoidable complications and costs.

This starts from referral to the specialist service, with full assessment and diagnostics at either the specialist hub or linked spoke unit. This may be followed by operative treatment and an episode in the critical care unit and ward. This

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[22] *Davoli et al. 2005*
[23] *Com-Ruelle et al. 2008*
[24] *National Audit Office 2000*
[25] *McCabe et al. 2007*
[26] *Bell et al. 2007*
[27] *Department of Health 2007*

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specification covers the period of treatment within the specialist unit until discharge or transfer to another provider.

The aim of the service is to deliver the highest quality specialist care to patients of all ages who have conditions listed in the service scope for specialised orthopaedics. This list includes:

- **Hip**- secondary or tertiary referred revisions; primary revision (all stages); infected revision; replacement requiring modular prosthesis; massive acetabular defects requiring bone grafting or metal augmentation; complex femoral reconstructive segmental reconstruction.
  See Appendix A for further detail.

- **Knee** -partial knee replacement, infected joint replacement; all revision joint replacements; autologous chondrocyte transplant of the knee[28]; failed ligament reconstruction of the knee; failed osteotomy / complications of osteotomy; complex patella / femoral dysfunction.
  See Appendix B for further detail.

- **Foot & Ankle** -ankle replacement and revision; revision fusion of the hind foot; complex post traumatic reconstruction requiring frames or multi- disciplinary input; complex neurological deformity; tertiary element of an integrated diabetic foot system; tertiary complex reconstruction of a forefoot following failed surgery. Revision or complex arthroscopic procedures e.g. coalition excision or revision surgery for osteochondral lesions.
  See Appendix C for further detail.

- **Shoulder -**complex primary and revision replacement with or without a Computer Aided Socket Design (CASD) and Computer Aided Manufacturing (CAM) CAD CAM prosthesis, revision of complex arthroscopic procedures, deformity correction (congenital), scapulothoracic fusions, glenohumeral joint fusions, major tendon transfers around the shoulder, sternoclavicular joint arthroscopy and stabilization.
  See Appendix D for further detail.

- **Elbow**- complex primary and revision elbow replacement; post traumatic elbow replacement. Ligament reconstructions for elbow instability; complex fracture fixation at the elbow; revision fracture fixation surgery; treatment of post-traumatic elbow stiffness; allograft bone reconstruction for bone loss in upper limb; deformity correction; elbow arthroscopy.
  See Appendix E for further detail.

- **Hand & Wrist** -complex microsurgical reconstruction the thumb; complex tendon grafting; congenital hand deformity; radio-carpal wrist replacement; total distal radio-ulnar joint replacement, ulnar head replacement, novel small joint replacements.; nerve reconstruction; complex soft tissue cover, trapezectomy,

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[28] *NICE's current guidance is that ACI should be performed only within the context of ongoing or new clinical studies that are designed to generate robust and relevant outcome data. NICE will be reviewing this guidance and appraising more recent evidence later in 2012 and interim guidance is listed in Appendix B*

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complex scaphoid reconstruction , It is recognised that because of the highly specialised nature of hand surgery, some of these procedures will be in an Orthopaedic Specialised Centre and others in a Plastic Surgery Specialised Centre.
Please see Appendix F for further detail.

- **Brachial plexus injury (BPI) and peripheral nerve injury (BNI)**
  Please see Appendix G

- **Soft tissue sarcomas (for Primary malignant bone tumours service (adults and adolescents refer to Highly specialised Specification B12/S(HSS)/a)** All investigations to confirm the diagnosis of suspected primary malignant soft tissue sarcoma by a specialised centre following referral of a patient from GP, other hospital or from within the specialist centre, is included in this specification. The investigation includes any radiological investigation (e.g. Magnetic resonance imaging (MRI), computerised tomography (CT) or bone scans), one or more outpatient attendances, multi-disciplinary team (MDT) review and/ or management of the investigation process partially or fully in an inpatient spell. Biopsy is a usual part of the investigation. For some lesions, excision may take place at the same time as biopsy.

  For confirmed soft tissue sarcomas excised as an inpatient, the primary diagnosis is sufficient to identify to the spell. Where the work-up process and subsequent excision is carried out on lesions confirmed as non-sarcoma, a separate identification method will need to be used.

  This definition is similar to the current relevant definitions which are part of the primary bone tumour process. For bone tumour, a separate local process is in place at each provider to identify suspected malignancy patients prior to confirmation of the diagnosis. The work-up phase is funded as a package within bone tumour funding, irrespective of the eventual diagnosis. See Appendix H for further detail.

The broad objectives of the service are to facilitate:

- accurate and timely diagnosis utilising best practice in the assessment of these rare and complex conditions to enable rapid access for new and existing patients.
- delivery of evidence-based treatments plans (where incidence rates make this possible) to enable improved treatment outcomes and the maximisation of patients' functional ability through best practice multi-disciplinary management strategies.
- consistent and equitable decision-making regarding the use of off-licence therapies.
- early diagnosis of patients with conditions listed within the service scope.
- appropriate shared care arrangements between specialities for the management of co-morbidities.
- detailed audit of patient outcomes and experience, shared with colleagues in other centres, enabling the dissemination of best practice and appropriate

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benchmarking of quality

- integration of patient care between regional and national specialised centres and local services through the use of standardised protocols, ensuring that support is delivered as close to patients' homes as possible, ensuring that access to specialist services is maintained.
- increased awareness of best practice in the diagnosis and management of these rare conditions through active engagement and shared care with local providers

2.2 Service description/care pathway

Choice of providers

Specialised orthopaedics services are those services which due to rarity or complexity require specialised expertise. Although coding currently reports 167 providers against this definition they are actually and only appropriately provided in 25-30 hospitals in England. This includes those that provide the most specialised nationally commissioned services, those that provide a range of complex MDT-delivered services and those that deliver trauma services where they are designated major trauma centres within a recognised Trauma Network.

- **Rarity**
  Due to the relative small activity seen by individual clinicians and providers, activity should be concentrated in a small number of providers (clinicians and multidisciplinary staff) to allow the development of expert skills. This will support the efficient use of resources, staff training and audit.

- **Complexity**
  Due to the complexity of the conditions and procedures, and the relatively low volumes seen by individual clinicians and providers, activity should be undertaken by a limited number of clinicians and a MDT who are trained, experienced and work collectively in a multi-disciplinary model at recognised specialist centres or through a network / hub and spoke / outreach model. Supports efficient use of resources, staff training and audit.

- **Tertiary**
  The referral of the most complex cases, often where previous treatments have been unsuccessful, or where serious or multiple co- morbidities exist, or where a second opinion is required: it requires the concentration of activity to be directed to a small number of clinicians and providers to allow the development of expert skills in a small group of clinicians and multi-disciplinary staff. Supports the efficient use of resources, staff training and audit

The service is commissioned to provide:

- assessment, diagnosis and management of all the conditions listed in the service scope.
- provision of surgery for patients with all the conditions listed in the service scope.
- provision of emergency, elective and planned care.

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- provision of rehabilitation services and close working relationship with local rehabilitation staff e.g. community physiotherapy services.
- close working relationship with designated site specific cancer services

Services to be delivered:

The following specialised orthopaedic services should be provided by appropriately trained MDTs a specialist centre or hub provider through networks which have a critical mass to ensure that the right clinical skills and expertise are in place to ensure excellent outcomes. Where this is not possible outreach clinics could be run by specialist teams at the local hospital to ensure that the patient is seen close to their home.

- **Hip -**secondary or tertiary referred revisions; primary revision (all stages); infected revision; replacement requiring modular prosthesis; massive acetabular defects requiring bone grafting or metal augmentation; complex femoral reconstructive segmental reconstruction.

- **Knee**-partial knee replacement, infected joint replacement; all revision joint replacements; autologous chondrocyte transplant of the knee[29]; failed ligament reconstruction of the knee; failed osteotomy / complications of osteotomy; complex patella / femoral dysfunction.

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- **Soft tissue sarcomas (for Primary malignant bone tumours service (adults and adolescents refer to Highly specialised Specification B12/S(HSS)/a)** to confirm the diagnosis of suspected primary malignant soft tissue sarcoma by a specialised centre following referral of a patient from General Practitioner (GP), other hospital or from within the specialist centre is included in this specification. The investigation includes any radiological investigation (e.g. Magnetic resonance imaging (MRI), computerised tomography (CT) or bone scans), one or more outpatient attendances, MDT review and/ or management of the investigation process partially or fully in an inpatient spell. Biopsy is a usual part of the investigation. For some lesions, excision may take place at the same time as biopsy.

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Provider characteristics

Specialist Orthopaedic Centre

A specialist orthopaedic centre has all the facilities and specialties required to be able to treat patients within the scope of this service speciation and in any combination. Elements of the service to manage these patients include:

Pre-operative care

- “Pre-hab” assessment
- A defined team to manage ongoing patient care, from referral to include rehabilitation.
- Access to specialist musculoskeletal radiology

Peri-operative care

- All surgical consultants have the required expertise
- Specialist nursing

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- Access to critical care or high dependency care when required
- Theatre inventory of specialised equipment
- Theatre inventory of relevant implant components
- Appropriate anaesthetist
- A defined ward for specialist orthopaedic patients – “Ring fenced orthopaedic beds”
- A defined theatre suite for orthopaedic procedures with appropriate fully trained orthopaedic theatre staff
- Links to vascular care
- Links to paediatric care
- Links to plastic surgery
- Nuclear medicine physician
- Pathologist
- Radiotherapist/oncologist
- Established MDT network.

Post-operative care

- Specialised physiotherapists and occupational therapists
- Specialised orthotics
- A defined service for appropriate specialised orthopaedic rehabilitation and ‘repatriation’ pathway.
- Submission of a core data set to all appropriate registries.

All MDT members must hold specific expertise relating to the specialist orthopaedic conditions in question.

Specialist Orthopaedic Unit

A spoke unit is a hospital that works in collaboration through a network with a specialist orthopaedic centre as a part of formalised network to provide care for patients classified in the complex category. All such hubs and spokes will be quality assured against standards to ensure that best practice is followed allowing for excellent outcomes.

The elements a spoke unit need to have in place include:

- A dedicated specialist orthopaedic team which includes
    - A specialist orthopaedic team leader of agreed level of seniority and training
    - Experienced anaesthetists.
    - Experienced musculoskeletal radiologists
    - Experienced physiotherapists and occupational therapists
    - Theatre inventory of specialised equipment
    - Theatre inventory of relevant implant components
- Access to CT and MRI Scanning
- Access to critical care or high dependency care when required
- A rehabilitation service

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- Rehabilitation prescriptions for every patient
- Submission of a core data set to all appropriate registries.

Networks

It is not the intention in supporting a network model of delivery that all complex or specialist procedures or care is only undertaken at the specialist centre. Rather it is in the intention that by delivering care through a network model that there will be increased local access to complex or specialist procedures and care, but within an appropriate framework which ensures that the required expertise, resources, support and clinical governance are available, standards followed and outcomes reported. Configuration of the network and the patient pathway will be for local determination by commissioners and clinicians informed by this specification, best practice, the location of providers and the needs of patients.

- Specialist orthopaedic networks should comprise one or more specialist centre hubs linked to a number of spoke units which will be deemed specialist.
- Networks work together collaboratively ensuring patients have seamless access to care and transfer back to their locality hospital home when medically fit.
- Networks will meet regularly to examine performance through formal governance processes which will include infection rate and readmission data. Performance improvement is undertaken through regular mortality and morbidity meetings which will generate action plans for improvement.
- Oversight of the network will be undertaken according to local structures and processes within a quality assurance framework.

Referrals

All activity would be via a tertiary referral process unless there is an agreed pathway from primary care In local hospitals/spoke units, outreach clinics should be led by the specialist orthopaedic team from the specialist provider.

2.3 Population covered

The specialised orthopaedics service is commissioned to provide and deliver high quality medical and surgical treatment for patients with the conditions listed in the service scope for specialised orthopaedics.

- All patients within England will have access to care within a specialised orthopaedic network. There will be differences in access methods based on the geography of the area.
- Although the majority of referrals are likely to arise from District General Hospitals (DGHs), GPs should operate a low threshold in terms of referring patients for specialist assessment where there is a clear indication that specialist care is likely to be indicated – for example, problems arising from an existing replacement joint.
- Children are treated in those units meeting the formal requirements for paediatric care or in collaboration with neighbouring paediatric units and it is presumed that paediatric specialist orthopaedic care is described in the paediatric specialised commissioning scope and service specification.

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Patients are generally referred by hospital consultants, although referrals can come from general practitioners in some circumstances, for example where the issue relates to the recurrence of a complication or the obvious degeneration of a replacement joint. Once referred the patient will be assessed by a MDT.

The service is accessible to all patients with a suspected specialised orthopaedic condition regardless of sex, race or gender. Providers will require staff to attend mandatory training on equality and diversity and the facilities provider to offer appropriate disabled access for patients, family and carers. When required the providers will use translators and printed information available in multiple languages.

The provider has a duty to co-operate with the commissioner in undertaking Equality Impact Assessments as a requirement of race, gender, sexual orientation, and religion and disability equality legislation.

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2.4 Any acceptance and exclusion criteria

There will be a network from which Clinical Commissioning Groups (CCGs) can commission common orthopaedic services, including:

- **Knee**
  primary soft tissue surgery; primary joint replacement, arthroscopy
- **Hip**
  primary joint replacement; arthroscopy
- **Foot and ankle**
  routine foot surgery; routine non-complex surgery of hind foot including fusions; arthroscopies
- **Shoulder**
  most routine arthroscopic procedures; routine rotated cuff repair; subacromial decompression; shoulder stabilisation; routine shoulder replacement,.
- **Elbow**
  routine soft tissue procedures around the elbow;
- **Hand**
  routine soft tissue surgery to facia and tendon; routine arthrodesis of joint; routine nerve release; routine joint replacement; trapezectomy.

2.5 Interdependencies with other services

Specialist orthopaedic conditions are complex and successful management involves a number of specialties. Specialist orthopaedic networks must have formal links with the following specialties in order to provide a comprehensive service:

- Pre-operative assessment
- Radiology
- Neurosurgery
- Spinal Cord Injury Services
- Plastic Surgery Transfusion services Vascular services Anaesthetics Theatres
- Intensive Care

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- Rehabilitation Services (implementing the rehabilitation
- 'prescription/recommendation' of the specialist centre/unit
- Paediatrics
- Oncology – if providing care for patients with primary bone or soft tissue sarcomas and bony metastases
- General medicine

3. Applicable Service Standards

3.1 Applicable national standards e.g. NICE, Royal College

Consideration should be given to the role of the National Joint Registry. As submission is compulsory it could play a key role in providing supporting information as to which activity is specialised as well as providing information on a range of process and outcomes measures Expansion of the National Joint Registry to include other joints (hand, wrist, elbow, shoulder, spine, ankle, foot) is strongly encouraged.

Adherence, where appropriate to the principles of The Enhanced Recovery Programme is recommended.

4. Key Service Outcomes

- To provide a comprehensive system of care for people requiring specialist orthopaedic treatment, there are three components which should be delivered through a network/hub and spoke model. They are:
    - **Rarity**- patients with exceptionally rare conditions should be treated at a small number of super specialist hubs.
    - **Complexity**-patients with highly complex conditions or requiring complex procedures should be treated at recognised specialist centres or through a network / hub and spoke / outreach model.
    - **Tertiary-**patients with complex conditions, often where previous treatments have been unsuccessful, or with serious or multiple co-morbidities and those requiring a second opinion should be assessed and treated at specialist hubs.
- To provide patient-centred and integrated care pathways from the pre-hospital phase through to rehabilitation and a return to socio-economic functioning.
- To ensure the quality of the system is monitored and subject to a process of continuous quality improvement.
- To improve the functionality and increase the quality of life of those patients with rare and/or highly complex orthopaedic conditions and complications.
- To provide access to care that will enhance patients' quality of life and life expectancy.

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- Improved clinical outcomes..
- Provision of cost-effective services
- Care delivered at the appropriate time and place.
- Equity of service provision.
- Innovation in service delivery.

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APPENDIX A – SPECIALISED HIP TREATMENT

FURTHER DETAILS

Notes
There are 10,000 revision THRs per annum from data extracted from the National Joint Registry (NJR).

Paediatric hip disorders – It is assumed that the paediatric specialised surgery definition set will include - congenital dislocation of the hip (CDH), Perthes, Slipped upper femoral epiphysis (SUFE), infection in hip. If this is not the case then this work should be covered within this definition set.

All THR revisions

Procedures
- Simple 1-stage revision procedures
- Single component revision
- 2-stage revision
- Osteotomy around the hip – femoral or acetabular.
- Revision acetabulum of THR with or without bone graft
- Revision of femoral stem of THR with or without bone graft
- Fixation of peri-prosthetic fracture around the hip
- Attention to THR without revision
- Custom/ endoprosthetic revisional replacement of hip
- Bone or strut grafting

Diagnoses

- Cemented or uncemented THR failure
- Chronic/ recurrent dislocations
- Infection
- Trauma
- Wear & bone loss
- Aseptic loosening
- Aseptic lymphocytic vasculitis-associated lesions (ALVAL) / metallosis

Complex primary THR

Procedures

- Custom/ endoprosthetic primary replacement of hip
- Primary THR for the following diagnoses

Diagnoses

- Post perthes, SUFE, congenital e.g. Achondroplasia

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- Tumour – Primary or Secondary, Benign or Malignant
- Infection
- Bone Loss
- Inflammatory Arthritis
- Tumour – Primary or Secondary, Benign or Malignant

Replacement requiring modular prosthesis

Procedures

- Mega-Endoprosthetic replacement involving femur and/or acetabulum and/or pelvis

Diagnoses

- Tumour – Primary or Secondary, Benign or Malignant
- Infection
- Bone Loss
- Trauma

Massive acetabular defects requiring bone grafting or metal augmentation

Procedures

- Acetabular Reconstruction
- Cad-Cam / Triflange / Cone acetabular/Pelvic replacement

Diagnoses

- Tumour, Primary or Secondary, Benign or Malignant
- Infection
- Wear
- Inflammatory Arthritis

Complex femoral reconstructive segmental reconstruction

Procedures

- Long-Stem Femoral revision
- Strut grafting + bone grafting + allografting
- Mega-Endoprosthetic femoral replacement

Diagnoses

- Trauma
- Tumour, Primary or Secondary, Benign or Malignant
- Component loosening

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APPENDIX B – SPECIALISED KNEE TREATMENT
FURTHER DETAILS

Notes
There are a total of 5,000 revision knee operations per annum (source, National Joint Registry).

There are 1,000 Patellofemoral replacement of the knee per annum (source, National Joint Registry)

There are 6,900 Unicondylar replacements of the knee per annum (source, National Joint Registry)

Interim guidance for those commissioning Autologous Chondrocyte Implantation - February 2013

NICE has stated previously that ACI should not be routinely commissioned and should only be undertaken as part of a clinical study.

NICE"s current guidance, (Technology Appraisal 89), is that autologous chondrocyte implantation (ACI) is not recommended for the treatment of articular cartilage defects of the knee joint except in the context of ongoing or new clinical studies that are designed to generate robust and relevant outcome data, including the measurement of health-related quality of life and long term follow up. Patients should be fully informed of the uncertainties about the long term effectiveness and the potential adverse effects of this procedure NICE is expected to review and appraise more recent evidence later in 2012.

Partial Knee Replacement

Procedures

- Unicondylar Total Knee Replacement (TKR)
- Patellofemoral replacement of the knee

Diagnoses

- To be added.

Infected joint replacement

Procedures

- 2-stage revision TKR

Diagnoses

- Infection

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All revision joint replacements

Procedures

- 1 or 2-stage revision TKR Stemmed Revision
- Semi & Constrained knee replacement
- Mega-Endoprosthesis

Diagnoses

- Infection
- Loosening – aseptic
- Wear
- Tumour, Primary or Secondary, Benign or Malignant
- Trauma

Autologous chondrocyte transplant of the knee

Procedures

- Autologous Chondrocyte implantation Matrix Assisted Chondrocyte implantation Fibrin gel assisted Chondrocyte implantation
- Chondral repair of the knee involving the use of cells – chondrocytes or mesenchymal stem cells

Diagnoses

- Chondral defect
- Osteochondral defect
- Large unstable osteochondral defect in young adult knees
- Trauma

Failed ligament reconstruction of the knee

Procedures

- 1 or 2-stage revision ACL repair with either patella tendon, redo-hamstring, allograft or synthetic ligaments
- Ligament reconstruction in adolescents
- Complex ligament Reconstruction around the knee
- Revision of ligament knee reconstruction single or multiple
- Complex osteotomy around the knee

Diagnoses

- Infection
- Trauma
- Failure of graft

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Failed osteotomy / complications of osteotomy

Procedures

- Complex osteotomy around the knee
- Re-do Osteotomy
- Bone grafting
- Total knee replacement

Diagnoses

- Mal/non/delayed union
- Trauma
- Infection
- Over correction

Complex patella / femoral dysfunction

Procedures

- Medial patella-femoral ligament reconstruction
- Medial reefing
- Roux-Goldthwaite procedure
- Trochlearplasty
- Medial or Lateral release
- Patello-Femoral replacement

Diagnoses

- Dysplasia
- Patella dislocation
- Trauma
- Inflammatory Arthritis

APPENDIX C – SPECIALISED FOOT AND ANKLE TREATMENT FURTHER DETAILS

Ankle replacement and revision ankle replacement

Procedures

- Ankle Replacement
- Ankle replacement with fusion or osteotomy and /or fusion to correct deformity
- Revision Ankle Replacement

Diagnoses

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- ankle osteoarthritis, post traumatic arthritis, rheumatoid arthritis deformity associated with above
- Diagnoses in revision cases - infection, loosening, periarticular fracture,

Revision ankle and hindfoot fusions

Procedures

- Revision of Ankle Subtalar, Tibiocalcaneal and triple arthrodeses
- Revision Midfoot arthrodesis, extended midfoot arthrodesis, with bone graft and internal and external fixation.

Diagnosis of/reason for revision

- Infection Non-union Mal-union

Diagnosis of underlying condition

- Post-traumatic arthritis
- Osteoarthritis
- Rheumatoid arthritis
- Deformity associated with neurological disease, including hereditary motor sensory neuropathy
- Post polio
- Spinabifida
- Spinal injury
- Diabetes (see below)

Complex post-traumatic reconstruction

Procedures

- Revision fracture fixation with soft tissue covering coverage requirement
- (plastics) of the ankle, calcaneum or midfoot
- Realignment procedures with osteotomy and internal fixation or circular frame application
- Bone block subtalar arthrodesis following calcaneal fracture
- Revision reconstruction of distal tibia, ankle, calcaneum or midfoot fractures
- (fracture of the navicular or cuboid)

Diagnosis

- Non-union
- Mal-union
- Soft tissue injury
- Infection failing to heal with simple measures Failure of primary fixation due to the above Progressive post-traumatic osteoarthritis

Diabetic foot disease

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This would be the tertiary element of an integrated diabetic foot system. As per World Health Organisation and NICE guidelines all patients should be referred to a multidisciplinary diabetic foot care team within each hospital. The tertiary element of this should be referred on to a regional centre.

Procedures

- Revision of fusion/stabilisation of the midfoot/hindfoot
- Complex fusion of multiple joints; ankle. subtalar, talonavicular and calcaneocuboid joints.

Diagnosis of the foot

- Charcot arthropathy

Diagnosis of the patient

- Diabetes with neuropathy +/- a history of ulceration

Complex deformity (neurological)

Procedure

- Complex procedure including osteotomies of the calcaneum and midfoot with multiple procedures to the forefoot
- Tendo Achilles lengthening
- Multiple tendon transfers

Diagnosis of foot

- Progressive severe deformity into pes cavovarus and pes planovalgus
- (including type IV)
- Non diabetic severe Charcot arthropathy

Underlying diagnosis

- Hereditary motor sensory neuropathy
- Other inherited neurological disorders
- Severe deformities secondary to spinal injury or trauma
- Severe unexplained progression into pes cavus or pes planus valgus

Tertiary complex reconstruction of forefoot following failed surgery

Procedure

- Revision of multiple tarsometatarsal fusions for non or mal union
- Revision procedure involving osteotomy and/or soft tissue procedures to

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multiple deformed rays (metatarsals and toes) including revision fusion as part of above

Diagnosis of the foot

- Failure of forefoot surgery to gain satisfactory state after multiple procedures to the forefoot
- Local surgical requirement for referral to specialist tertiary service for revision deformity correction

Diagnosis of the patient

- Rheumatoid arthritis
- Seronegative arthritis
- Generalised osteoarthritis
- Severe hallux va

APPENDIX D – COMPLEX SHOULDER TREATMENT

FURTHER DETAILS

Complex primary and revision shoulder replacement with or without a CAD CAM prosthesis

Procedures

- Procedures Simple 1 stage revisions.
- Single component revisions.
- 2 Stage revisions
- Custom implants

Diagnoses

- Instability
- Infection
- Aseptic loosening
- Wear
- Fracture, tumour, congenital deformities

Revision of complex arthroscopic procedures

Procedures

- Revision reconstructive arthroscopic procedures

Diagnoses

- Failed instability surgery

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- Large re-tears of the rotator cuff
- Deformity correction, congenital

Procedures

- Resections
- Releases
- Osteotomies
- Muscle transfers

Diagnoses

- Sprengels shoulder
- Scapulothoracic fusions (this is the procedure description)

Diagnoses

- Scapulothoracic fusions
- Diagnosis Fascioscapulohumeral dystrophy, neuralgic amyotrophy, polio,
- Nerve palsy's and salvage of tendon transfers for nerve palsy

Glenohumeral joint fusions

Procedures

- Arthroscopic assisted and open fusion of the Shoulder

Diagnoses

- End stage failed stabilisation surgery Deltoid dennervation and detachment Failed arthroplasty
- Tumour
- Brachial plexus injuries
- Infection

Major tendon transfers around the shoulder

Procedures

- Transfers of pectoralis major, latissimus dorsi and teres major, Trapezius. Tendon lengthening around the shoulder

Diagnoses

- Massive cuff tear, obstetric brachial plexus injury, traumatic paralysis

Sternoclavicular joint arthroscopy and stabilization

Procedures

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- Arthroscopic debridement
- Stabilisation
- Resection

Diagnoses

- Osteoarthritis
- Infection
- Instability
- Tumour

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APPENDIX E – COMPLEX ELBOW TREATMENT

FURTHER DETAILS

Complex fracture fixation at the elbow

Diagnoses

- Fractures of the Coronoid
- Complex fractures of the radial head
- Fractures of the coronoid and radial head
- Terrible triad injuries

Procedures

- Open reduction and internal fixation of coronoid fracture
- Open reduction and internal fixation of radial head fracture
- Radial head replacement

Revision fracture fixation surgery

Diagnoses

- Non union/Malunion distal humeral fractures
- Non union/Malunion proximal ulna fractures
- Non union/Malunion radial head fractures

Procedures

- Osteotomy and replating distal humeral fracture
- Distal humeral hemiarthroplasty
- Total elbow replacement
- Osteotomy and replating proximal ulna fracture
- Radial head excision/replacement

Treatment of post-traumatic elbow stiffness

Diagnoses

- Post-traumatic soft tissue elbow stiffness
- Post-traumatic bony elbow stiffness

Procedures

- Arthroscopy and capsular release
- Open Column procedure with arthrolysis
- OK procedure

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- Bony reconstruction surgery
- All of the above with/without Continuous Passive Motion following surgery

Deformity correction

Diagnoses

- Malunion of the distal humerus
- Malunion of the proximal ulna

Procedures

- Osteotomy realignment and internal fixation
- Total elbow replacement

Elbow arthroscopy

Diagnoses

- Loose bodies in the joint
- Capsular tightness
- Synovitis

Procedures

- Removal of loose bodies
- Arthrolysis
- Synovectomy

Ligament reconstruction for elbow instability

Diagnoses

- Acute dislocation with/without fracture and instability
- Chronic posterolateral or posteromedial instability

Procedures

- Ligament repair and reinforcement
- Ligament reconstruction with tendon graft/artificial ligament

Complex primary and revision total elbow replacement

Diagnoses

- Rheumatoid arthritis with limited bone loss
- Psoriatic arthritis

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- Haemophilic arthritis
- Revision total elbow replacement with major bone loss or infection

Procedures

- Total elbow replacement with bone grafting
- Single stage revision
- Two stage revision

Post traumatic elbow replacement

Diagnoses

- Acute or chronic complex distal humeral fractures in older patients that can't be reconstructed
- Salvage of distal humeral fractures following conservative management or failed internal fixation

Procedures

- Total elbow replacement with bone grafting
- Removal of metal work and total elbow replacement with bone grafting

Allograft bone reconstruction

Diagnoses

- Massive structural bone loss around the elbow

Procedures

- Allograft reconstruction +/- total elbow replacement, bone grafting +/- bone morphogenic protein

APPENDIX F – SPECIALISED HAND AND WRIST TREATMENT[i]

FURTHER DETAILS

Complex reconstruction of the thumb

Diagnosis

- Loss of thumb

Procedure

- Pollicisation

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- Thumb lengthening
- Toe transfer

Complex tendon grafting

Diagnosis

- Flexor tendon repair failure
- Flexor tendon rupture

Procedure

- One stage and two stage tendon graft

Congenital hand deformity

Diagnosis

- The entire spectrum of congenital hand deformity

Procedures

- The entire spectrum of congenital hand reconstruction, excluding simple

Novel small joint replacements

Procedures

Use of designs which have not already become established without a proper literature base e.g. any wrist replacement, any partial wrist replacement, the total distal radioulnar joint (DRUJ) replacement, thumb base replacement, any new design of Thumb carpo-metacarpal joint (CMC), metacarpophalangeal joints (MCP) and proximal interphalangeal joint (PIP) replacement (established designs of ulnar head hemiarthroplasty, PIP, MCP are excluded)

Nerve reconstruction

Diagnosis

- Loss of nerve length due to trauma or tumour

Procedures

- Secondary Nerve grafting (i.e. not primary trauma) Nerve conduits

Complex soft tissue

Diagnosis

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- Complex loss of tissue- skin and/or tendon and/or bone

Procedures

- Free flap
- Large pedicled flap (not small skin flap)

Complex scaphoid reconstruction

Diagnosis

- Scaphoid non-union having had previous surgery
- Scaphoid malunion

Procedures

- Vascularised scaphoid graft as second procedure
- Other interpositional bone graft as re-do procedure
- Scaphoid osteotomy

APPENDIX G – BRACHIAL PLEXUS AND PERIPHERAL NERVE INJURY

FURTHER DETAILS

Procedures

- Neurolysis for BPI
- Nerve repair for BPI
- Exploration for BPI
- Nerve transfer for all PNI
- Nerve grafting for all PNI
- Free muscle flap for BPI

Diagnoses

- Axonotmesis
- Neurotmesis
- Neuropraxia
- Trauma
- Tumour, Primary or Secondary, Benign or Malignant

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APPENDIX H – SOFT TISSUE SARCOMA

FURTHER DETAILS

Notes

All soft tissue swellings > 5cms and deep to the fascia should be referred to a specialist centre for investigation and surgical treatment.

All soft tissue lesions, whether superficial of deep, which are less than 5 cms in size but are increasing in size and shown to be solid and not cystic on imaging using ultrasound, and do not fully fat suppress on MRI should be referred for appropriate investigation to a specialist centre.

Procedures

- Biopsy of soft tissue swelling- open or needle biopsy
- Complete imaging of soft tissue tumours
- Excision of Soft tissue sarcoma
- Complex excision of Soft tissue mass
- Combined excision of soft tissue mass with bone followed be endoprosthetic reconstruction
- Excision of recurrent soft tissue tumour
- Re excision of soft tissue tumour bed
- Excision of soft tissue tumour and reconstruction with; skin graft, flap which can be local or free flap
- Attention to wound following soft tissue tumour excision
- Amputation for soft tissue tumour primary or secondary – both upper and lower limb. This will include; forequarter amputation, shoulder disarticulation, trans humeral amputation, forearm amputation, amputation of the hand, amputation of thumb of fingers, ray amputation of hand. Also hindquarter amputation, hip disarticulation, above knee amputation, below knee amputation, amputation of all or part of foot, ray amputation.

Diagnoses

- Tumour, Primary or Secondary, Benign or Malignant

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[i] 'Hand Surgery in the UK, manpower, resources, standards and training' British Society for Surgery of the Hand

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