Screening hips of newborns in Scotland

A Health Technology Assessment scoping report
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Karen Macpherson
Screening hips of newborns in Scotland
Foreword

A key function of NHS Quality Improvement Scotland (NHS QIS) is to provide advice to NHSScotland on the clinical and cost effectiveness of any methods that are used to promote health. Such methods are referred to as ‘health technologies’ and NHS QIS provides such advice through its health technology assessments (HTAs). The term ‘health technology’ does not just refer to medical technology; it covers a wide range of methods of intervening to promote health, including the prevention, diagnosing or treatment of disease, and the rehabilitation or long-term care of patients, as well as drugs, devices, clinical procedures and healthcare settings.

NHS QIS has completed a comprehensive scoping exercise on screening of newborns for Developmental Dysplasia of the Hip (DDH - formerly known as Congenital Dislocation of the Hip (CDH)), to determine whether a full HTA should be undertaken on this topic.

Our work identified high quality evidence that will be of interest to those working in screening programmes. We also identified those areas where it is important that further research is carried out. We concluded that it is not currently appropriate to undertake an HTA. We do however wish to share this report with the wider NHS community. We believe that it will prove a valuable resource to all those involved in developing the screening of hips of newborns.

David R Steel

Chief Executive
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Screening hips of newborns in Scotland
1 Executive summary

This report documents the scoping exercise undertaken to determine whether NHS Quality Improvement Scotland (NHS QIS) should undertake a Health Technology Assessment (HTA) on the screening of hips of newborns in Scotland.

An extensive literature search was carried out in June 2005 to identify the existing clinical and cost effectiveness high level evidence on screening the hips of newborns. A number of high quality systematic reviews and guidelines were identified and these are summarised in the report.

Approximately 1 to 2 infants out of every thousand suffer from varying degrees of hip abnormality, known as developmental dysplasia of the hip (DDH). The incidence varies according to factors such as ethnic and geographic origin, sex of the infant, the position of the infant before birth and its size. The natural history and long-term outcomes of the condition are subject to debate. However the condition can lead to significant disability in later life if left untreated. Early treatment usually consists of abduction splinting. It is believed that if DDH is detected at an early stage and adequately treated there is less need for invasive procedures and long-term disability is reduced. Not all late diagnoses lead to a poor outcome however and there are risks associated with treatment, particularly avascular necrosis. National screening to identify infants at increased risk of hip instability was introduced in the UK in the late 1960s. This initially involved clinical examination using two diagnostic manoeuvres. Use has also been made of universal or selective ultrasound to examine the hip; this allows changes not evident on clinical examination to be detected.

The reviews considered in this scoping exercise all identified the lack of good quality primary studies investigating the outcomes of screening programmes and given this, the difficulty of drawing conclusions on the effectiveness of the programmes. While both clinical and ultrasound screening appear to reduce the number of late invasive interventions performed, they depend on the training and expertise of the examiner, and can result in overtreatment. Compared to clinical screening alone, universal ultrasound screening appears to increase overall treatment rates, but it does result in fewer late invasive procedures. Overtreatment rates can be reduced by carrying out the screen after one month of age. Selective ultrasound of infants with clinically identified neonatal hip instability could reduce the number of infants needing abduction splinting without increasing the risk of operative procedures at a later stage. Uncertainties remain however around the use of ultrasonography such as its effectiveness in screening infants with risk factors for hip displacement but clinically stable hips. Arthrography and magnetic resonance imaging enable determination of the precise hip anatomy, however neither is a
practical option for screening this age group.

There appear to be only marginal differences in the overall costs of using clinical, selective or universal ultrasound screening but conclusions regarding cost effectiveness are limited by the lack of clinical effectiveness data. On the basis of current evidence, the National Screening Committee advocates clinical screening with selective ultrasound for infants with risk factors or clinical signs present. Canadian, American and Australian guidelines however all make slightly different recommendations. It is clear from the literature considered that further research is required. In particular, studies are needed to investigate the clinical significance of hip instability, the use of risk factors in selecting newborns for screening, long-term functional outcomes and the training of staff to perform screening. The outcomes of screening for DDH have never been compared to clinical diagnosis in a randomised trial. However this screening has become such an accepted part of newborn health care that it would be almost impossible to discontinue it without compelling contradictory evidence.

Despite the major uncertainties surrounding screening for DDH, undertaking an HTA at this time is not considered to be useful. The evidence as it stands has already been extensively evaluated; the unresolved issues that remain require primary research to be undertaken.

While an HTA is inappropriate, there is serious concern in Scotland regarding the variation in practice in identifying and managing this condition. This needs to be addressed, and there is a need to standardise practices and procedures based on the current best evidence. NHS QIS, when planning its future work programme, will consider the issues identified in this report and how they may be addressed eg through undertaking audit work.
2 Introduction

“Routine early ultrasound scanning of hips in neonates for the detection of developmental hip dysplasia” was proposed to the Health Technology Board for Scotland as a potential topic for a Health Technology Assessment in 2002. After carrying out a scoping literature search and consulting with experts, it was decided at that time not to proceed with the topic. However, following a meeting held in Edinburgh on 24 May 2005 entitled ‘Hip Screening in Scotland: Which way forward?’, it was agreed that NHS QIS would reconsider this topic, although more broadly, by looking at the whole area of hip examination for neonates, and identify if there was new evidence available to suggest that an HTA should now be undertaken. As this was a scoping exercise, only published literature was to be considered. Public consultation is not undertaken at this stage of topic selection.

This document provides an introduction to the topic, and then sets out the available evidence before discussing the usefulness of undertaking a Health Technology Assessment in this area.
3 Background

3.1 Developmental dysplasia of the hip

Developmental Dysplasia of the Hip (DDH) comprises a range of abnormalities of the hip that includes hips that are unstable, malformed, subluxated, or dislocated (Aronsson et al., 1994). The condition was previously known as Congenital Hip Dislocation (CHD), but was renamed to reflect the wider range of possible problems and their occurrence after birth as well as being present at birth (Witt, 2003).

3.2 Incidence

The reported incidence of DDH is influenced by genetic and racial factors, diagnostic criteria, the experience and training of the examiner, and the age of the child at the time of the examination (American Academy of Pediatrics, 2000). There is no “gold standard” for diagnosis during the newborn period (American Academy of Pediatrics, 2000). After the introduction of clinical screening in the late 1960s, Hall (2003) points out that reported incidence rates in Northern Europe went up from 0.8 –1.6 per 1000 infants with DDH requiring surgery to between 2.5 and 20 per 1000 infants with neonatal hip instability. The National Screening Committee (2004) suggests a current DDH incidence of 1.2 per 1000 births.

3.3 Risk factors

Risk factors for DDH include the following (Witt, 2003), although Patel (2001) notes that more than 60% of children do not have identifiable risk factors:

- Geographic, ethnic, cultural factors – DDH is more common in Caucasian neonates than in neonates of African American, Korean, or Chinese origin. The incidence increases in colder climates which is thought to be due to the tight swaddling of infants to protect them against the cold (Norton & Mitre, 2003).

- Female sex – DDH is 4–8 times more common in female than male infants (Norton & Mitre, 2003). Girls are more sensitive to the maternal hormone relaxin, which can cause laxity of the ligaments with resultant instability of the hip.

- First pregnancy – due to constrained fetal movement.

- Breech presentation – the breech position results in increased flexion of the hip and decreased movement.

- Oligohydramnios – which results in fetal compression.
• Large for gestational age.
• Positive family history.
• Limited postnatal mobility.

3.4 Untreated DDH

The natural history and long-term outcomes of DDH are still subject to debate. Patel (2001) states that prospective studies of the long-term morbidity of DDH are long overdue. The morbidity varies significantly because the disorder covers a wide spectrum of problems, but can include hip, low back and knee pain (Woolacott et al., 2005a), gait abnormalities and may predispose adults to degenerative joint disease (Patel, 2001). McKechnie et al. (2004) note that up to 94% of adults with untreated congenital dislocation of the hip may develop moderate or severe osteoarthritis before reaching their twenties. In the neonatal period there may be sufficient laxity in the joint that the hip spontaneously dislocates and reduces again. If the condition does persist and is not diagnosed and treated, anatomical changes in the joint develop, and eventually the correct positioning of the femoral head within the acetabulum requires surgery. It is thought that if DDH is detected at an early stage and adequately treated, there is less need for invasive procedures to be used (Woolacott et al., 2005b) and the risk of long-term disability is reduced (National Screening Committee, 2004). Not all late diagnoses lead to a poor outcome however, and adverse outcomes sometimes occur following early treatment (National Screening Committee, 2004).

3.5 Treatment

If infants are diagnosed at an early stage, the usual treatment is with abduction splints (e.g. Pavlik harness, Craig splint, Von Rosen splint) (Witt, 2003). The treatment success rate when complete dislocation is present is approximately 85% (Haynes & Torchia, 2005). The effectiveness of splinting has however not been assessed in a randomised control trial and long-term follow-up is required (Elbourne et al., 2002). There are also risks associated with abduction splinting, particularly avascular necrosis of the femoral head, which can result in premature osteoarthritis of the hip (Dezateux et al., 2003). It has been suggested that splints might interfere with daily care and with the relationship with parents (Elbourne et al., 2002; Gardner et al., 2005).
3.6 Screening

National screening tests to identify infants with neonatal hip instability at increased risk of hip displacement were introduced in the UK in the late 1960s. These involve establishing the medical history of the infant, and carrying out a clinical examination including the use of the Ortolani and Barlow manoeuvres. In the Ortolani test, the femur is flexed and abducted while lifting anteriorly and a distinct low-frequency ‘clunk’ is noted as the femoral head slides back into place. The Barlow test involves flexing and abducting the femur while posteriorly directed pressure is applied. This displaces an unstable hip from the acetabulum (Witt, 2003). Neither test will effectively detect hips that are already completely dislocated and cannot be moved back into the socket. Practice is required in using the tests but this is difficult to obtain as the number of positive cases are fairly small and further manipulation of an unstable hip can worsen the condition (Witt, 2003). The problem is compounded by the fact that it is frequently junior members of staff who are expected to perform the clinical examination.

Since the mid 1980s, static and dynamic ultrasound has been used increasingly to examine the hip. Cartilage is visualised allowing detection of abnormal positioning of the femoral head within the acetabulum, instability and dysplasia. Changes not evident on clinical examination can be detected, but this can then lead to overtreatment, especially if the screening is carried out in the first few weeks of life when many problems can resolve spontaneously (Woolacott et al., 2005a). As with the clinical examination, the accuracy of the diagnosis can depend on the skills of the examiner. Ultrasound scanning can be either universal or selective, targeting those infants considered to be at most risk.

Arthrography and magnetic resonance imaging enable determination of the precise hip anatomy, however neither is a practical option for screening this age group (American Academy of Pediatrics, 2000).
4 Review of clinical and cost effectiveness literature on screening for DDH

4.1 Literature search

An extensive literature search was undertaken in early June 2005 to identify published and ongoing Health Technology Assessments, systematic reviews, guidelines and economic evaluations considering screening of newborn hips. The list of sources searched is given in Appendix 1. No date or language restrictions were applied.

4.2 Clinical effectiveness review

4.2.1 Clinical examination

A systematic review by Patel (2001) with the Canadian Task Force on Preventive Health Care published in 2001 included 13 English language studies covering the clinical examination of infants. These comprised 12 descriptive studies and one editorial. Patel notes that when the Ortolani and Barlow tests are combined they can be highly specific (0.98-0.99) for the diagnosis of hip dislocation or subluxation. The sensitivity of the procedures, however, is very dependent on the skills and experience of the person carrying out the examination. With experienced examiners, Patel notes that sensitivities of between 0.87 and 0.99 can be achieved, although it is suggested elsewhere that this can fall to as low as 0.74 (Witt, 2003). The review reports that since clinical screening was introduced the number of infants diagnosed with hip joint instability has gone up from 1 to 2 cases per 1000 infants to 5 to 20 per 1000 infants, and the rate of abduction splinting has increased similarly. The rate of operations for DDH has decreased from 1 to 2 per 1000 infants to 0.2 to 0.7 per 1000. It is suggested that such a large increase in the rate of cases implies a significant number of false positives. When considering the fall in operations, these false positives unnecessarily treated with abduction splinting, and also false negative infants who will present later, must be taken into account.

4.2.2 Ultrasonography

A high quality systematic review by Woolacott et al. (2005a) examined the clinical and cost effectiveness of ultrasound screening of newborns for DDH, covering the literature from 1975 to March 2004. Only one study of the diagnostic accuracy of screening was identified. It reported a negative predictive value for ultrasound of 99.4% and positive predictive value of 61.6%. These values would indicate the occurrence of a significant number of false positives. The results are of limited value, however, as the study was considered to have used an inappropriate reference standard. Ten
studies evaluating the impact of ultrasound screening in newborn infants for DDH on therapeutic decision making and on patient outcomes were identified. All studies were considered to be of poor quality, including the two identified RCTs, and this limited the conclusions which could be drawn. The authors suggest the following:

- Screening of all newborns (henceforth known as universal screening) at birth or before one month of age using ultrasound appears to increase overall treatment rates compared to clinical screening. There could potentially be an overtreatment rate of 16 infants per 1000 screened. Carrying out universal ultrasound screening after the first month may reduce this rate.

- Universal screening at birth using ultrasound does however result in fewer patients requiring open or closed reductions or in-hospital treatment than previous screening programs involving clinical screening.

- Universal ultrasound screening at birth for DDH reduced the number of cases of late detected DDH by 1 to 2 per 1000 when late is considered to be after 1 month of age, but not when late is considered to be after 8 months.

- The rates of cases of DDH diagnosed after 1 month of age are higher with selective ultrasound (in which only infants deemed to have particular risk factors, or with clinically identified signs of DDH are screened) than with universal ultrasound, however the difference is not statistically significant.

- There is a lack of data on the adverse effects of universal ultrasound screening of newborns for DDH and the associated treatments.

When considering ultrasonography, the review by Patel (2001) focused mainly on the large trial by Rosendahl et al. (1994) which is included in the Woolacott et al. review. The conclusions drawn by Patel reflect those of Woolacott et al.

The American Academy of Pediatrics (2000) built a decision model to enable them to make recommendations on the screening process for DDH in newborns. They concluded that based on the lack of data on late diagnosis using ultrasound screening, they could not currently recommend its use.

The UK Hip Trial (Elbourne et al., 2002), a multicentre RCT of 629 infants clinically diagnosed by a senior doctor as having neonatal hip instability, aimed to examine whether the use of ultrasonography compared to
clinical examination could reduce the number of these infants requiring abduction splinting, without increasing the risk of later more invasive procedures. It found that the use of ultrasonography did allow early treatment rates to be reduced and was not associated with an increase in abnormal hip development or higher rates of surgical treatment by 2 years. The authors note that whilst these findings help to inform clinical practice, large uncertainties remain around the use of ultrasonography such as its effectiveness in screening infants with risk factors for hip displacement but clinically stable hips.

When considering ultrasound, it is interesting to compare the effect of the different viewpoints on hip dysplasia between German speaking countries and the UK. In Austria and parts of Switzerland there is a strong belief that all degrees of dysplasia should be treated. Consequently there are sufficient numbers of trained specialists able to conduct ultrasound screening and well developed methods. As such, ultrasound screening combined with a clinical examination is considered a gold standard for diagnosing dysplasia (Dorn & Neumann, 2005). Routine universal ultrasound screening is also supported by Tomá et al (2001) in Italy and it would appear that this recommendation rests upon a similar availability of expertise.

4.2.3 The overall programme

The merits of a screening programme and the role of ultrasound within that programme are clearly uncertain. A decision model based mainly on observational studies (Dezateux et al., 2003) suggested that clinical screening, as currently performed in the UK, is of marginal benefit relative to no screening, but could be improved by use of more expert primary screening examiners, who have been specifically trained to screen, and by using ultrasound to assess infants with positive screening results. Currently, few areas monitor coverage, training or performance and there is a lack of consensus about protocol and interpretation or reporting. Also there are not enough orthopaedic surgeons with an interest in paediatrics (National Screening Committee, 2004).

Screening was initiated in the UK on the basis that outcomes were likely to be better if DDH is diagnosed at an early stage (Dezateux et al., 2003). However, as the outcome of clinical screening has never been compared to that of clinical diagnosis in a randomised trial, its effectiveness remains unknown. The UK National Screening Committee document (2004) suggests that screening for DDH has become such an accepted and expected part of newborn healthcare that it would almost impossible to discontinue it without very strong contradicting evidence, however if it was to be proposed now as a screening programme it would be unlikely to be accepted.
4.3 Cost-effectiveness review

Several studies have looked at the cost effectiveness of screening strategies and the place of ultrasound screening within them, although all are limited by the lack of clinical effectiveness data. There appears to be only marginal differences in the overall costs of different approaches. The costs of screening all or some infants using ultrasound tend to be offset by savings in treatment costs, however the actual figures are very sensitive to factors such as the expertise of the examiner. Litigation costs could be an issue if dysplasia is not detected, or inappropriately treated.

The Woolacott et al. review (2005a) identified four economic evaluations, based on screening in the UK, Norway and the Netherlands.

Clegg et al. (2000) in the UK carried out a cost consequence study comparing clinical screening, with selective ultrasound, and with universal ultrasound. This concluded that when the cost of running the screening programme is added to the expense of treating DDH, the overall cost for the management of DDH is comparable for the different screening policies.

A study by Rosendahl (1995) in Norway compared the cost effectiveness of adding either universal or selective ultrasound screening to the routine clinical examination for DDH. They concluded that the costs did not vary greatly between the different programmes, but that the estimates were very sensitive to the number of infants screened each year, the cost of hospitalisation and surgery, and the incidence of infants who are considered to require hospitalisation or surgery. Alvarez points out that the overall costs for ultrasound screening could be reduced if the scans were carried out at 60 days (Alvarez et al., 2005).

A second study from Norway, (Geitung et al., 1996) concluded that although ultrasound would result in fewer cases of late detected DDH, a universal screening programme applied to the total population of newborn infants would not be cost effective. Selective screening of those at greater risk however may be cost-effective.

Woolacott et al (2005a) question the clinical validity of the use of diagnosis of DDH after one month of age as an effectiveness measure in both the Norwegian studies.

A study in the Netherlands by Roovers et al. (2004) showed that universal screening at 3 months could be cost effective but only if nearly all infants participated. Woolacott et al (2005a) suggest however that this finding might not be generalisable to other countries.

In the UK Hip Trial, Elbourne et al. (2002) found that the total costs incurred
for patients allocated to the ‘diagnosis and management with ultrasound group’ were £724 and those ‘diagnosed with clinical examination alone’, £827. This represents a statistically non-significant saving of £102 per patient (95% CI -£331 to £127).

Using a decision model looking at outcomes at skeletal maturity, Brown et al. (2003) estimated the incremental cost effectiveness ratios (ICERs) for three screening options relative to no screening. The values obtained for each option, ranked by increasing clinical effectiveness, as identified in a related paper by Dezateux et al (2003), are given in Table 1.

**Table 1  Incremental cost-effectiveness ratios of different screening strategies**

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Additional costs compared to no screening (£)</th>
<th>Additional favourable outcomes compared to no screening</th>
<th>Incremental cost-effectiveness ratio (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical screening alone</td>
<td>633,941</td>
<td>4.15</td>
<td>152,757</td>
</tr>
<tr>
<td>Selective ultrasound</td>
<td>2,460,699</td>
<td>16.25</td>
<td>151,428</td>
</tr>
<tr>
<td>Universal ultrasound</td>
<td>4,013,919</td>
<td>20.93</td>
<td>191,778</td>
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Source: Reprinted with permission from BMJ Publishing Group (Arch Dis Child, 2003,88, 760-766)

The ICERs are reasonably similar suggesting that the relative cost effectiveness of one strategy over another is not demonstrated. Sensitivity analyses showed that the key uncertainties are:

- criteria used to select high risk infants for ultrasound
- probability of abduction splinting following ultrasound
- cost of ultrasound
- probability of an unfavourable outcome following surgery.

When clinical screening is undertaken by more experienced examiners, and ultrasound is used to manage those infants identified with clinical instability, clinical screening alone becomes the most effective and least costly strategy, with each favourable outcome achieved in this strategy costing just over £20,000.
The authors conclude that the choices made by policy makers depend on the values that they attach to the outcomes produced by the different approaches. Further research is required on measuring the utilities assigned to the screening outcomes, the effectiveness of abduction splinting in children exhibiting risk factors for hip dysplasia but with stable hips, and appropriate training for clinical screening examiners.

4.4 Summary of existing guidelines

For reference, the recommendations for screening infants for DDH contained within existing guidelines are summarised below.

National Screening Committee (published May 2005, update due May 2006)

- Every baby to be reviewed within the first week of life for risk factors, examined by the clinical screening procedures described in report, and referred for ultrasound if risk factors or clinical signs are present. Ideally not done in the first two days because more false positives at that time, although in practice this is often unavoidable.

- Second examination within first 10 days has not been shown conclusively to increase identification of DDH. However, given the variability in age of discharge from maternity units and the uncertain coverage of the newborn examination in hospital, a practical case can be made for a second examination sometime in first week.

- Hips should be examined again before 8 weeks of age, and preferably before six weeks, as evidence suggests that treatment before then is preferable.

- Ultrasound should not be introduced as a primary screening measure at present. Although excellent results have been reported, very high levels of intervention are being reported and can probably only be avoided by a high level of senior level involvement by imaging and orthopaedic specialists.

- Ultrasound for further examination of referred cases is useful, but more work is urgently needed to decide on reporting criteria and management of the less severe abnormalities.

National Health and Medical Research Council, Australia (2002)

- Universal ultrasound screening for developmental dysplasia of the hip is not recommended.
• Although there is little firm evidence to support the value of clinical screening for developmental dysplasia of the hip, the continuation of newborn and 6 week examination using the Ortolani and Barlow manoeuvre, provided it is in the context of an adequate early detection programme, is recommended.

• Measures to increase the effectiveness of a screening programme should be implemented and the incidence of surgery and late presentations monitored. If these rates are not reduced by improvements in the screening programme, the benefits of clinical screening need to be examined further.

**Canadian Task Force on Preventive Health Care (2001 update)**

• There is fair evidence to include serial clinical examination of the hips to detect DDH in the periodic health examination of all infants. This should be done by a trained clinician during the first few weeks of life, in the first month, and then at 2, 4, 6, 9 and 12 months of age. If an abnormality is detected, consultation with a paediatric orthopaedist is indicated, as are focused hip imaging studies.

• There is fair evidence to exclude universal ultrasound screening for DDH from the periodic health exam of infants.

• There is fair evidence to exclude selective ultrasound screening for DDH from the periodic health exam of high-risk infants. Physicians may however opt to examine infants with risk factors more frequently and may opt to follow recommendations of the American Academy of Pediatrics for these groups.


• All newborns to be screened by physical examination. It is recommended that screening is done by a properly trained healthcare provider.

• Ultrasonography of all newborns is not recommended.

• If a positive Ortolani or Barlow sign is found in the newborn examination, the infant should be referred to an orthopaedist. If the results of the physical examination are ‘equivocally’ positive, then a follow-up hip examination by the paediatrician should be carried out in 2 weeks.

• At 2 week examination, if the results of the physical examination are positive, refer to an orthopaedist.
• If at the 2 week examination Ortolani and Barlow signs are absent but physical findings raise suspicions, consider referral to an orthopaedist or request ultrasonography at age 3 to 4 weeks.

• If the results of the newborn examination are negative or equivocally positive, risk factors may be considered.

• The hips must be examined at every well-baby visit according to the recommended schedule for well-baby examinations.

**American College of Radiology (2003) and American Institute of Ultrasound in Medicine (2003)**

• Each institution has produced guidelines on the undertaking of sonographic studies for the detection of developmental dysplasia of the hip. The clinical aspects of both guidelines were developed jointly. Recommendations for physician requirements, procedure documentation and quality control vary between the two organisations and are addressed by each separately.

4.5 Further research required

The foregoing discussion has illustrated that there are many uncertainties regarding the screening and management of DDH. Various studies make recommendations of research that needs to be undertaken to achieve greater clarity.

At the most basic level, not enough is understood about the natural history of DDH and the clinical significance of mild to moderate asymptomatic hip dysplasia (Patel, 2001), and further study is needed in this area. Moving on to the screening programme, both the National Screening Committee (2004) and the Canadian Task Force (Patel, 2001) identify the need for further study of risk factors and their validity, and how they are used by staff. Brown et al (2003) suggest research is needed into measuring the utility values assigned to the screening outcomes and further work is required on the measurement of long-term functional outcomes (Patel, 2001). There are issues surrounding how to teach staff to carry out clinical examinations, and how to monitor and maintain quality (National Screening Committee, 2004). Also if universal ultrasound screening was introduced, the appropriate staff to carry out the examinations need to be identified (Alvarez et al., 2005). Following screening, the optimal timing and effectiveness of abduction splinting is unknown (Elbourne et al., 2002; Patel, 2001).
5 Implications for NHS QIS Health Technology Assessment scoping project

While there are clearly major uncertainties regarding the effectiveness of a screening programme for DDH and its nature, undertaking a health technology assessment at this time would not seem to be useful. The evidence as it stands has been extensively evaluated (American Academy of Pediatrics, 2000; Centre for Community Child Health, 2002; National Screening Committee, 2004; Patel, 2001; Woolacott et al., 2005a; Woolacott et al., 2005b), and the unresolved issues that remain require primary research to be undertaken. Carrying out further secondary research at this time would not add to the debate. In addition, a Cochrane Review is due to be published in 2006 on the effect of no screening, clinical screening and ultrasound screening (universal or targeted) alone or in combination on the incidence of late presentation, and also the implications of early screening (within first two weeks of life) versus late screening (after two weeks and before six weeks) (McKechnie et al., 2004). It is anticipated that this review will have examined in detail the current clinical effectiveness literature.

It is acknowledged, however, that there are serious concerns within Scotland in relation to DDH as there is no formal screening programme in place, no-one has specific responsibility for this area, and there are significant variations between NHS boards leading to confusion for staff and parents. The NHS QIS Best Practice Statement on Screening of Newborns (NHS Quality Improvement Scotland, 2004) recommends that a clinical hip examination is carried out within the first 72 hours after birth but does not cover subsequent screening or procedures. The National Screening Committee (2004) has provided guidelines on how screening should be carried out, based on the best available evidence. It appears, however, that these are not followed in Scotland and that there is uncertainty within Scottish professional circles regarding risk factors, the role of ultrasound, which staff should carry out the screen, and the availability of ultrasound. There is an urgent need to standardise practices and procedures across the country based on current best evidence and to raise awareness of this evidence.

A recent review of the literature from 1966 to 2004 carried out in response to concerns about late presentation of cases of DDH in Wales (Mahmood & Aitken, 2005) makes a number of recommendations to improve screening in Wales. These include carrying out an audit of the screening programme in Wales, implementing quality standards for the clinical examination at birth and at six weeks, implementing a training programme for health professionals involved, and setting up a quality control system. It would appear from the discussions taking place among professionals in Scotland
that similar recommendations could be applied here. Although an HTA is not appropriate at this time, NHS QIS, when planning its future work programme, will consider the issues identified in this report and how they may be addressed eg through undertaking audit work.
6 Acknowledgements

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Dr Harpreet Kohli  Medical Director and Head of Health Services Research and Assessment Unit
7 References


8 Appendix 1 Literature search sources

HTA

• Health Technology Assessment Database
  Cochrane Library (http://www.cochrane.org)

• NICE
  http://www.nice.org.uk/

• NCCHTA (National Coordinating Centre for Health Technology Assessment)
  http://www.ncchta.org/

• NHS Centre for Reviews and Dissemination, University of York
  http://www.york.ac.uk/inst/crd/

• Birmingham Technology Assessment Group, Department of Public Health and Epidemiology, University of Birmingham
  http://www.publichealth.bham.ac.uk/wmhtag/

• ScHARR, University of Sheffield
  http://www.shef.ac.uk/uni/academic/R-Z/scharr/publications.htm

• South and West R&D Directorate, DEC reports
  http://www.hta.nhsweb.nhs.uk/rapidhta/

• ECRI
  http://www.ecri.org/

• HSTAT

• ASERNIP-S
  www.surgeons.org/asernip-s/

Reviews and guidelines

• Cochrane Database of Systematic Reviews (CDSR)
  Cochrane Library (http://www.cochrane.org)

• Database of Abstracts of Reviews of Effects (DARE)
  Cochrane Library (http://www.cochrane.org)
Screening hips of newborns in Scotland

- ARIF (Aggressive Research Intelligence Facility)
  http://www.arif.bham.ac.uk/

- Health Evidence Bulletins Wales
  http://hebw.cf.ac.uk/

- Centre for Clinical Effectiveness, Monash Institute of Public Health

- Clinical Evidence (BMJ)
  http://www.clinicalevidence.com

- Prodigy
  http://www.prodigy.nhs.uk

- TRiP
  http://www.tripdatabase.com

- Bandolier
  http://www.jr2.ox.ac.uk/bandolier/

- Omni
  http://omni.ac.uk

- SIGN (Scottish Intercollegiate Guidelines Network)
  http://www.sign.ac.uk/

- NeLH Guidelines Finder
  www.nelh.nhs.uk/guidelinesfinder/

Ongoing research

- NRR
  http://www.nrr.nhs.uk

Scottish policy

- Scottish Executive Health Department
  http://www.show.scot.nhs.uk/sehd/

- SHOW (Scotland’s Health on the Web)
  http://www.show.scot.nhs.uk/

- Public Health Institute of Scotland (PHIS)
http://www.phis.org.uk/index.asp

- Chief Scientist Office (CSO)
  http://www.show.scot.nhs.uk/cso/

- NHS Quality Improvement Scotland
  http://nhshealthquality.org

**Health Economics**

- NHS Economic Evaluation Database (NHS EED)
  Cochrane Library (http://www.cochrane.org)

- Health Economic Evaluation Database (HEED)
  http://clarinet-nt.clarinet.co.uk/ohe/
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