

A large decorative graphic on the left side of the cover, consisting of three overlapping circles. The outermost circle is green, the middle one is purple, and the innermost one is light purple. The text is overlaid on these circles.

Ultrasound Survey of England 2008:

Mapping of 1st and 2nd trimester
fetal screening services in the NHS

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Introduction



1 Introduction

1.1 Background

In 2006, the UK National Screening Committee (UK NSC) recommended that all pregnant women should be offered an ultrasound scan to screen for fetal anomaly¹. This was commensurate with recommendations from the National Institute for Health and Clinical Excellence (NICE, 2003)² and the National Service Framework (NSF, 2004)³. A national policy for screening for Trisomy 21 (Down's syndrome) was implemented in England in 2003 and is now well established. Both programmes are collectively known and managed as the NHS Fetal Anomaly Screening Programme (NHS FASP).

This survey is the second Ultrasound Survey of England conducted on behalf of the UK NSC. The first was commissioned in 2002 and since then policy, recommendations and service provision for fetal anomaly screening have undergone significant changes.

Previous published literature⁴ and evidence from the 2002 survey⁵ clearly demonstrate that although routine fetal screening forms a standard part of most antenatal screening packages its application is variable.

The NHS FASP is committed to ensuring all pregnant women in England have access to safe, evidence-based, high-quality, uniform fetal screening services. This study maps local service delivery against current national policy and standards. This will assist in identifying where extra support and guidance is required to improve services to meet the standards.

1.2 Objectives

The main objectives of the survey were to:

- a) map the provision of 1st and 2nd trimester ultrasound screening for fetal abnormality in England
- b) identify inconsistencies and barriers to the universal offer and provision of uniform quality in screening for fetal abnormality
- c) identify training needs in relation to fetal ultrasound screening
- d) provide a body of knowledge to inform all obstetric ultrasound service managers, providers and ultrasonographers in developing the service they offer
- e) inform the Department of Health (DH), Strategic Health Authorities (SHAs), Screening Leads and Regional Screening Coordinators of the operational level of fetal screening services, nationally and in their locality
- f) inform the development of national guidance and quality assurance mechanisms
- g) map the degree of change from the ultrasound survey conducted in 2002, where comparable data exist.

1.3 Methods

The questions from the original 2002 survey were revised and updated to produce the 2008 questionnaire, with input from an expert review panel and CFEP UK Surveys (Client Focused Evaluation Programme). The aim was to produce an unambiguous, shortened version of the 2002 questionnaire to encourage completion and rapid return. The survey covered a period of 12 months from January to December 2008 and was sent to all NHS Trust obstetric ultrasound units within the ten SHAs in the nine English regions (SHA boundaries) of England. The current SHA boundaries have been in existence since July 2006 (Figure 1).

Each region is overseen by a Regional Screening Team consisting of a Regional Antenatal and Child Health Screening Coordinator with a deputy. The teams are funded through the UK NSC to facilitate implementation of the antenatal and newborn screening programmes and monitor services against standards. The nine Regional Antenatal and Child Health Screening Coordinators (South East region consists of South East Coast and South Central SHAs) were contacted by the Programme Centre in the Autumn of 2008 to provide an updated contacts list of lead ultrasonographers for each NHS Trust ultrasound unit.

A questionnaire was then sent by post directly to every listed unit in January 2009, with a request that it should be completed by the clinical lead for obstetric ultrasound. If the lead did not have the equivalent of a Postgraduate Certificate (Pg.Cert.) qualification or above in obstetric ultrasound then the survey should have been completed by the most senior appropriately qualified staff member in conjunction with the clinical lead.

The survey was divided into seven sections:

- Fetal ultrasound screening package
- Information and support for parents
- Technical information
- Management following identification of an abnormality
- Equipment and image archiving
- Standards, audit and monitoring
- Staffing for 1st and 2nd trimester fetal ultrasound screening

1.3 Methods

The data have been analysed and presented as a national report. In addition, data will be separated and presented to each region offering guidance and recommendations wherever possible. It is accepted that some changes in service provision may have occurred from date of questionnaire completion to report publication.

All report data are presented to demonstrate the relationship between evidence-based clinical practice and national guidance and policy. Bold text boxes highlight clear guidance to:

- Recommendations (DH, NHS FASP, NICE)
- Best practice points (which relate to NHS FASP standards under development. Due to be launched and distributed January 2010)
- Other professional guidance (Royal College of Obstetricians and Gynaecologists (RCOG), Royal College of Radiologists (RCR), British Medical Ultrasound Society (BMUS), National Occupational Standards (Skills for Health)).

The 2008 Ultrasound Survey of England will be reported directly to the DH, UK NSC and to each Director of Public Health of the ten SHAs.

1.4 Data collection and analysis

The NHS FASP commissioned CFEP UK Surveys to project manage the 2008 Ultrasound Survey for England. This included distribution, collation, data analysis and report production, in conjunction with the NHS FASP.

CFEP UK Surveys were selected to undertake this work as they are specialists in feedback surveys for health professionals working in the NHS and allied services and have been established for 10 years in the UK (<http://www.cfep.co.uk>).

Data were collated and analysed by CFEP UK Surveys using a custom designed database using Microsoft SQL Server 2005 and a bespoke data entry application. The dataset was analysed and exported as a Microsoft Excel Spreadsheet. All written comments were sent to the NHS FASP for comment and interpretation.

1.5 Comparison with 2002 Ultrasound Survey data

Comparison with information from the 2002 Ultrasound Survey was restricted as the original raw dataset was not available. The only data available were incorporated within the 2002 Ultrasound Survey report. In addition, as many of the questions in the 2008 survey had been modified from the 2002 survey, it was not always possible to make direct comparisons. However, wherever comparison was possible, the 2002 data have been included in this report.

For the purposes of this report, data from the South East region have been analysed per SHA (South Central and South East Coast) to assist with identification of local service and workforce issues which can then be addressed separately by the relevant SHA and PCT screening leads (Figure 1).

Figure 1 Map of England to show SHA boundaries 2006



Results



2 Results

2.1 Questionnaire returns and response rate

The process commenced in November 2008 when advance notice of the distribution of the questionnaires was sent electronically by the NHS FASP to the nine Regional Screening Teams. The teams were asked to send updated details of all NHS Trust obstetric ultrasound units in their region, together with a contact name for the clinical lead sonographer in ultrasound for that unit. The information was cascaded to each ultrasound unit via an established email network to 189 maternity units in England in November 2008. The questionnaire, together with an explanatory letter, was sent to these units by CFEP UK Surveys in January 2009.

Although there were several issues causing delay for units in the completion and return of questionnaires, a final response rate of 81% was achieved overall. Acknowledgement and thanks are extended from the authors to the Regional Screening Teams for their assistance in achieving this figure.

Inaccuracies in the original contact database led to four additional units returning completed questionnaires, producing a total of 193 units. The original deadline set for February 2009 for completion and return had to be extended due to a disappointing initial response rate of 40%. Reported problems with completion mainly concerned staff shortages but were also due to:

- Incorrect contact details, so survey delayed or did not arrive at all or with the designated person
- Change of 'lead' sonographer and questionnaire not forwarded to appropriate individual
- Staff sickness
- Completed survey dispatched but not delivered to CFEP UK Surveys.

Details of questionnaire distribution, response rates for their return and subsequent relevant action taken until the final closing date for returns in April 2009 are shown in Table 1. A final questionnaire return response rate of 81% was achieved; 156 useable questionnaires were returned out of 193 distributed. Data from one returned questionnaire could not be included in the analysis as no identification was provided and, despite enquiries being made, the originating unit could not be traced.

2.1 Questionnaire returns and response rate

Table 1 Questionnaire distribution, response rate and relevant action taken (2008-2009)

Date	Response rates for questionnaire return	Relevant action taken
27/11/08	-	Advance notice of the survey sent electronically to 189 units
05/01/09	-	Questionnaire posted to 189 units with a deadline of 05/02/09 (4 additional units were subsequently incorporated in the study)
16/01/09	9%	Reminder letter sent
06/02/09	40%	A reminder letter was sent to all the Regional Screening Teams extending the deadline to 20/02/09
20/02/09	59%	Extended deadline
02/03/09	64%	NHS FASP updated the Regional Screening Teams, who then contacted the non-responders
26/03/09	76%	NHS FASP updated the Regional Screening Teams in a final attempt
21/04/09	81%	Data collection closed

Clear guidance on the qualifications and experience required of the health professional completing the survey was given on the front page of the survey. It stated that the questionnaire 'should be completed by the clinical lead for obstetric ultrasound. If the lead does not have the equivalent of a Pg.Cert. qualification (or above) in obstetric ultrasound then the survey should be completed by the most senior appropriately qualified staff member in conjunction with the clinical lead'.

However, it was not always clear whether these criteria had been met as questionnaires had been completed by a variety of health professionals (Table 2) which in some instances may have limited the depth and validity of the data returned.

2.1 Questionnaire returns and response rate

Table 2 Completion of survey by professional group

Professional group	Number of clinicians
Radiographer	43
Midwife/Sonographers	8
Midwives	7
Clinician/Doctor	3
Midwife/Sonographers OR Radiographer/Sonographers*	8
Other**	87

* Unclear as to which professional group was responding to questionnaire (e.g. advanced practitioner).

** Many respondees had a 'generic' job title, and no inference of their original healthcare discipline was discernible (e.g. 'manager' or 'clinical lead').

The total number of units responding to each section is illustrated in the text or tables of the report. This figure relates to the total number of questionnaires returned. Not all units completed all sections of the questionnaire.

2.2 Survey coverage by region

Table 3 provides an overview of the response rates for the return of questionnaires from the maternity units by region. In addition, it provides regional details of population size and the total number of live births (the most recent data available were from 2007). A response rate of 100% was achieved in the 2002 survey as data were collected in person by the Regional Antenatal and Child Health Screening Coordinator and their team from each of the 202 units surveyed.

Table 3 Population size, number of live births and response rates of maternity units by region

Region	Population	Live births	No. of units sent questionnaires (2008)	No. of questionnaires returned (2008)	Response rate (%) (2008)
East Midlands	4 364 200	54 192	12	9	75%
East of England	5 606 600	71 738	17	15	88%
London	7 512 400	127 651	32	17	53%
North East	2 555 700	30 217	14	12	86%
North West	6 853 200	88 167	34	29	85%
South East Coast	4 248 300	-	15	15	100%
South Central	3 989 500	-	12	12	100%
South West	5 124 100	58 742	19	15	79%
West Midlands	5 366 700	71 725	17	17	100%
Yorkshire & The Humber	5 142 400	66 353	21	15	71%
Total for Regions	50 763 100	672 807	193	156	81%
South East: Combined South East Coast and South Central data *					
South East	8 237 800	104 022	27	27	100%

- No data available. Live birth data for South East Coast and South Central not available individually so combined South East data illustrated.

* See footer above.

Population size and live birth data from <http://www.statistics.gov.uk> (2007).

2.3 Fetal ultrasound screening package

In the 1st trimester, 99% of units provided all women with either a 1st trimester dating scan only, or a 1st trimester dating and nuchal translucency (NT) scan, or a 1st trimester anomaly scan or a combination of these. Two units indicated that they provided all three scans. In the 2nd trimester, 100% of units provided either a 2nd trimester dating scan or a 2nd trimester dating and anomaly scan for all women. However, owing to a degree of ambiguity in the question, these results may not present an entirely accurate picture of provision.

The 1st trimester dating scan, the 1st trimester dating and NT scan and the 2nd trimester anomaly scan were all used more for routine use for all women than for selected women. All the other fetal ultrasound screening examinations were most commonly used for selected women (Table 4, Figure 2). This pattern was the same as reported in 2002 except for the 1st trimester dating and NT scan which was at the time used more for selected women than for all women. All other types of fetal ultrasound scans were used very little for screening all women.

In 2008, 73% of units offered a 1st trimester dating scan only to all women and 8% to some women as compared to 57% units offering this scan to all women and 32% units offering it to some women in 2002.

A significant number of units (36%) did not provide information on the target gestational age for 1st trimester scan. A wide variation of free-text responses was given when information was provided, rendering the data difficult to interpret. The majority of units (56%) offered a 1st trimester dating scan between 10 - 14 weeks of gestation. Only 1% of units offered appointments before 11 weeks, with a further 1% of units offering appointments after 14 weeks of gestation.

In 2008, 37% of all women were offered a 1st trimester dating and NT scan as compared to 16% in 2002, but 8% more selected women were offered this scan in 2002 than in 2008.

In the 2nd trimester in 2008, 100% of units offered a 2nd trimester scan to all women, either as a 2nd trimester anomaly scan or as a 2nd trimester dating and anomaly scan. The majority of units (71%) targeted 18 - 21 weeks gestation to provide a second trimester anomaly scan to women. A further 7% of units provided this scan after 21 weeks gestation, with 22% of women not responding to this question.

NHS FASP recommendation

'1st trimester combined is the preferred method (of screening for Trisomy 21) as it supports screening being completed in one stage without the need for more than one attendance. It will also give a risk before 14 weeks of pregnancy allowing earlier decision making for parents.' (NHS FASP Model of Best Practice 2008 – DH policy)⁶

NHS FASP recommendation

'Ultrasound screening for fetal anomalies should be routinely offered, normally between 18 weeks 0 days and 20 weeks 6 days.' (NICE guidance 2008)⁷

2.3 Fetal ultrasound screening package

The 2nd trimester uterine artery Doppler studies were the most commonly offered scans to selected women (35%), with all criteria apart from family history and maternal age playing an important part in the selection (Table 4). 18% of units offered selected women 1st or 2nd trimester fetal Doppler studies where the same indications described above were reported.

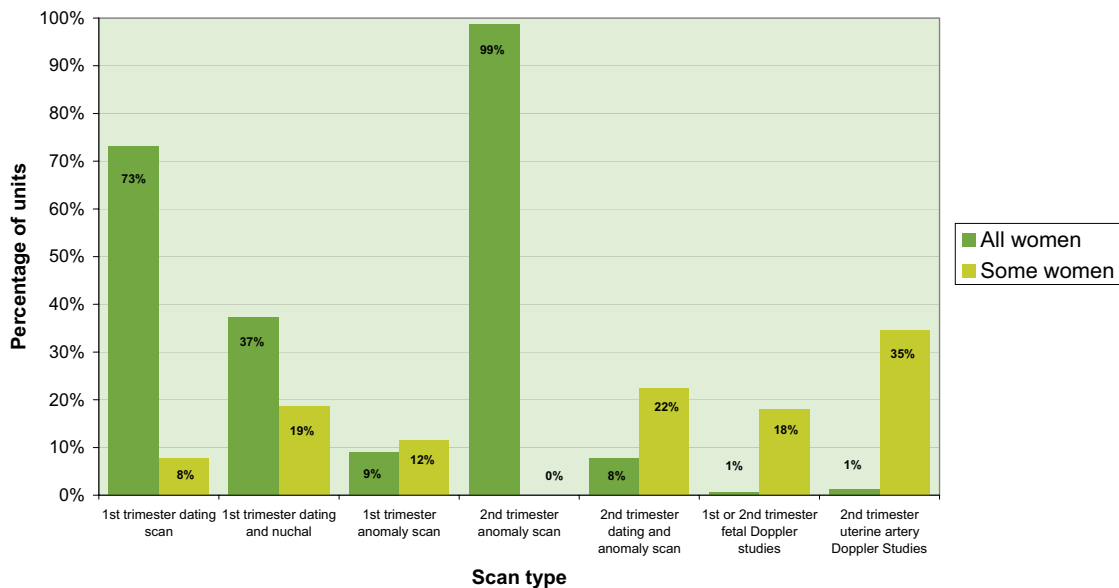
19% of units offered selected women a 1st trimester dating and NT scan and 22% a 2nd trimester dating and anomaly scan. A smaller percentage of selected women were offered a 1st trimester dating (8%) or anomaly scan (12%). No unit reported only offering selected women 2nd trimester dating and anomaly scans.

Table 4 The provision of fetal ultrasound screening offered to all or some women in 2008, expressed as percentage of units (2002 data illustrated where available)

	All women		Some women		No response
	2008	2002	2008	2002	2008
1st trimester dating scan	73%	57%	8%	32%	19%
1st trimester dating and nuchal translucency	37%	16%	19%	27%	44%
1st trimester anomaly scan	9%	6%	12%	18%	79%
2nd trimester anomaly scan	99%	97%	0%	3%	1%
2nd trimester dating and anomaly scan	8%	-	22%	-	70%
1st or 2nd trimester fetal Doppler studies	1%	-	18%	-	81%
2nd trimester uterine artery Doppler studies	1%	-	35%	-	64%

- Data not available.

Figure 2 The provision of fetal ultrasound screening offered to all or some women in 2008



More than one scan type can be offered by units, therefore overall totals may be greater than 100%.

2.3 Fetal ultrasound screening package

Only 1% of units reported using 1st or 2nd trimester fetal Doppler studies or 2nd trimester uterine artery Doppler studies for all women in 2008.

The types of fetal Doppler studies offered to all or selected women included: tricuspid regurgitation (1st trimester) by 1 unit, ductus venosus (1st trimester) by 3 units and middle cerebral artery (trimester not specified) by 6 units. Uterine artery (2nd trimester) studies were offered by 13 units for a variety of indications (e.g. pre-eclampsia, previous history of fetal growth restriction, previous history of stillbirth, low PAPP-A and women in first pregnancy).

Where units only offered scans to selected women, obstetric and maternal history were the most common determining factors overall (Table 5). The type of scans offered to selected women who had experienced previous fetal growth restriction or stillbirth were mainly the 1st or 2nd trimester fetal Doppler studies and the 2nd trimester uterine artery Doppler studies. Where maternal age was a factor, a 1st trimester dating and NT scan was most commonly offered. No units selectively offered 2nd trimester dating and anomaly scans.

Table 5 Criteria for screening where some scans are offered only to selected women in 2008 (number of units*)

	Maternal age	Family history	Maternal history	Obstetric history	Previous fetal growth restriction	Previous stillbirth
1st trimester dating scan	2	8	12	14	5	7
1st trimester dating and NT	11	7	14	20	0	1
1st trimester anomaly (detailed) scan	2	6	2	14	1	1
2nd trimester anomaly scan	1	2	3	3	1	1
2nd trimester dating and anomaly scan	0	0	0	0	0	0
1st or 2nd trimester fetal Doppler studies	0	1	16	28	20	18
2nd trimester uterine artery Doppler studies	0	2	35	46	41	29

* Total number of participating units = 156

2.3 Fetal ultrasound screening package

Table 6 Number of units offering a 1st trimester dating scan, 1st trimester dating and NT scan, 1st trimester anomaly scan and 2nd trimester dating scan to all women, by SHA in 2008

Region	Number of participating units/region	1st trimester dating scan	1st trimester dating plus NT	1st trimester anomaly scan	2nd trimester dating scan	Total percentage of all women offered a dating scan
East Midlands	9	6	3	0	0	100%
East of England	15	14	5	0	0	100%
North East	12	11	1	1	1	100%
London	17	4	16	3	1	100%
North West	29	27	0	2	3	100%
South East Coast	15	6	14	4	1	100%
South Central	12	3	11	1	1	100%
South West	15	11	7	1	2	93%
West Midlands	17	17	1	1	1	100%
Yorkshire and the Humber	15	15	0	1	2	100%

* Total number of participating units = 156

There was minimal regional variation in the provision of a 1st trimester scan as shown in Table 6, with the majority of regions offering all women an early pregnancy ultrasound scan.

NHS FASP recommendation

'Pregnant women should be offered an early ultrasound scan between 10 weeks 0 days and 13 weeks 6 days to determine gestational age and to detect multiple pregnancies.' (NICE guidance 2008)⁷

2.3 Fetal ultrasound screening package

All units offered a scan to 'late bookers' who presented after 20 weeks 6 days gestation (Table 7). 98% of units offered a dating scan and attempted an anomaly scan. 14% provided a fetal wellbeing and placental site only scan. Seven units indicated that other types of screening were offered to these women, which fell into three broad groups comprising the 21/40-24/40 anomaly scan ($\geq 24/40$ growth scan only), full anomaly scan or a repeat scan to observe growth after the initial scan (between 2 and 4 weeks).

Table 7 Type of ultrasound scan offered to women who present after 20⁺⁶ weeks (2008)

	Number of units	Percentage of units
Scan not offered	0	0%
Dating scan only	1	0.6%
Dating and attempt anomaly scan	153	98%
Umbilical artery Doppler	6	4%
Fetal wellbeing and placental site only	22	14%
Placental site only	6	4%
Other	7	5%

Total number of participating units =156.

More than one scan type can be offered by units so overall totals are greater than 100% or 156 units.

2.3 Fetal ultrasound screening package

The most usual length of time for any ultrasound appointment was 20 minutes, except for the 1st trimester dating scan where the most usual length of time was 15 minutes (Table 8).

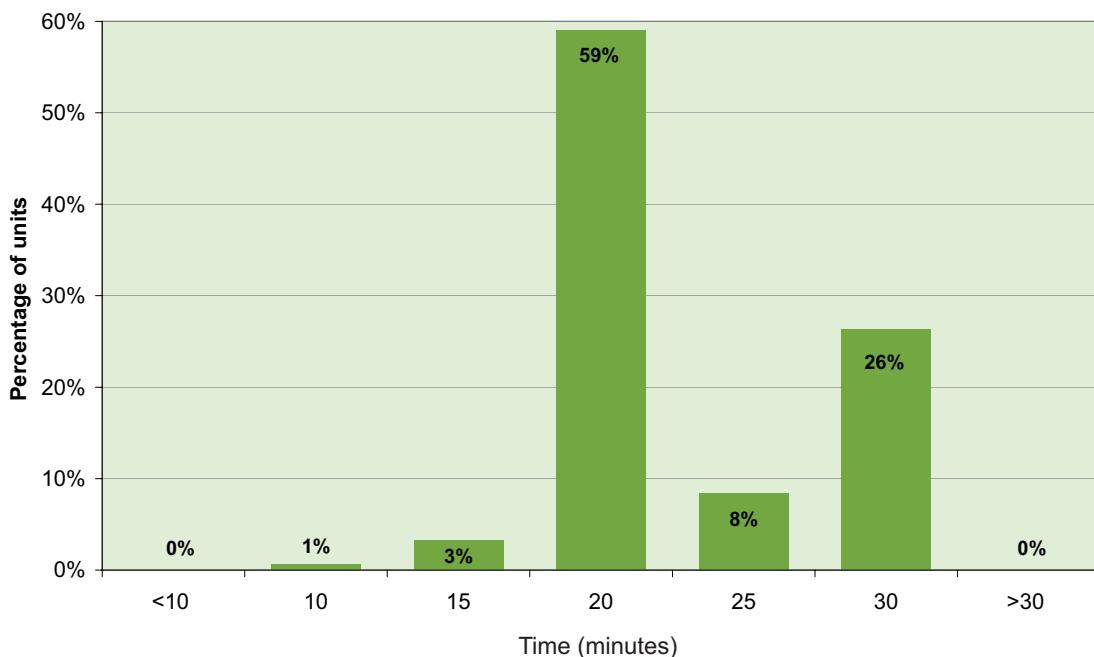
Table 8 Amount of time allocated by units to ultrasound appointments (2008) (number of units)

	Minutes							
	<10	10	15	20	25	30	>30	No response
1st trimester dating scan	5	32	63	33	1	0	0	22
1st trimester dating and NT	0	1	7	51	5	19	4	69
1st trimester anomaly (detailed) scan	0	2	3	15	1	10	1	124
2nd trimester anomaly scan	0	1	5	92	13	41	0	4
2nd trimester dating and anomaly	0	1	1	53	4	15	1	81
1st or 2nd trimester fetal Doppler studies	2	1	7	19	0	4	0	123
2nd trimester uterine artery Doppler studies	2	4	13	22	0	10	2	103

Total number of participating units = 156

The majority of units either allocated 20 minutes (59%) or 30 minutes (26%) for the 2nd trimester anomaly scan (Figure 3).

Figure 3 Time allocated for the 2nd trimester anomaly scan (2008)



2.3 Fetal ultrasound screening package

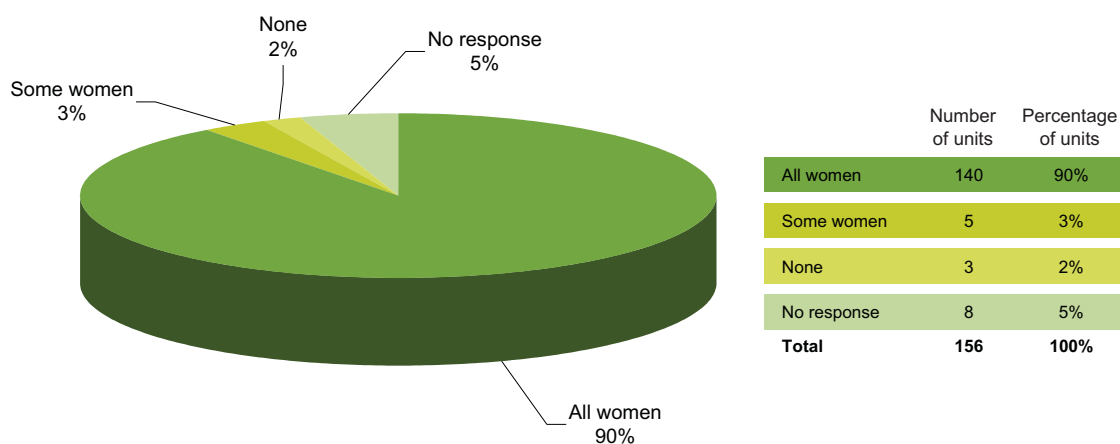
The 2002 data for the time allocated for the 2nd trimester anomaly scan are not directly comparable as the time increment options in the questionnaire are different. However, it was reported in 2002 that 58% of units allocated between 15 and 20 minutes for this scan and 33% allocated between 20 and 30 minutes.

Other professional guidance

'Recommended examination timings: 30 minutes – 2nd trimester routine anomaly screening.' (UKAS - Guidelines for Professional Working Standards: Ultrasound Practice 2008)⁸

90% of units reported providing all women with a written report detailing their scan result (Figure 4). In the 2002 report it states that 'just over 90% of units issued women with a written report'.

Figure 4 The percentage and number of units providing women with a written report detailing their scan result (2008)



Other professional guidance

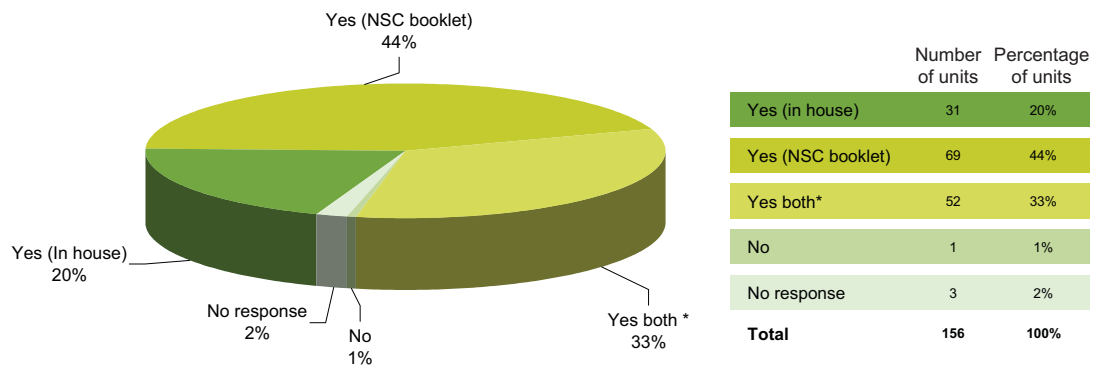
'Women should receive a report that they understand.' (RCOG – Ultrasound screening: supplement to Ultrasound Screening for Fetal Abnormalities 2000)⁹

2.4 Information and support for parents

Pre-scan information regarding ultrasound screening for fetal abnormality was offered to all women in 97% of units as compared to 91% in 2002. 1% of units indicated they did not provide information and 2% did not respond to the question.

44% of units provided the UK NSC booklet, 'Screening Tests for You and Your Baby' 2008¹⁰, and 20% provided information prepared in house. 33% of all women were offered both types of information (Figure 5).

Figure 5 The number and percentage of units offering all women pre-scan information regarding ultrasound screening for fetal anomaly (2008)



* UK NSC booklet and information prepared in house

NHS FASP recommendation

'Women should be given information about the purpose and implications of the anomaly scan to enable them to make an informed choice as to whether or not to have the scan.' (NICE guidance 2008)⁷

Of those units which reported providing in house developed fetal screening information to women, 12 units attached a copy with their returned questionnaire. The content of the in house documents were compared to the UK NSC booklet. The NHS FASP identified 17 criteria from the UK NSC booklet and determined whether these were included in the in house documents. These criteria are listed in Table 9.

2.4 Information and support for parents

Table 9

Criteria identified from the UK NSC booklet mapped against in house prepared pre-scan information documents			
1.	Purpose of the scan	10.	Type of scan offered (i.e. 2D)
2.	Safety of ultrasound in pregnancy	11.	Having the scan is a matter of personal choice
3.	Explicit, documented consent is a scan prerequisite	12.	The scope of the scan (structures to be examined and types of anomaly detectable)
4.	Limitations of the scan	13.	Who can accompany the woman for support during the scan
5.	Who the scan is performed by	14.	How the scan is performed
6.	Approximate length of scan	15.	Factors affecting image quality
7.	How to prepare for the scan	16.	How results will be reported and received
8.	Policy on purchasing scan memorabilia	17.	Policy on sexing of the fetus
9.	Where to obtain more information		

Only two of the 17 criteria included in the UK NSC booklet were covered by all of the in house documents: the purpose of the scan and how results will be reported and received. The number of criteria covered in any one in house document ranged from between 8/17 and 13/17.

Written information was available in languages other than English in 29% of units. Other support, provided in the form of interpreters, link workers, advocates or Language Line, was available in 95% of units for those women whose first language is not English (Figure 6). Only 4 units (3%) did not offer written information in languages other than English or provide other relevant support, and an additional 5 units (3%) did not respond to either question.

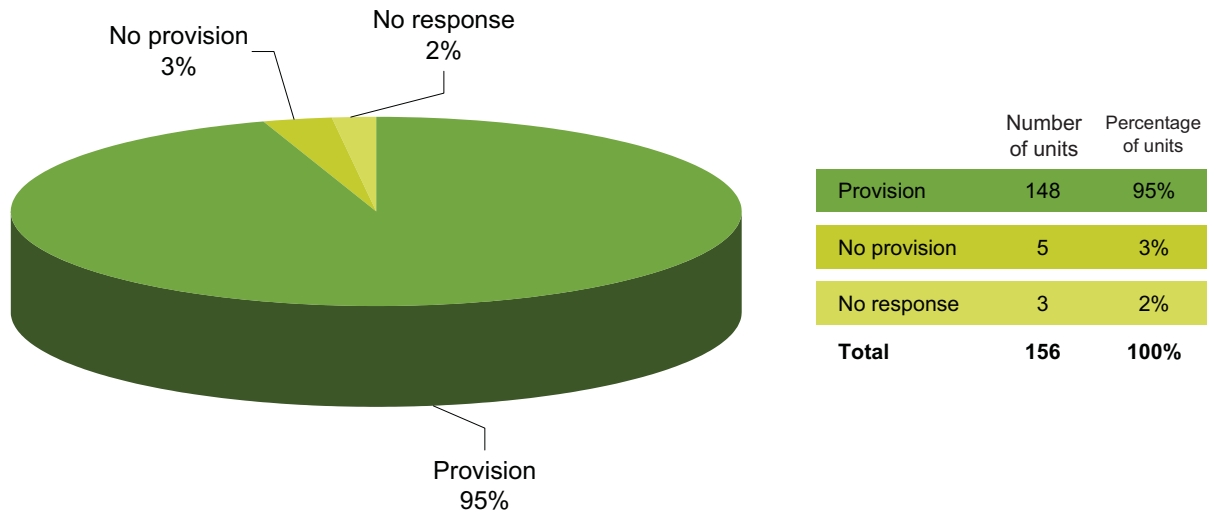
The number of languages in which written information was provided varied greatly by unit and by region, however no request for information was made within the questionnaire to ascertain why some languages were offered and not others.

NHS FASP recommendation

'Units should ensure that systems are in place to provide the required information when there are language or other communication barriers.' (NHS FASP Consent Standards for Screening 2007)¹¹

2.4 Information and support for parents

Figure 6 The number and percentage of units providing interpreters, link workers, advocates or Language Line for women who do not speak English (2008)



Information about screening for fetal anomalies was available in other formats in a small number of units, i.e. video, audiotape, CD-ROM, or books (Table 10). Books were the most frequently reported format, accounting for 10% of all units. The 'other' format category included 7 units using an internet-based format.

Table 10 Other formats in which units provided pre-scan information (2008)

	Number of units*		
	In English	In other languages	Do not provide either
Video	4	0	152
Audiotape	2	0	154
CD-ROM	8	0	148
Books	16	7	140
Other	17	5	139

NHS FASP recommendation
 'Women require information in a medium or language which suits their needs.' (DH Maternity Standard (11), National Service Framework for Children, Young People and Maternity Services 2004)³

* Total number of participating units = 156

2.5 Technical information

Before 13 weeks + 6 days crown-rump length (CRL) was by far the most widely used measurement to determine gestational age in the 1st trimester, used by 99% of units (Table 11 and Figure 7). This measurement was not carried out at any other time during pregnancy.

The most commonly used measurement for all other gestational ages was head circumference (HC) used by 81% of units at 14–17 weeks + 6 days, 94% of units at 18–21 weeks + 6 days (Figure 8) and 85% of units at >22 weeks. Where details of other types of measurements were provided for the assessment of gestational age the most commonly used was abdominal circumference (AC), used by 21 units (13%). As depicted in Table 11, a combination of biometry measurements were usually used.

Biparietal diameter (BPD) measurement was used most widely at 14–17 weeks + 6 days (49% units) and at 18–21 weeks + 6 days (42% of units). Femur length measurement was used most widely at 18–21 weeks + 6 days (60% of units) and at >22 weeks (58% of units).

The gestational time increments were recorded differently in the 2002 survey so direct comparison with the data are not possible, however it was reported that in the 1st trimester 97% of units performed a CRL and 61% performed a BPD measurement. In the 2nd trimester the most commonly used measurements were BPD (96%), HC (93%) and femur length (97%). In the third trimester measurements undertaken were BPD (80%), HC (95%) and femur length (82%).

Although direct comparisons between the 2002 and 2008 data cannot be made, it is apparent from these figures that BPD measurements were used considerably less in 2008.

Table 11 Week of pregnancy in which specific biometric measurements were taken to determine gestational age in 2008 (expressed in percentage of units)

Biometry	Weeks of gestation			
	<13 ⁺⁶	14 – 17 ⁺⁶	18 – 21 ⁺⁶	>22
Crown-rump length	99%	0%	0%	0%
Biparietal diameter	14%	49%	42%	30%
Head circumference	8%	81%	94%	85%
Femur length measurement	3%	44%	60%	58%
Other	0%	9%	19%	23%

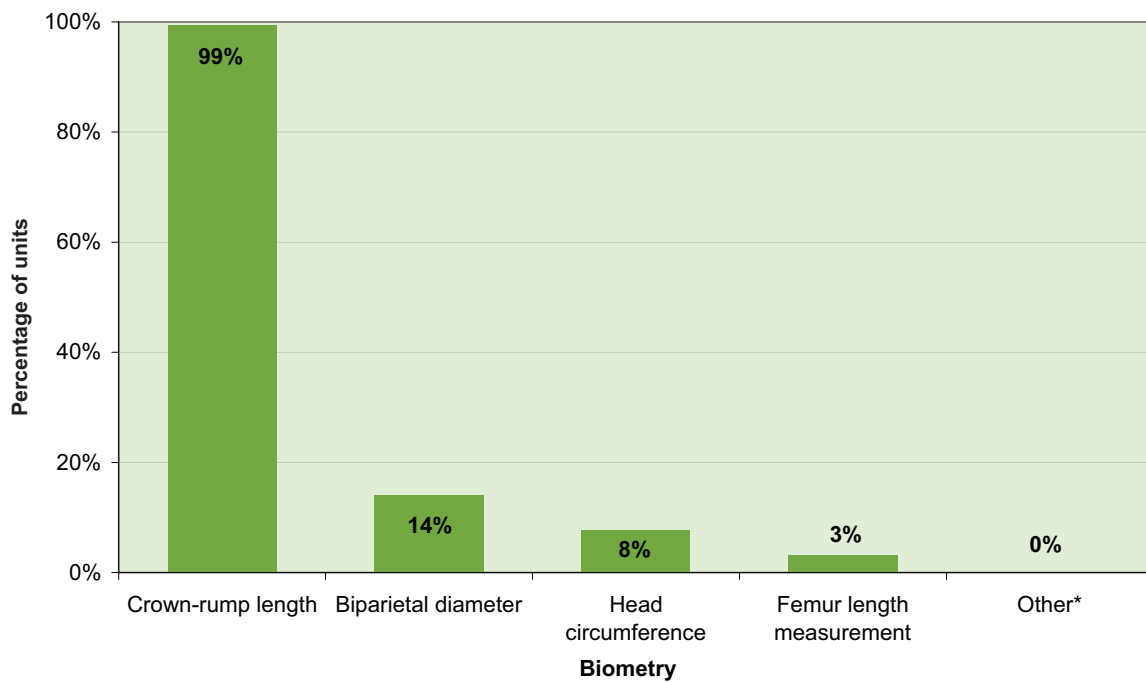
The total is greater than 100% as some units used more than one biometry to determine gestational age.

2.5 Technical information

Other professional guidance

'1. The measurements of choice for pregnancy dating are gestation dependent. ... Estimation of gestational age: CRL - 6 weeks to 13 weeks gestation. HC - 13 to 25 completed weeks. If head measurements are not feasible or appropriate, estimation of gestational age should be made using FL. These measurements can be used beyond the gestation indicated, but the imprecision around the estimate will increase significantly.' (BMUS Fetal Size and Dating: Charts recommended for clinical obstetric practice 2008)¹²

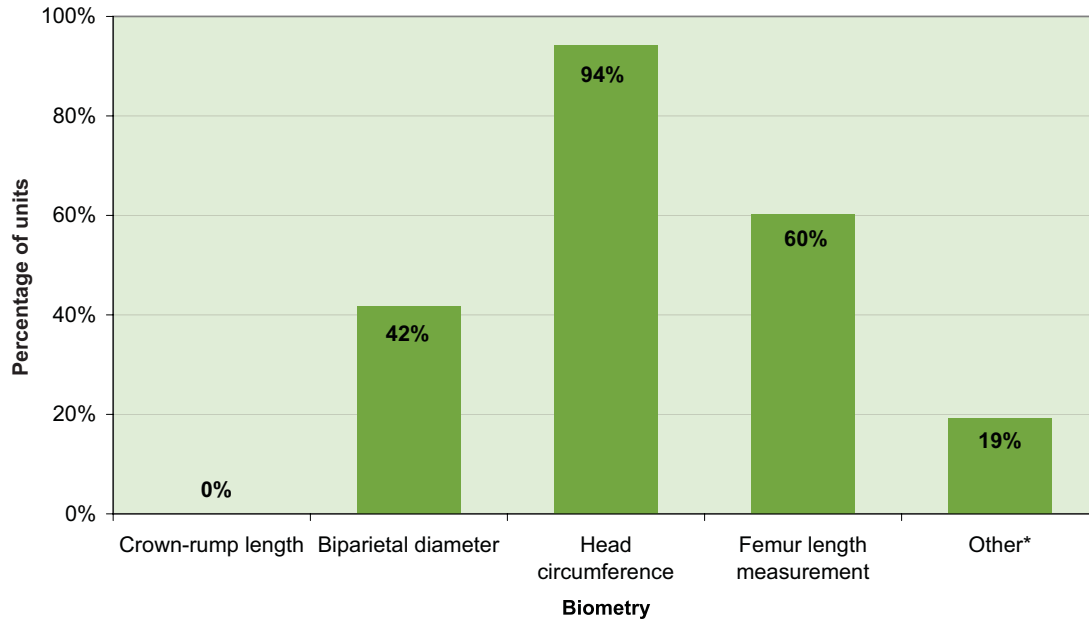
Figure 7 Type of biometry measurement performed at <13⁺⁶ weeks gestation (2008)



The total is greater than 100% as some units perform more than one type of biometry measurement at this gestational age.

2.5 Technical information

Figure 8 Type of biometry measurement performed between 18⁺⁰ and 21⁺⁶ weeks gestation (2008)



The total is greater than 100% as some units perform more than one type of biometry measurement at this gestational age.

2.5 Technical information

The percentage of units examining specific structures routinely at the 2nd trimester anomaly scan were generally very similar in 2002 and 2008; the figures are largely a few per cent higher in 2008 than 2002, apart from longitudinal axis abdomino-thoracic appearance, orbits and nostrils, which were a few per cent lower (Table 12).

Table 12 Structures routinely examined by units at the 2nd trimester anomaly scan in 2002 and 2008

Structure examined	% of units in 2008	% of units in 2002	Structure examined	% of units in 2008	% of units in 2002
Head shape	99%	97%	Longitudinal axis abdomino-thoracic appearance	85%	87%
Internal structures			Diaphragm	96%	92%
Cavum pellucidum	97%	94%	Heart		
Cerebellum	100%	97%	Four-chamber view	100%	98%
Ventricular size at atrium	96%	91%	Outflow tracts	75%	57%
Spine			Limbs		
Coronal	97%	95%	Arms: three bones and hand (not counting fingers)	100%	95%
Transverse	98%	97%	Legs: three bones and foot (not counting toes)	100%	95%
Sagittal	99%	97%	Face		
Abdomen			Profile	84%	78%
Abdominal shape and content at level of stomach	99%	98%	Orbits	67%	69%
Cord insertion	99%	98%	Nostrils	59%	64%
Kidneys	99%	96%	Coronal lips	90%	82%
Bladder	100%	96%	Other*	12%	13%

*Other structures routinely examined in 2008 included alveolar ridge, profile, nasal bone, attitude/heel, count fingers and lenses of the eyes.

2.5 Technical information

There were two structures however, which were markedly routinely more examined in the 2nd trimester anomaly scan by units in 2008: coronal lips and fetal cardiac outflow tracts. In 2002, it was reported that 82% of units examined coronal lips as compared with 90% in 2008, and the examination of fetal cardiac outflow tracts rose from 57% to 75% in 2008.

The provision of routine structural examinations at the 2nd trimester fetal anomaly scan varied greatly by region. The percentage of units within a region offering an outflow tract examination varied from 12% to 100% and those providing a coronal lip examination varied from 41% to 100% (Table 13).

Table 13 Percentage of units by region offering routine examination of coronal lips and fetal cardiac outflow tracts at the 2nd trimester routine anomaly scan (2008)

SHA	Coronal lips	Outflow tract
East Midlands	100%	78%
East of England	100%	100%
London	100%	100%
North East	100%	75%
North West	90%	66%
South East Coast	100%	93%
South Central	92%	83%
South West	93%	73%
West Midlands	41%	12%
Yorkshire and the Humber	100%	87%

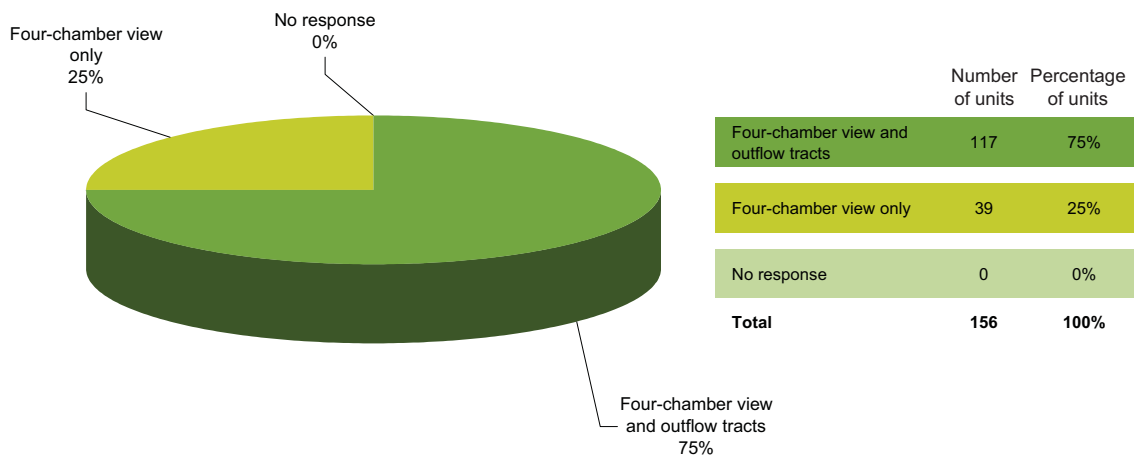
NHS FASP recommendation

'Fetal echocardiography involving the four chamber view of the fetal heart and outflow tracts is recommended as part of the routine anomaly scan.' (NICE guidance 2008)⁷

2.5 Technical information

All units routinely provided either a four-chamber view or a four-chamber view and outflow tract examination of the fetal heart. No unit provided only an outflow tract examination. 25% offered only a four-chamber view examination (Figure 9).

Figure 9 Number and percentage of units providing routine examination of four-chamber view or four-chamber view and outflow tracts at the 2nd trimester routine anomaly scan in 2008



In 2002, 95% of units reported routinely looking for sonographic markers of aneuploidy (soft markers) during 2nd trimester fetal anomaly scans as compared to 92% (144 of the 156 responding units) in 2008.

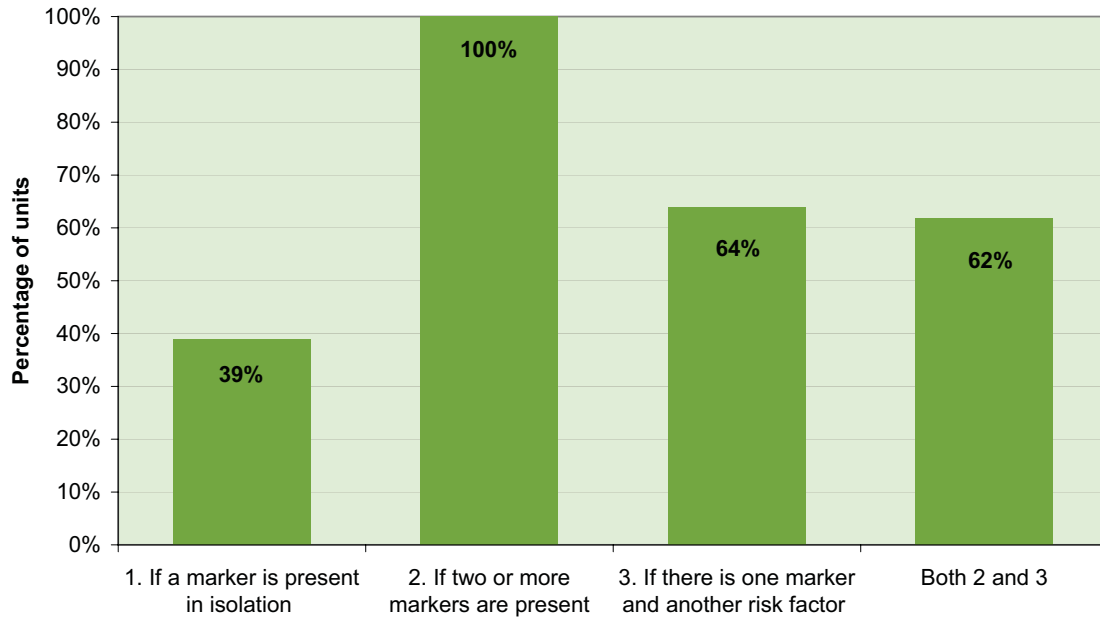
Of the units which did not look for these markers in 2008, 5 units indicated that this was because the woman declined screening for Trisomy 21, 3 units because diagnostic testing revealed normal chromosomes, 2 units because it was in opposition to local policy and 4 units reported that there were other reasons not covered by the questionnaire. Four units did not provide a reason why they did not look for these markers.

If markers were reported in some circumstances but not routinely, it was indicated this was because of a high risk for aneuploidy and declined diagnostic test for 9 units, late booking of >20 weeks gestation for 5 units and other reasons not specified by the questionnaire for 7 units. Of these 'other' reasons 3 units indicated that this was due to maternal wishes.

All of the units that routinely looked for sonographic markers informed the woman if two or more markers were present (100% in 2002). If there was one marker and one other unspecified risk factor 64% (100% in 2002) of these units informed the woman and if one marker was present in isolation 39% (49% in 2002) informed the woman. 62% of units informed the woman if both of the following were present: two or more markers and one marker and another risk factor (Figure 10). If any of the markers were present, 77% of units offered further detailed scanning in their hospital, 66% of units offered further scanning at a tertiary unit and 78% offered an amniocentesis.

2.5 Technical information

Figure 10 Criteria for informing the woman of the presence of sonographic markers of aneuploidy (2008)



NHS FASP recommendation

'The presence of an isolated soft marker, with an exception of increased nuchal fold, on the routine anomaly scan, should not be used to adjust the a priori risk for Trisomy 21.' NICE guidance 2008⁷

2.5 Technical information

If no other risk factors were present, 116 units (74%) reported nuchal fold >6 mm and ventriculomegaly in isolation (Table 14).

Table 14 Markers reported by units in isolation, assuming no other risk factors were present (2008)

	Number of units	Percentage of units
Ventriculomegaly	116	74
Nuchal fold >6 mm	116	74
Dilated renal pelvis	106	68
Cisterna magna >10 mm	103	66
Echogenic bowel	97	62
Short femur	96	62
2-vessel cord	86	55
Head shape	69	44
Clinodactyly	53	34
Short humerus	52	33
Clenched hand	43	28
Sandal gap	31	20
Choroid plexus cysts	25	16
Echogenic foci in heart	15	10
Other*	11	7

* Other markers, not specified by the questionnaire, reported by units in isolation, included talipes, cleft lip and absent nasal bone.

2.6 Management following identification of an abnormality

In 85% of units all women would be given information immediately by the sonographer if a definite abnormality was seen (Table 15). If a suspicious abnormality was seen, however, 69% of women were informed. This compares with 66% for definite abnormalities and 47% for suspicious abnormalities in 2002.

The second most adopted procedure for all women with a definite abnormality (reported by 41% of units) was for the sonographer to arrange an appointment with a consultant obstetrician/radiologist. 35% units adopted this procedure for all women with a suspicious abnormality.

Table 15 Percentage of units using specific procedures for informing women if definite or suspicious anomalies are seen on the routine anomaly scan (2008)

	Definite		Suspicious	
	All women	Some women	All women	Some women
Sonographer gives information immediately	85%	9%	69%	19%
Sonographer refers to sonographer for second opinion	30%	40%	36%	41%
Sonographer calls specialist midwife	33%	8%	26%	10%
Sonographer calls named/team midwife	7%	7%	6%	3%
Sonographer calls specialist consultant obstetrician/radiologist	28%	21%	22%	0%
Sonographer arranges appointment with consultant obstetrician/radiologist	41%	14%	35%	18%
Sonographer refers to fetal medicine unit/tertiary unit	31%	20%	20%	26%
Sonographer calls GP	1%	3%	0%	2%
Other*	7%	3%	4%	3%

* Where units selected the 'other' option for this question and details were provided, it was apparent that the procedures they outlined could have been appropriated to one of the options already supplied in the question.

The total percentage is greater than 100% as units may have more than one procedure for informing women if definite or suspicious abnormalities are seen.

NHS FASP recommendation

'Women should receive written details about their scan result and, whenever possible, information concerning the type of fetal abnormality present.' (RCOG 2000)⁹

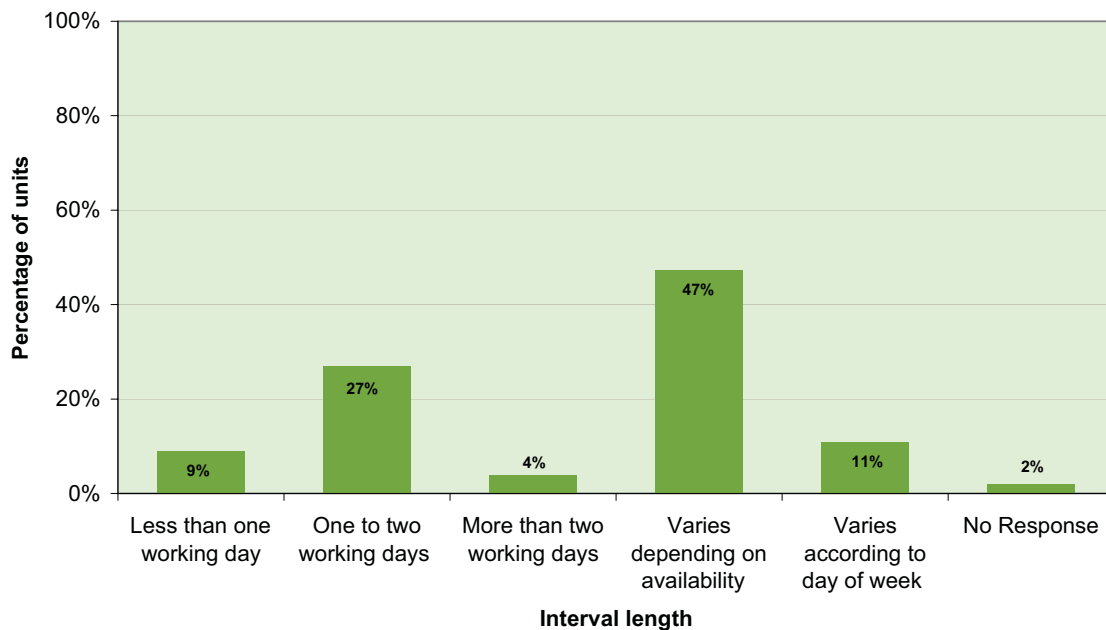
2.6 Management following identification of an abnormality

The interval between a scan revealing a suspected abnormality and a second scan to reveal whether the suspicion was correct largely varied according to availability (47% of units). However, 27% of units reported providing this service in one to two working days (Figure 11).

NHS FASP recommendation

'4.3.4 Discussion of the implications of a suspicious scan should occur with an obstetrician within 24 hours (or one working day). If indicated, referral to a tertiary centre with maternal fetal medicine specialists and other relevant practitioners should be possible within 72 hours (or two working days).' (RCOG 2000)⁹

Figure 11 The usual interval reported by units between a scan revealing a suspected abnormality and a second scan to determine whether the suspicion is correct (2008)



2.6 Management following identification of an abnormality

91% of units had access to specialist fetal cardiac ultrasound services. The most common indication for referral (but not necessarily a specialist fetal cardiology referral), reported by 96% of the units, was the suspicion of abnormality of the four chambers of the heart. The number of units which used other indications for referral varied but there were no reported referrals for echogenic foci (Table 16). Arrhythmia, maternal exposure (it was not specified to what), monochorionic twins and persistent fetal bradycardia or tachycardia were offered as free text comments as other indications for referral.

Table 16 Number and percentage of units using specific indications for referral for fetal cardiac scanning (2008)

	Number of units	Percentage of units
Suspicion of abnormality of four chambers	150	96%
Previous child with congenital heart disease	119	76%
Inability to view four chambers	105	67%
Parental congenital heart disease	98	63%
Increased nuchal translucency ≥ 3.5 mm (1st trimester)	94	60%
Inability to view outflow tracts	78	50%
Suspected/known chromosomal anomaly	78	50%
Maternal disease (e.g. diabetes)	63	40%
Increased nuchal fold >6 mm (2nd trimester)	59	38%
Other genetic risk	52	33%
Detection of another fetal anomaly	50	32%
Other	12	8%
Echogenic foci	0	0%

Total number of participating units = 156

The total number of participating units is greater than 156 and the total percentage is greater than 100% as units may use more than one indication for referral for fetal cardiac scanning.

It should be noted that the term 'specialist fetal cardiac ultrasound services' was not defined within the questionnaire and may have led to different interpretation.

NHS FASP recommendation

'Referral for specialist scanning should be considered as good clinical management in all cases where the NT is greater than or equal to 3.5mm (even when screening for Trisomy 21 has been declined).' (NHS FASP statement 2008)¹³

2.7 Equipment and image archiving

Details of 681 machines used for Trisomy 21 and/or fetal anomaly screening were provided. The mean age of all the machines used, where a date was provided (641 machines), was 2 years 6 months. Manufacturer details are provided in Table 17.

Table 17 Manufacturers of machines used in all responding units (2008)

	Number of machines	Percentage of machines
Toshiba	234	34%
GE	125	18%
Siemens	107	16%
Phillips	100	15%
Aloka	92	14%
Olympus Keymed	15	2%
Hitachi	3	<1%
Acuson	3	<1%
Sonosite	2	<1%
Total	681	100%

The replacement and maintenance policy of machines used varied considerably by region. The formal rolling programme for regular replacement/upgrading of ultrasound machines within departments varied from 20% to 78%. Machines deemed fit for purpose ranged from 76% to 95% with an overall average of 87%. The percentage of machines per region >5 years old varied from 0% to 23% (Table 18). The overall percentage of machines >5 years old was 11% in 2008 and 20% in 2002.

There appears to be an inverse relationship between the percentage of machines >5 years old and the percentage of machines deemed fit for purpose; those units which reported having a higher percentage of older machines had a lower percentage of machines deemed fit for purpose.

Other professional guidance

'The sonographer is expected to have a detailed knowledge of ultrasound equipment in order to ensure that it is appropriate for purpose.' UKAS Guidelines for Professional Working Standards Ultrasound Practice 2008⁸

2.7 Equipment and image archiving

Table 18 Details of machines used for Trisomy 21 and fetal anomaly screening in responding units by region (2008)

SHA	No. of units	Total no. of machines	% of machines >5 years old	% Rolling replacement programme	Machines fit for purpose
East Midlands	9	39	0%	78%	87%
East of England	15	56	6%	47%	93%
London	17	93	7%	47%	91%
North East	12	55	22%	25%	91%
North West	29	116	11%	52%	82%
South East Coast	15	70	23%	20%	76%
South Central	12	43	12%	42%	91%
South West	15	62	6%	67%	95%
West Midlands	17	79	17%	47%	80%
Yorkshire and the Humber	15	68	13%	73%	82%
Total	156	681	11%	49%	87%

Other professional guidance

'Upgrading or replacement of equipment is dependent on the type of equipment and its applications. High-specification ultrasound scanners will often have a longer useful life than basic or middle-range equipment. Review is typically undertaken between four to six years following installation.' (Royal College of Radiologists 2005)¹⁴

81% of units that provided information reported that regular quality assurance tests were performed on machines, with abnormal results audited and promptly resolved, as compared to 85% in 2002.

Other professional guidance

'A quality assurance programme should be developed in discussion with medical physics or service engineers for each individual machine... The programme should indicate clearly the limits of acceptability for each test, what and by whom action should be taken when these are exceeded.' (UKAS Guidelines for Professional Working Standards, Ultrasound Practice 2008)⁸

2.7 Equipment and image archiving

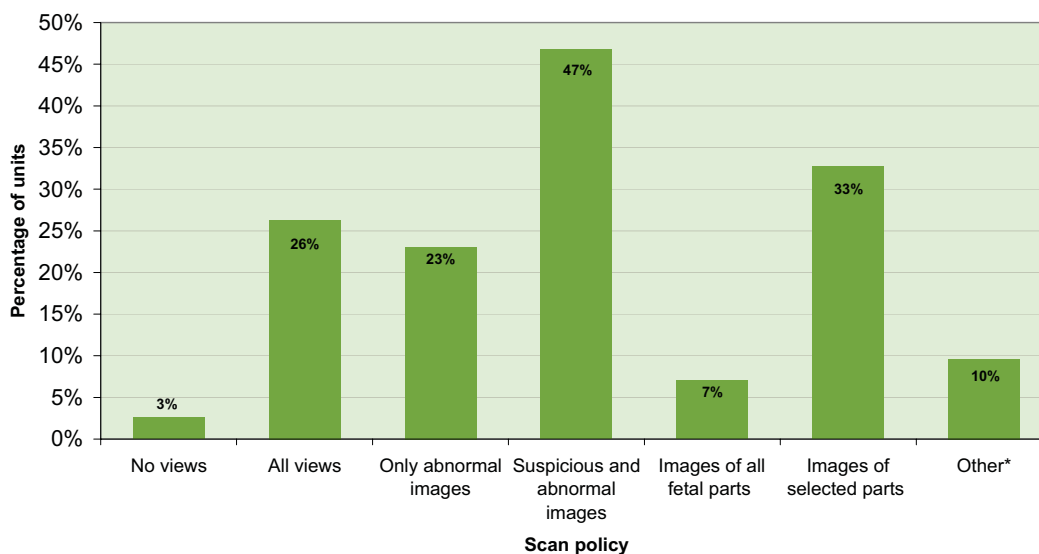
35% of units who provided information reported that the ambient lighting conditions within ultrasound rooms was monitored regularly, the results audited and sub-optimal conditions resolved. Written comments recorded from units indicated that there was no formal policy used for lighting. 29% of those who commented relied on dimmer switches.

Other professional guidance

'Correct room lighting is essential when using ultrasound equipment for fetal anomaly screening. When studied, 25% of NHS sonography rooms have been shown to have lighting that is higher than recommended. This results in poor image quality.' (NHS FASP 7 Essentials Campaign)¹⁵

Only 4 units (3%) reported not storing scan images at all. 26% of units stored all views. The greatest number of units (47%) reported storing images if they were suspicious or abnormal (Figure 12). 33% of units reported storing images of selected parts. The details provided from units which selected the 'other' option of the question indicated that their responses could largely have been appropriated to the 'images of selected parts' option.

Figure 12 The percentage of units using specific policies for the storage of scan images (2008)



The total number of participating units is greater than 100% as units reported more than one policy for the storage of scan images.

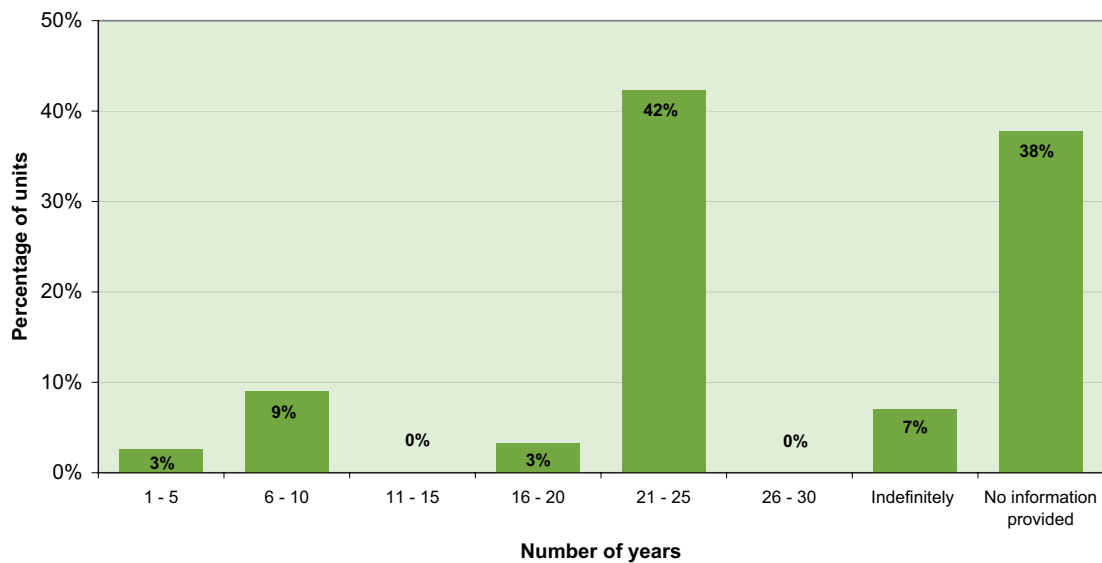
NHS FASP recommendation

'Equipment used to store current records on all types of media should provide storage that is safe and secure from unauthorised access and which meets health and safety and fire regulations, but which also allow maximum accessibility of the information commensurate with its frequency of use.' (Code of Practice DH/NHS Code of Practice: Records Management 2006)¹⁶

2.7 Equipment and image archiving

Only 64% of units responded to the question 'how long do you keep stored images?' For those who did respond, 66% reported keeping scanned images for between 21 and 25 years (Figure 13) as compared to 50% in 2002.

Figure 13 The number of years units stored scanned images (2008)



2.7 Equipment and image archiving

81% of units reported using electronic digital archiving system for storage although this figure is probably artificially low as several units did not respond to the question but provided a written comment indicating the use of picture archiving communication systems (PACS) (Table 19). 44% (69 units) used thermal paper to store scan images. Other storage methods available were infrequently used. Where details were provided in the 'other' category, a small number of units reported the use of CD/DVD.

Table 19 Scan image storage methods used by units (%) (2008)

	Number of units	Percentage of units
Polaroid	1	1%
X-ray film	4	3%
Video	4	3%
Thermal images	69	44%
Electronic digital archiving system	127	81%
Other	5	3%

Total number of participating units = 156

The total number of participating units is greater than 156 and the total percentage is greater than 100% as units may use more than one image storage method.

83% of units were satisfied that the manner in which their scanned images were stored ensured minimum deterioration, as compared to 66% of units in 2002. In 2002 it was reported that 85% of units used thermal imaging for storage compared with 44% in 2008. Furthermore, 10 units in 2008 expressed concern that thermal imaging was not a satisfactory method of storage. Unfortunately data from 2002 are not available for electronic digital archiving system storage.

Other professional guidance

'The minimum retention schedule for radiological records (for maternity) are 25 years after the birth of the child, including stillbirths.' (Royal College of Radiologists 2008)¹⁷

Other professional guidance

'The radiological archive is one of text and image data. It is recommended that the retention period of text and image data are equal and comply with the published retention schedules.' (Royal College of Radiologists 2008)¹⁷

2.8 Standards, audit and monitoring

The number of units which reported regular auditing of the quality of specific areas of the fetal ultrasound service was variable (Table 20). The number of units ranged from 90 (58%), which monitored the quality of 'detection rates for main anomalies', to 15 (10%) which monitored 'time to referral for second opinions'.

The quality of the fetal monitoring service in all areas was most commonly audited on an annual basis (Table 20). 'Detection rates for main anomalies' was the most reported area to be audited annually. Few units provided any auditing on a 3 or 6 monthly basis. Biennial auditing was not common and largely occurred for 'parents satisfaction with ultrasound service'.

There are minimal 2002 data available for this question. However, where available, it appears that there is very little difference between the two years surveyed in the percentage of units which monitored the quality in specific areas.

NHS FASP recommendation

'Audit and monitoring of the screening programme should be performance managed by the relevant SHA. Screening programmes are expected to have the appropriate tools to support the minimum criteria for the audit process.' (NHS FASP Working Standards 2007)¹⁸

Table 20 The number and frequency of units auditing specific areas of the fetal ultrasound screening service (2008)

Audited	Number of units					Percentage of units responding to question	
	3-monthly	6-monthly	Annually	Biennially	Other	(2008)	(2002)
Detection rates for main anomalies	5	4	66	2	13	58%	60%
False positives	2	3	29	0	8	27%	28%
Reliability of measurements	7	6	26	3	7	31%	-
Accuracy of measurements	7	6	24	3	7	30%	-
Referral rates to tertiary units	3	1	17	0	4	16%	-
Time to referral for second opinions	1	1	9	0	4	10%	-
Parents' satisfaction with ultrasound service	1	2	24	10	22	38%	32%

Total number of participating units = 156

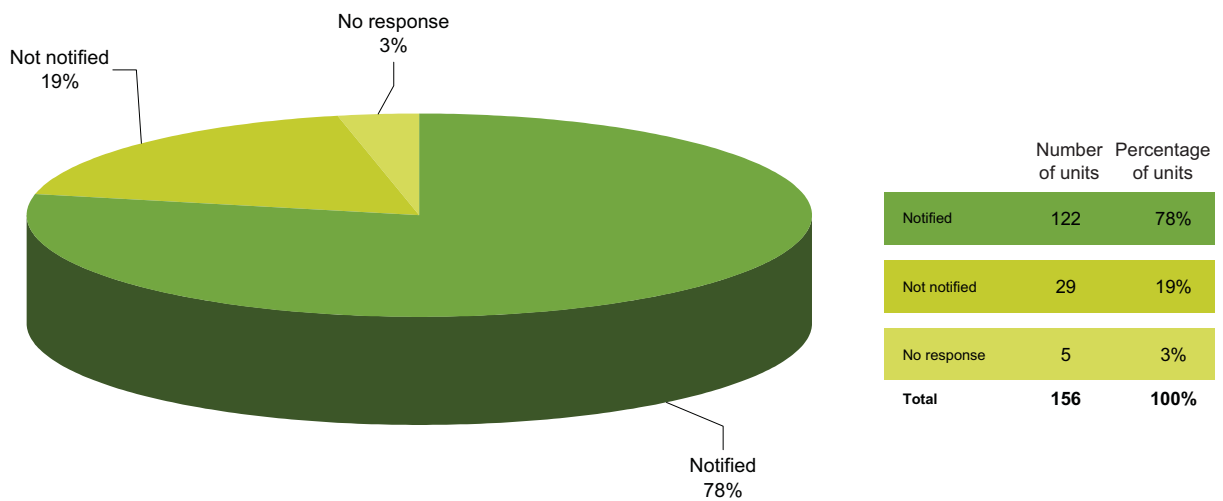
2.8 Standards, audit and monitoring

NHS FASP recommendation

'A survey of womens' views and experiences of Trust's screening programme should be conducted at least once a year [for Trisomy 21].'
(NHS FASP Working Standards 2007)¹⁸

78% of units notified definite or suspected fetal anomalies to a congenital malformation register (Figure 14), as compared to 70% in 2002. However, it must be noted that an incomplete response rate was achieved by the 2008 questionnaire.

Figure 14 The number and percentage of units which notified definite or suspected fetal anomalies to a congenital malformation register (2008)



2.8 Standards, audit and monitoring

Units informed either regional congenital anomaly registers of definite or suspected fetal anomalies or one of two national registers: the ONS National Congenital Anomalies Register and the National Down's Syndrome Cytogenetic Register. Of all the registers, the most notified by units was the National Down's Syndrome Cytogenetic Register (Table 21).

Table 21 Number of units notifying congenital anomaly registers of definite or suspected fetal anomalies (2008)

Anglia CESDI/ACET	7
Cranio-Facial Anomalies Register	2
Merseyside & Cheshire Congenital Anomaly Survey	9
National Down's Syndrome Cytogenetic Register	31
Northern Congenital Anomaly Survey (NORCAS)	15
North Thames West Congenital Malformation Register	12
North Western Perinatal Survey	2
Oxford Congenital Malformation Register	6
ONS National Congenital Anomalies Register	1
Wessex Antenatally Detected Anomalies Register (WANDA)	8
West Midlands Congenital Anomalies Register	16
South West Congenital Anomaly Register	12
Trent Congenital Anomaly Register	11
Other*	11
Total	143

Total number of participating units = 156

Not all units responded to this question but some indicated they notify more than one register.

* Details provided from the 'other' category indicated that 2 units notified the Congenital Anomaly Register for Oxfordshire Berkshire and Buckinghamshire (CAROBB) and 2 units notified the East Midlands and South Yorkshire Congenital Anomalies Register (EMSYCAR).

NHS FASP recommendation

'Participation in regional congenital anomaly registers and/or UK National Screening Committee approved audit systems is strongly recommended to facilitate the audit of detection rates.' (NICE guidance 2008)⁷

2.9 Staffing for 1st and 2nd trimester fetal ultrasound screening

There were gaps in the data collected from units as the information requested was detailed and the questionnaire had not always been filled out accurately or completely. For example, 15 units failed to itemise each health professional conducting fetal screening and only provided an overall whole time equivalent for their department. This rendered their data unusable. Given the difficulty some units experienced in completing this question, caution should be taken in the interpretation of the results.

The total number of staff in any region ranged from 97 to 287. The overall percentage of qualified radiographer/sonographers recorded in all regions of England represented 67% of all staff (1120 sonographers) performing fetal ultrasound screening, with a range of 52-83% according to region (Table 22). Qualified midwife/sonographers accounted for 18% (302) of this workforce and consultant obstetricians 9% (146). The least represented group was the trainee radiologists which accounted for <0.1% (2) of the workforce.

Table 22 Number and professional status of staff by region (2008)

SHA	Consultant obstetrician	Associate specialist	Trainee obstetrician	Consultant radiologist	Trainee radiologist	Qualified radiographer / sonographer	Qualified midwife / sonographer	Qualified midwife	Other	Total
East Midlands	10	2	0	0	0	61	18	0	6	97
East of England	15	0	1	0	0	110	38	2	1	167
London	29	1	0	1	1	133	27	0	9	201
North East	8	3	1	0	0	79	34	2	0	127
North West	14	2	2	4	0	198	58	0	9	287
South East Coast	7	4	0	0	0	102	22	2	3	140
South Central	13	2	0	0	1	79	17	0	3	115
South West	15	2	0	2	0	105	28	2	0	154
West Midlands	28	1	0	1	0	104	42	20	3	199
Yorkshire and the Humber	7	0	0	4	0	149	18	0	1	179
Total	146	17	4	12	2	1120	302	28	35	1666

2.9 Staffing for 1st and 2nd trimester fetal ultrasound screening

97% (1091) of qualified radiographer/sonographers and 91% (274) of qualified midwife/sonographers had postgraduate certification (Pg.Cert.) in obstetric ultrasound (Table 23). 58% of consultant obstetricians had an ATSM qualification (RCOG). 51% of consultant obstetricians, 50% of qualified radiographer/sonographers and 37% of qualified midwife/sonographers were NT accredited. 69% of qualified radiographer/sonographers, 68% of consultant obstetricians and 49% of qualified midwife/sonographers were trained in outflow tracts.

Although only 17 associate specialists formed part of this workforce, 53% were trained in outflow tracts and 41% were NT accredited. Similarly, of the 12 consultant radiologists 50% were trained in outflow tracts, and 25% were NT accredited.

Table 23 Staff qualifications by health professional type (2008)

Clinician	Total number of clinicians	Pg.Cert.	ATSM	Trained in NT	Trained in outflow tracts
Consultant obstetrician	146	27	85	74	99
Associate specialist	17	5	5	7	9
Trainee obstetrician	4	1	2	0	1
Consultant radiologist	12	3	2	3	6
Trainee radiologist	2	1	0	2	1
Qualified radiographer/sonographer	1120	1091	0	554	768
Qualified midwife/sonographer	302	274	1	113	148
Qualified midwife	28	4	0	4	4
Other	35	14	0	18	12
Total	1666	1420	95	775	1048

NHS FASP recommendation

'All sonographers/clinicians performing nuchal translucency measurements must have received appropriate training through an accredited training course.' (NHS FASP Working Standards 2007)¹⁸

Some questionnaires contained 'blank' responses relating to the level of individual staff qualification when other associated details were otherwise fully completed, which may indicate that a number of clinicians did not have a formal recognised qualification in ultrasound.

2.9 Staffing for 1st and 2nd trimester fetal ultrasound screening

Data illustrate that the highest number of clinicians who scan women with suspected anomalies only were consultant obstetricians (Table 24).

Table 24 The number of clinicians in units who scan women with suspected fetal anomalies only (2008)

Type	Total clinicians	Scan suspected anomalies only
Consultant obstetrician	146	93
Associate specialist	17	4
Trainee obstetrician	4	0
Consultant radiologist	12	9
Trainee radiologist	2	1
Qualified radiographer/sonographer	1120	82
Qualified midwife/sonographer	302	18
Qualified midwife	28	1
Other	35	8
Total	1666	216

NHS FASP recommendation

'The patient consents to an examination that he or she has the right to expect will be delivered and reported by a competent sonographer.' (UKAS Guidelines for Professional Working Standards, Ultrasound Practice 2008)⁸

At units where dating and NT scans were performed, 85% of qualified radiographer/sonographers, 84% of qualified midwife/sonographers, 75% of associate specialists, 75% of qualified midwives and 65% of consultant obstetricians were NT accredited. The 1 trainee radiologist was also reported to be NT accredited.

At units routinely examining outflow tracts, 80% of qualified radiographer/sonographers, 75% of associate specialists, 67% of qualified midwives, 66% of qualified midwife/sonographers, and 66% of consultant obstetricians and 56% of consultant radiologists were trained in examining these structures.

60% of clinicians having a Pg.Cert. or above qualification and/or ATSM qualification were trained in outflow tracts. 43% of clinicians (775 staff) having a Pg.Cert. or above qualification and/or ATSM qualification were NT trained.

2.9 Staffing for 1st and 2nd trimester fetal ultrasound screening

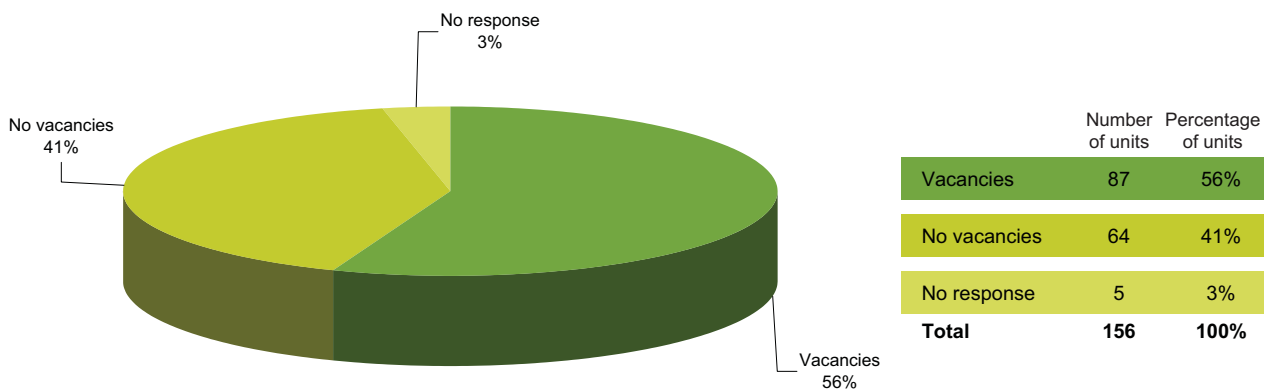
59 units (38%) had a policy ensuring that each professional undertook sufficient scans to maintain competence. Of these, 14 units had this policy documented in writing and for 13 units the policy included medical staff.

NHS FASP recommendation

'To ensure satisfactory performance, each sonographer must perform a minimum of 50 nuchal translucency measurements per year.' (Working Standards for Down's syndrome Screening 2007)¹⁸

56% of units currently had vacant posts for ultrasonographers (Figure 15) as compared to 45% in 2002.

Figure 15 Number and percentage of units currently having vacant posts for ultrasonographers (2008)



RCOG guidance

'Health care organisations should ensure that: they take into account nationally agreed guidance when planning and delivering treatment and care.' (RCOG 2008)¹⁹

2.9 Staffing for 1st and 2nd trimester fetal ultrasound screening

95% of units which reported having vacancies, provided information about whole time equivalent (WTE) vacancies, equating to a total of 155 WTE vacancies throughout England. This produces an average of 1.8 WTE vacancies per unit, with a regional range of 0.9 to 3.0 (Table 25) compared to 'about' 2 WTE per unit reported in 2002.

Table 25 The percentage of units with vacancies and the total and average WTE vacancy by region (2008)

SHA	% of units with vacancies	Total WTE vacancies	Average WTE vacancies
East Midlands	67%	9.6	1.6
East of England	67%	30.4	3.0
London	76%	23.4	1.8
North East	33%	4.4	1.1
North West	48%	29.3	2.1
South East Coast	67%	10.1	1.0
South Central	50%	5.2	0.9
South West	60%	11.9	1.3
West Midlands	47%	14.2	1.8
Yorkshire and the Humber	47%	16.9	2.4
Total	56%	155.3	1.8

2.9 Staffing for 1st and 2nd trimester fetal ultrasound screening

Table 26 Number of live births, WTE vacancies and vacancies /1000 live births in 2002 and 2008

SHA	2002 live births	2008 live births	Number of vacancies WTE 2002	Number of vacancies WTE 2008	Vacancies WTE/1000 live births 2002	Vacancies WTE/1000 live births 2008
East Midlands	61 267	54 192	5.5	9.6	0.1	0.2
East of England	41 385	71 738	19.8	30.4	0.5	0.4
London	98 428	127 651	38.3	23.4	0.4	0.2
North East	27 323	30 217	11	4.40	0.4	0.1
North West	68 239	88 167	10	29.3	0.1	0.3
South East Coast	-	-	--	10.1	-	-
South Central	-	-	--	5.2	-	-
South West	47 148	58 742	9.6	11.9	0.2	0.2
West Midlands	61 957	71 725	12.9	14.2	0.2	0.2
Yorkshire and the Humber	54 493	66 353	9.8	16.9	0.2	0.3
South East: Combined South East Coast and South Central data *						
South East	86 874	104 022	22.6	15.3	0.3	0.1

- No data available. Live birth data for South East Coast and South Central not available individually so combined South East data illustrated.

-- No data available. All 2002 data used previous SHA boundaries which incorporated South East Coast and South Central regions into the South East region.

* See footers above.

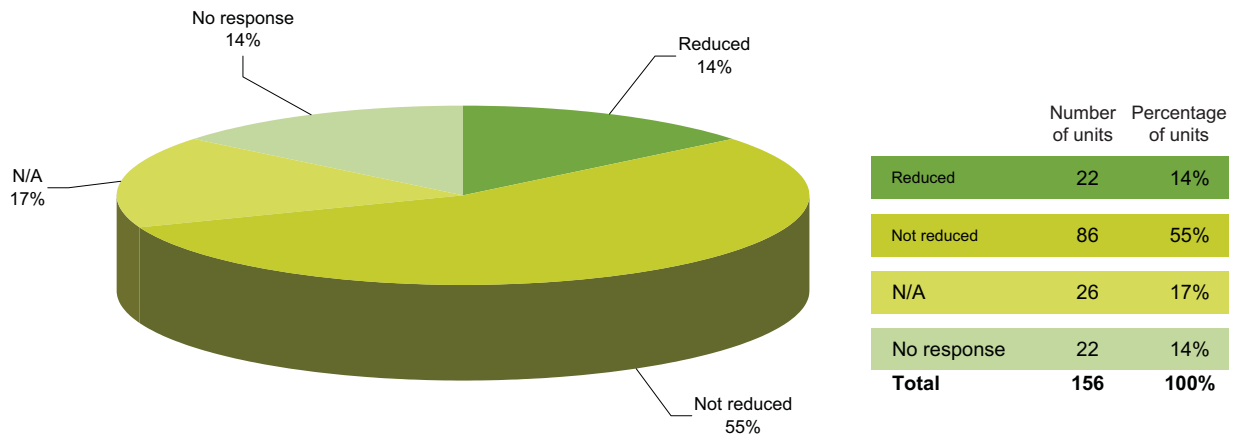
Live birth data from <http://www.statistics.gov.uk> (2007).

Table 26 shows the WTE vacancies per 1000 live births by region. The East of England had the highest proportion of WTE vacancies per 1000 live births and the North East and the combined South East had the lowest proportion of WTE vacancies per 1000 live births.

The original funding for vacant posts had not been reduced or withdrawn for 55% of units which had been unable to fill these posts for extended periods of time (Figure 16). Only 14% of units reported funding being reduced or withdrawn. 14% of units however did not respond to this question and 17% considered the question 'not applicable'.

2.9 Staffing for 1st and 2nd trimester fetal ultrasound screening

Figure 16 Number and percentage of units reporting funding reduced or withdrawn for prolonged vacant posts (2008)



72% of units reported that all trained obstetric sonographers had attended a course in breaking bad news. Of these, 76% attended an antenatal results and choices course, 35% received in house training and 29% attended other certified courses by external provider. Where details of the in house training were provided, it was indicated that this was carried out by Trust education departments, hospital counsellors and local screening coordinators. A few units reported that in house training was provided by universities, an option which should have been incorporated into the 'other certified courses by external provider' category.

Other professional guidance

'Training on how to communicate information in an effective sensitive manner should be provided to all healthcare professionals.' (RCOG 2008)¹⁹

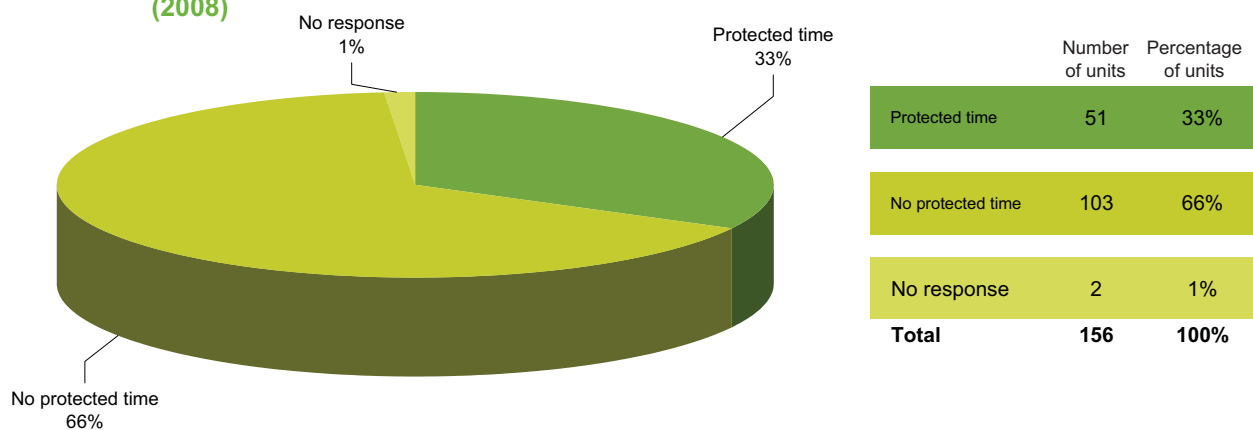
2.9 Staffing for 1st and 2nd trimester fetal ultrasound screening

Best practice point

'Each hospital Trust should ensure provision of a multidisciplinary education and training programme for all healthcare professionals which fulfil the requirements of their annual appraisal ongoing CPD or induction programme to the ultrasound department.' (NHS FASP draft standards under development, due for publication January 2010)

Only 33% of units reported that staff had access to protected time for continuous professional development (CPD) in relation to all aspects of fetal ultrasound screening (Figure 17).

Figure 17 The number and percentage of units having access to protected time for continuous professional development (CPD) in relation to all aspects of fetal ultrasound screening (2008)



Other professional guidance

'The most significant barrier to facilitation of education and training for screening at Trust level is staff shortage, resulting in difficulty releasing staff to attend education sessions.' (National Education and Training Needs Analysis for Antenatal Screening & Newborn Blood spot Screening across England 2007)²⁰

2.9 Staffing for 1st and 2nd trimester fetal ultrasound screening

There were two recurrent themes emerging in the comments provided by units in the free text section of the questionnaire. These related to staff shortages (Table 25 and 26) and financial constraints.

A number of units expressed concern that these issues could compromise the quality of patient care and impact on staff morale. For example, some units were aware that they could not provide all types of recommended scan (Table 4), despite being committed in principle to implementing the required changes to local services.

There were challenges detailed regarding recruitment. Some units reported having a vacant post but receiving no response to advertisements or posts being converted to radiography positions due to an inability to appoint a suitable sonography applicant. It was also mentioned that younger recruits often seemed to prefer agency work, making it difficult to recruit permanent members of staff to the ultrasound team.

Financial constraints were perceived to intensify the problems caused by the staffing issues, leading to increased pressure on existing staff. This included the use of machines greater than 5 years old (Table 18) and staff reporting working extended hours to 'free-up' room space and increase capacity and throughput. Some reported that replacement equipment was difficult to procure due to a lack of capital money.

Not all units expressed concern over staffing or financial constraints and described providing a good service to patients, having a low turn-over of competent staff, opportunities and encouragement to engage in CPD activities and a supportive working environment.

Discussion



3 Discussion

This is the second comprehensive survey of fetal ultrasound screening provision in England, conducted on behalf of the UK National Screening Committee. The first mapping exercise took place in 2002 and was reported and published in 2005.

One of the main aims of the NHS Fetal Anomaly Screening Programme is to ensure all pregnant women in England have access to a uniform fetal screening programme which conforms to an agreed level of quality. The data contained within the results section provide an uplifting insight into progress since the 2002 survey. However, it also highlights continuing gaps, deficiencies and a general lack of uniformity between service provision at local level and current national guidance.

3.1 Fetal ultrasound screening package

1st trimester screening package

The provision of a 1st trimester ultrasound scan for dating and viability has long been considered of value and was recommended by NICE in 2003² and 2008⁷ and by the UK NSC in 2006. This survey demonstrates 99% of units offer a 1st trimester scan which includes dating of the pregnancy to all women in the 1st trimester of pregnancy.

Also, a significant increase in 1st trimester dating scans which include the measurement of nuchal translucency is demonstrated from the 2002 survey report, when 16% of units offered this service. In 2008, 37% of responding units offered NT screening within a local screening package. This figure is expected to continue to rise as the 2008 Department of Health (DH) Model of Best Practice⁶ policy recommending 'combined screening' for Trisomy 21 is implemented nationally.

An increasing level of discussion and debate is being devoted at clinical level to the potential value of 1st trimester anomaly ultrasound screening. As mentioned above, current national evidence-based guidance states the 1st trimester scan is primarily for dating, viability and the detection of multi-fetal pregnancy, not for the formal screening and identification of major structural anomaly. However, the 2008 survey data demonstrated 9% of units already offer 1st trimester anomaly scans to all women, with a further 12% offering this to 'some' women. It should be noted that the term '1st trimester anomaly scan' was not defined within the questionnaire and may have led to different interpretation. The majority of responding units suggested their target or optimal timing of the 1st trimester scan was between 10 and 14 weeks and the fetal anatomy is reasonably well developed towards the upper end of this gestational age window.

3.1 Fetal ultrasound screening package

Anecdotally, sonographers appear to feel strongly that if early screening and detection of major structural anomalies is possible, then this care pathway should be formalised and women offered an option of an earlier test. However, this must be balanced against the evidence in the 'harm versus benefits' debate, and on managing women's expectations regarding detection rates of serious or fatal fetal conditions.

2nd trimester screening package

Comparative data from the 2002 survey demonstrate the number of responding units offering a 2nd trimester scan which includes a screen for major structural anomalies has risen from 98% to 100%. This is a pleasing result, as there are strong recommendations from NICE, the DH and NHS FASP to offer this service universally.

The amount of appointment time allocated to the 18⁺⁰ to 20⁺⁶ weeks anomaly scan has significant time and human resource management implications for many ultrasound imaging departments. There is little doubt that in the future extra scanning time per appointment will be required. This will be needed to absorb more technically difficult and time consuming elements of anomaly scanning, such as fetal outflow tracts and the examination of coronal lips. Following the extensive NHS FASP consultation process to develop standards for fetal anomaly screening (conducted throughout 2007 and 2008) the agreed time allowance will be 30 minutes per 18⁺⁰ to 20⁺⁶ week anomaly scan. This is congruent with the recommendations from the UK Association of Sonographers (UKAS)⁸. Currently only 26% of responding units offer a 30 minute time allocation.

A number of factors combine to deplete the pool of medical imaging staff, and therefore the time available, for undertaking longer fetal screening scans. These include the number of sonographer vacancies, Government waiting list targets within general medical imaging, and emerging national screening committee programmes using ultrasound (e.g. abdominal aortic aneurysm screening). However, in a recent report outlining an audit of obstetric ultrasound referrals from 22 units from England and Wales²¹, it was noted that 'the largest contribution to workload for scan units, with potential for rationalisation, was from the scans performed after the anomaly scan. These accounted for 27% of all scans and 63% of non-routine scans'. The findings demonstrated 17% of post-anomaly scans and 10% of pre-dating scans were deemed 'inappropriate' by the sonographer performing the examination.

From this audit referral report there is clearly a suggestion that a significant proportion of scan appointment time per week could be released by units reviewing their current referral mechanisms and reducing the number of non-clinically indicated scans. This would thereby release more appointment time for Department of Health policy approved fetal screening examinations. Units will need to develop local strategies to support and educate midwives and doctors in identifying and referring women for scans only when clinically justified.

3.1 Fetal ultrasound screening package

Doppler studies

Units demonstrate a variable acceptance and use of Doppler ultrasound for maternal or 'previous pregnancy' obstetric indications. Only three responding units offered Doppler studies routinely to all women in the 1st and 2nd trimesters of pregnancy. This practice is contrary to research findings contained within the NICE evidence summary⁷ which states that 'there was no evidence of difference in antenatal admissions, obstetric interventions, neonatal intervention or overall perinatal mortality between routine and no routine use of Doppler ultrasound during pregnancy'.

As financial and medical imaging staffing resources in ultrasound departments are under considerable pressure, units may wish to re-evaluate the provision of services that are non-evidence based and do not appear to deliver any clinical outcome advantage and are not recommended by the UK NSC or NICE.

Another important issue which must be considered is the safe use of ultrasound. Although diagnostic ultrasound has been in routine clinical use for many years with no significant adverse effects noted, UKAS (2008⁸) quote from the clinical safety statement from the European Federation of Societies for Ultrasound in Medicine and Biology, stating "if used imprudently diagnostic ultrasound could be capable of producing harmful effects... Doppler imaging and measurement techniques may require higher exposures than those used in B- and M-modes, with pulsed Doppler techniques having the potential for the highest levels". The developing embryo and fetus are potentially particularly vulnerable and Doppler ultrasound should therefore be used only by appropriately trained operators, with a good understanding of the relative risks for each application and when a robust clinical indication is identified.

3.2 Information and support for parents

The 2009 Handbook to the NHS Constitution²² clearly states ‘The NHS commits to offer you easily accessible, reliable and relevant information to enable you to participate fully in your own healthcare decisions and to support you in making choices’. As the purpose of fetal ultrasound screening tests is to detect fetal abnormality, some women will receive devastating news and possible long-term psychological sequelae from the results obtained. It is therefore imperative that high-quality pre and post screening information and support should be a prerequisite of any maternity and obstetric ultrasound service.

This survey demonstrates that 97% of responding units offer pre-scan information regarding ultrasound screening for fetal abnormality to all women. 33% offered both the UK NSC booklet ‘Screening tests for you and your baby’¹⁰ and their own in house developed information. Obtaining consent is a professional obligation and a crucial aspect of the screening process, it is important that ‘the patient understands the scope of the ultrasound examination prior to giving his or her consent.’ This includes explicit information on the nature, purpose and implications of accepting or declining the examination.

The advantages of offering in house developed information describing local policy and procedures has to be considered against offering standardised, freely available, nationally produced information which has undergone extensive consultation and peer review. It is recommended that departments should consult their Trust Antenatal Screening Multidisciplinary Clinical Steering Group (see Appendix 1) for guidance on which information strategy to adopt.

Encouragingly, all units who returned a copy of their in house developed information leaflets provided information to women on the purpose of the scan and how results would be received. However, when compared with the comprehensive pre-scan information available in the nationally produced NSC booklet there were some worrying omissions in many of the in house developed leaflets. Notably, only one responding unit raised the important issue of the need for explicit informed consent, and two used arguably coercive language, stating that scans were ‘recommended’ or ‘needed’. The ‘offer’ of a scan should be just that, and any literature provided must emphasise choice and avoid any suggestion of fetal screening as a routine part of antenatal care.

Furthermore, where units submitted examples of their in house produced information, it invariably offered information on fetal sexing and on the purchase of photographic momentos. There are arguments to support the omission of this information from both nationally and locally produced publications as it could be seen to reinforce the message that scans are a social occasion rather than a serious medical examination.

3.2 Information and support for parents

Of major concern is the 1% of responding units who do not offer any pre-scan information regarding ultrasound screening for fetal abnormality to all women, and the 2% in which no response at all was offered to the question. By definition, pre-scan information is usually offered to women by a non-sonographer. It is possible that some questionnaire respondents may not have been precisely aware of the nature and type of information offered by midwives or doctors prior to their scan.

Only 29% of units were able to offer written information in languages other than English to appropriate women. The significant changes in demographics in many areas of England have driven a recent NSC initiative to review the translations available for the booklet 'Screening tests for you and your baby'¹⁰. Access to screening information in other languages is now much improved.

Although the availability of written information in other languages was variable by unit and by region, there was a very positive response on the availability of interpreters, link workers, advocates and Language-Line for women who do not speak English. 95% of respondents could confirm these services were available.

Local maternity services and obstetric ultrasound services should be flexible enough to meet the needs of all women, including vulnerable and hard to reach groups. A small proportion of units offered information in other formats. It is important for all units to be aware of fetal screening resources available in Braille, British Sign Language and to remain vigilant to the emergence of new resources. New pictorial information booklets are available²³ for parents with learning difficulties or low literacy levels.

3.3 Technical Information

Fetal biometry

This survey demonstrates that biometric measurements used for dating pregnancy in the 1st and 2nd trimesters are still subject to variation across England. The majority favour the Working Standards recommendation of CRL $\leq 13^{+6}$ and BMUS recommended HC after 13 weeks of pregnancy for the assessment of gestational age.

In January 2008, due to acknowledged inaccuracies with the Robinson & Fleming (1977) CRL chart, BMUS took the decision to withdraw it from their documentation and website, pending a review of evidence. In November 2008, a BMUS/FASP joint initiative¹² recommended an algorithm and produced a new CRL look-up table for dating pregnancy, with data extracted from a large evidence base. This was intended for use between gestational ages 6 and 13⁺⁶ weeks. This new chart has been disseminated within a NHS FASP Programme Statement to equipment manufacturers, software providers, laboratories and sonography departments. The National Programme recommends exclusive use of this algorithm and chart to ensure uniformity of ultrasound measurement for the assessment of gestational age and calculation of risk for Trisomy 21 as part of a quality-assured national screening programme.

Structures examined during 2nd trimester anomaly scan

Data returned suggest that the majority of units deliver an anomaly scan service that adheres closely to the guidance within the RCOG 2000⁹ report outlining fetal structures to be examined. This report set out criteria for a screening scan deliverable at two levels, a minimum and an 'optimal' standard. The minimum standard appears to be widely adopted with a reasonably uniform service offered. The optimal standard includes views of the fetal outflow tracts and fetal face. Interestingly, but unsurprisingly, it is in these two areas where the widest variation in ultrasound practice occurs. 75% of respondents routinely examine outflow tracts and 84% view the fetal profile, 67% orbits, 90% coronal lips and 59% the nostrils.

NICE⁷ have recommended that the examination of fetal outflow tracts should become part of the routine scan, and this will be further endorsed by NHS FASP in their standards and base scan 'menu' for the anomaly scan, currently in the final stages of development and due for publication January 2010. It is expected that units are likely to implement the recommendation to examine and report on outflow tracts once staff have had an opportunity to receive support for further training to develop the appropriate skill-set.

'Soft marker' examination during 2nd trimester anomaly scan

The survey data demonstrate wide variability in the soft marker screening package offered, the presumed significance of each marker and management and referral pathways following identification. This variation in practice is also unsurprising as the routine examination of soft markers at anomaly scan remains a contentious issue. This is primarily because the significance of markers has previously been unclear, and because of the ethical issues and management dilemmas raised when markers are noted at anomaly scan, especially when women have been pre-screened for Trisomy 21 with a low-risk result or when women have declined screening for Trisomy 21.

3.3 Technical Information

In their Evidence Summary, NICE⁷ concluded that ‘Soft markers on ultrasound have low sensitivity and LR+ (positive likelihood ratio) when seen individually, except for nuchal fold thickening’. The ultrasound survey demonstrated that the majority of units (74%) appear to have acknowledged this evidence and consider nuchal fold ≥ 6 mm as a significant feature and would report this in isolation.

NICE⁷ also recommend that the identification of two or more markers should prompt the offer of a referral to a fetal medicine specialist or appropriate healthcare professional with a special interest in fetal medicine. Although survey data demonstrate that all units routinely screening for soft markers classify two or more as sufficiently significant to inform women, there are differences in subsequent management strategies.

When an otherwise structurally normal fetus is noted to have markers, the psychological effects on the woman can be profound. It is therefore imperative that guidance for ultrasound departments is available and the recommendations implemented uniformly across England. The NHS FASP has recognised the need for clarity and has commissioned a formal external consultation within the sonographic stakeholder fraternity to debate and agree a set of recommendations. These should be available early in 2010 and will offer units an evidence-based guidance framework on the significance of markers and suggested management. One early recommendation from the consultation process appears to be support to change the term ‘soft marker’ to ‘normal variant’. This would reflect more accurately the NICE statement on low sensitivity and likelihood ratio when these features are seen in isolation.

3.4 Management following identification of an abnormality

Disclosure of information

Overall, responses to the questions within this section gave some cause for concern, demonstrating lack of uniformity and lack of clarity across units in the management of women following identification of an abnormality. A possible reason for this is the broad acceptance that different units may have variability of access to obstetric, fetal medicine and tertiary services. Furthermore, the previous lack of standards in this area has naturally resulted in a variable approach to referral patterns across England, and even between units within the same SHA.

Survey data are strongly suggestive of a trend towards immediate disclosure of bad news to all women when a definite anomaly is detected (85%), when compared with the 2002 survey (66%). Correspondingly, the rates of disclosure for suspected anomalies to all women increased from 47% in 2002 to 69% in 2008. Research by Alkazaleh F *et al*,²⁴ demonstrated that the overwhelming majority of women would rather have the sonographer disclose bad-news results during the scan than wait for the obstetrician to discuss the implications and options. Likewise, Lalor *et al*,²⁵ could also report that all the women who were scanned by a sonographer but subsequently received their results from an obstetrician were unhappy with this procedure. Women appear to wish for prompt information. However, Lalor balances the results of this research by acknowledging that women can find it distressing when the sonographer is unable then to answer more detailed questions on the prognosis for their baby.

Historically, many sonographers were constrained by medical models of care delivery that prevented them from communicating scan results to pregnant women. It could be also be deduced that perhaps the increase in disclosure of bad news at the time of scan may be attributable to Trust policies and recruitment strategies changing, as more autonomous 'reporting' sonographers have been employed since the 2002 survey was completed.

Local management pathways following disclosure of bad news

The usual interval between a scan revealing a suspected abnormality and a second scan to determine whether the suspicion is correct varied considerably, which is of some concern. A proportion of surveys 43 units (28%) were returned with more than one box ticked, rendering the response for this question from those units difficult to interpret. 47% of units responded that there was variability in the usual interval depending on the availability of a health professional to perform the second scan. 27% reported the second scan was usually performed within one to two working days and 14 units (9%) reported less than one working day. The RCOG Standards for Maternity Care: Report of a Working Party¹⁹ give some welcome guidance to units (see key points box in Results section) which may assist in standardising processes in management following identification of an anomaly. Further NHS FASP guidance will be available in 2010 within the newly developed Standards for the 18⁺⁰ to 20⁺⁶ weeks anomaly scan.

3.4 Management following identification of an abnormality

As examination and reporting of the structure of the fetal cardiac outflow tracts becomes accepted and implemented as routine practice in England, clear referral pathways for access to specialist fetal cardiac ultrasound services must be developed at Trust level. Survey data revealed that 91% of units already have this access. Only 3% do not have access currently, with a further 6% not responding to this question.

Units were asked to specify the indications they would use for referral for fetal heart scanning. Once again, a broad range of responses were returned, indicating lack of uniformity of approach to which indications warranted referral and further investigation. Although it is acknowledged that a standardised approach is desirable, this may be difficult to achieve when only 91% of units could report access to specialist fetal ultrasound services.

3.5 Equipment and image archiving

Replacement and upgrades of ultrasound equipment

The survey appeared to demonstrate considerable regional differences as to the existence of a formal rolling programme for regular replacement or upgrading of ultrasound equipment. The range was from a low of 20% of units in the South East to a high of 78% of responding units in the East Midlands region. The region with the least number of units with a formal rolling programme also reported the lowest number of machines deemed fit for fetal screening purposes. It is acknowledged that this was a subjective question and the response given could be the opinion only of the clinician completing the questionnaire. However, one of the findings from a NHS FASP commissioned Machine Specification study (2007 - awaiting publication) by Dr J Evans appeared to suggest that there is a high level of agreement between sonographers about the identification of a good image. It is possible, therefore, that those units reporting that a machine was not fit for purpose were sharing the collective opinion of sonography staff employed within that unit.

Local quality assurance (QA) and quality control (QC) arrangements

UKAS⁸ and the Royal College of Radiologists (RCR)¹⁴ strongly advocate regular QA checks on every machine used for diagnostic ultrasound purposes, however, this survey demonstrates that only 81% of responding units reported that these checks were performed, with abnormal results audited and promptly resolved. This was a very disappointing result, in view of the findings of the 2002 survey, when 85% of units responded in the affirmative. Missing data from non-responding units in the 2008 survey may be one of the reasons for this apparent decrease in those units performing regular QA checks.

Of major concern was the small number (35%) of responding units who reported that ambient lighting conditions within ultrasound rooms were monitored regularly, results audited and sub-optimal conditions resolved. The aforementioned Machine Specification Study undertaken in 2007 monitored the room lighting levels in 21 scanning rooms and found that 7 out of the 21 rooms failed to meet the 15 lux level recommended in the IPEM report 91²⁶. The Machine Specification Study report summarised the section studying lighting and display conditions by suggesting 'there is a need for some local arrangements to be in place to measure room lighting in all scanning rooms'.

As clear guidance is available from professional bodies on QA of ultrasound equipment, it is recommended that units review their machine QA policy status with their Medical Physics departments on a regular basis. This will assist in ensuring equipment consistently produces images of diagnostic quality.

3.5 Equipment and image archiving

Image archiving arrangements

Effective storage of scan images has been a challenge for many units in the past. The adoption of digital technology in the NHS is demonstrated in the survey results which show a trend towards using digital archiving systems to store images and away from storing thermal images. This should resolve issues of deterioration of some stored images, especially in relation to thermal images.

The NHS FASP standards under development, which contain a 'menu' of structures to be examined between 18⁺⁰ and 20⁺⁶ weeks gestation, will suggest a limited number of selected views to be stored for all examinations where the fetal structure appears normal. These images will serve an important purpose: facilitating growth trend comparisons in the event of subsequent pregnancy complications and providing image data to audit and monitor the quality of obstetric biometric measurements. Further stored images will be required if a fetal anomaly is suspected or detected. This will assist specialists in monitoring the nature and severity of the anomaly or anomalies and will inform management decisions.

3.6 Standards, audit and monitoring

Systems were in place to monitor the fetal screening service in 58% of units. This gives cause for serious concern as these figures demonstrate only a marginal 4% improvement on the data obtained in the 2002 survey when 54% of units monitored the quality of their fetal ultrasound screening service. According to the 2009 NHS Constitution²², “individual clinical teams are already encouraged to participate in clinical audit, comparing their standards of care with best practice”. It is recommended that this should be taken forward by Trust Antenatal Screening Multidisciplinary Steering Groups (Appendix 1). The NHS FASP standards under development will expect units to adhere to the minimum audit criteria required from the Programme.

Most units who do audit the quality of their fetal screening services do so on an annual basis. Minimum data sets and audit interval periods should be discussed and agreed by Trust Antenatal Steering Groups based on recommendations from available, reputable national groups based on available recommendations from NHS FASP, NICE and the Royal Colleges, along with advice from internal Governance and Clinical Negligence Scheme for Trusts advisors.

In the past, auditing detection rates for Trisomy 21 and structural fetal abnormalities has been somewhat hampered by a lack of suitable, reliable IT facilities able to collate outcome data for all England. The NHS FASP is exploring a variety of mechanisms to ensure reliable access to complete outcome data is possible in the future.

Currently, some data is provided by regional congenital anomaly registers (CARs) via the British Isles Network of Congenital Anomalies Registers (BINOCAR) but not all areas are served and there are some challenges obtaining validated data from the registers. 78% of units responded that they do notify their regional cytogenetic register of suspected or confirmed fetal anomalies, with 19% stating they do not. Incomplete coverage of CARs may account for the 3% who did not respond or those that stated ‘no’ to this question. The National Down’s syndrome Cytogenetic Register (NDSCR) also provides some data on pregnancy outcomes. Both mechanisms feed into the Office for National Statistics (ONS).

3.7 Staffing for 1st and 2nd trimester fetal ultrasound screening

This section of the ultrasound survey required detailed responses and clearly represented a challenge to some staff completing the questionnaire. The following discussion reflects the results returned, but, as mentioned in the Results section, caution should be taken in the interpretation of the results.

Staff qualifications and continuous professional development

The majority (67%) of the sonographic workforce are qualified radiographer/sonographers. However, data from this survey demonstrate that fetal screening services are delivered within different units by a workforce from an eclectic mix of original healthcare and allied disciplines.

This workforce also demonstrates a varying level of qualification in ultrasound. There are several generic and discipline-specific documents and statements published relating to recommended levels of staff training within the NHS. All endorse the recommendation that staff should have received appropriate training to enable them to deliver a high-quality service. The firm guidance and strong stance across the governing and professional bodies with regards to this is discussed below.

The basic rights of any person accessing NHS healthcare are clearly laid out in the 2009 NHS Constitution.²² It offers an explicit pledge that 'You have the right to be treated with a professional standard of care, by appropriately qualified and experienced staff, in a properly approved or registered organisation that meets required levels of safety and quality'. A number of incomplete questionnaires were returned where no information was provided with regard to the qualification of all staff. It would be unwise to conclude that 'blank' boxes necessarily translate into firm evidence of higher numbers of health professionals performing fetal screening without formal ultrasound qualification. SHAs may wish to consider conducting their own detailed staffing breakdowns to obtain a fuller and more accurate picture of the level of qualification of the workforce.

Although a high-quality screening service cannot be guaranteed by employing staff with a formal ultrasound qualification, the BMUS¹² are clear that 'The use of unqualified staff has adverse implications for diagnostic accuracy and potentially significant medico-legal consequences'. With increasing litigation in obstetric ultrasound this has to be a consideration when workforce planning and devising risk management strategies at Trust level following discussion within Trust Steering Groups.

In order to offer a uniform fetal screening service and to meet 2008 NICE guidance⁷, it is now known from data collected in this survey that a significant proportion of the workforce will require additional support and training in the examination of fetal outflow tracts to complete the 18⁺⁰ to 20⁺⁶ weeks gestation scan to the required level. 69% of Pg.Cert. qualified radiographer/sonographers (who represent the majority of the sonographic workforce) have already received extra tuition, albeit in a variety of settings from in house training to formalised courses. It is logical to assume that the delivery of previously

3.7 Staffing for 1st and 2nd trimester fetal ultrasound screening

accessed training may well vary in content, degree of complexity and whether competency is assessed following theoretical training.

The survey demonstrated that 72% of obstetric ultrasound staff had attended a course in breaking bad news. The type of course accessed varied considerably, and was delivered by a range of internal and external educators, counsellors and religious or spiritual supporters. As discussed in 'management following identification of an abnormality', women are especially vulnerable at this time and the timing and manner of disclosure of bad news has a strong psychological impact. As a best practice point, therefore, there is a need within units to ensure that all staff have had an opportunity to access a course on breaking bad news.

Access to ongoing CPD is clearly a challenge for many units, with only 33% of units offering protected time. Some units stated that a number of staff self-funded or trained in their own time. This is clearly not acceptable. The 2007 Training Needs Analysis²⁰ stated 'The most significant barrier to facilitation of education and training for screening at Trust level is staff shortage, resulting in difficulty releasing staff to attend education sessions'.

This survey demonstrates the need for formalised, accessible training programmes for sonographers in measuring NT, fetal outflow tract examination and breaking bad news. All will be required in the future to meet the changing standards and requirements of the NHS FASP and NICE, and the infrastructure to support this is already being taken forward.

Staff vacancies

Data from this survey corroborate the findings from the 2007 Training Needs Analysis mentioned above, suggesting that vacancies within ultrasound units remains a significant barrier to delivering fetal screening services to local populations. 56% of units reported having vacant posts. This represents a worsening picture, as 45% of units reported having vacant posts in the 2002 survey⁵.

As little is known of the demographic profile of the sonographic workforce due to the lack of a formal 'register', the true extent of this workforce dilemma is difficult to assess. Indeed, another challenge relates to defining what an 'ultrasonographer' actually is. A case has been put forward to the Health Professions Council which acts as a regulator for a number of healthcare professions. It must be argued that formal role definition, level of training and recognition for those undertaking ultrasound in clinical practice would offer a higher degree of public protection and a clear framework for high-quality, safe practice.

Although some data can be obtained from the Consortium for the Association of Sonographic Education (CASE) accredited Higher Education Institutions on numbers of students and recent graduates, there is minimal information in published literature on the number of sonographers leaving the profession and retiring.

3.7 Staffing for 1st and 2nd trimester fetal ultrasound screening

Until more is known about the demographics of the ultrasound workforce it is difficult for commissioners to plan effectively to address the staffing shortfall. In the meantime, units should be encouraged to review their current working practices and resources, and where necessary reconfigure their services to optimise the time and staff available. There are examples of successful adoption of the 'Lean' process within NHS ultrasound departments. In 2007, The Royal Bolton Hospital NHS Foundation Trust found a review of their working practices invaluable and reflected afterwards that 'We delivered in 4 days what we have been talking & moaning about for 18 months' and online resources are available to support this via the NHS Institute for Innovation and Improvement and via the Healthcare Workforce Portal.

The significant shortfall in staff may also have been a contributory factor in the slow return of survey questionnaires, the return of incomplete questionnaires and in not achieving a 100% response rate.

Number of sessions worked per sonographer per week

Most units did not have a policy offering guidance on the minimum number of scans to be performed to maintain competency. As ultrasound scanning is widely accepted to be a highly operator-dependent imaging modality this is rather incongruous. No recommendations were found on a literature review except nuchal translucency-specific recommendations from the NHS FASP Working Standards¹⁸.

In this survey, 15 units failed to itemise the number of clinical sessions per week performed by each health professional, and only provided a whole time equivalent for the unit. Valuable information was therefore unavailable. This is unfortunate, as the data may have added to the debate on the number of sessions per week to be undertaken to maintain competency in fetal screening. Logically, it is assumed that more experienced members of staff will require less scanning time per week, yet still confidently deliver a high-quality service. More junior, or less experienced staff may require more scanning time to maintain acceptable competency levels.

The issue of measuring sonographer performance and competency within a 'screening' programme is an interesting one. By definition, screening programmes will not detect all anomalies. So debate at national level has recently centred on which anomalies sonographers are reasonably expected to detect, along with a recommendation of regular departmental audit for these conditions, rather than the number of ultrasound sessions they perform per week.

Summary of findings



4 Summary of findings

Fetal ultrasound screening package (pages 16 - 22)

1. This survey indicates that the offer of a 1st trimester scan to all women is now almost universal (99%)
2. Only 37% of units offer a nuchal translucency measurement as part of their 1st trimester screening package
3. 1st trimester 'anomaly' screening is offered in 9% of units to all women
4. A 2nd trimester anomaly scan is offered to 100% of pregnant women
5. Routine Doppler is only offered to all women in 1% of units in the 1st and 2nd trimesters of pregnancy
6. 26% of units offered a 30 minute appointment for the 2nd trimester anomaly scan

Information and support for parents (pages 23 - 25)

7. 97% of units offer all women pre-scan information on fetal ultrasound screening
8. Written information was available in languages other than English to appropriate women in 29% of units
9. Other support is provided in the form of interpreters, link worker, advocates or Language Line in 95% of units for women who do not speak English
10. 90% of women receive a written report detailing their scan results

Technical information (pages 26 - 33)

11. CRL remains the commonest measurement for dating pregnancy up to 13⁺⁶ weeks (99%)
12. HC was the commonest biometry measurement used in the 2nd trimester of pregnancy
13. Data are highly suggestive of the majority of units delivering an anomaly scan service which adheres closely to the guidance within the RCOG 2000 report⁹, outlining the 'minimum' fetal structures to be examined
14. 100% of units examine the four-chamber fetal heart view routinely at 2nd trimester anomaly scan
15. 75% of units examine the fetal cardiac outflow tracts routinely at 2nd trimester anomaly scan
16. A view of coronal lips is examined routinely in 90% of units
17. Ultrasound markers of aneuploidy were assessed in 92% of units, 39% would report one marker present in isolation, 100% of units that assessed markers would inform the woman if two or more were present
18. 74% of units would report nuchal fold ≥ 6 mm and ventriculomegaly in isolation
19. Management following identification of markers of aneuploidy varied considerably

Management following identification of an anomaly at the 2nd trimester anomaly scan (pages 34 - 36)

20. The woman was informed immediately about the identification of a 'definite' anomaly in 85% of units, this fell to 69% if it was only a 'suspicion'
21. The interval between identification of an anomaly and a second scan to reveal whether the suspicion was correct 'varied according to availability' in 47% of units. 27% of units reported providing this service in one to two working days

22. 91% of units had access to specialist fetal cardiac ultrasound services, with suspicion of an abnormal four-chamber view as the most common indication for referral (96%)

Equipment and image archiving (pages 37 - 41)

23. Ultrasound machines >5 years old constituted 11% of machines used for fetal screening purposes
24. The formal rolling programme for regular replacement/upgrading of ultrasound machines within regions varied from 20% to 78%
25. Machines deemed 'fit for purpose' within regions ranged from 76% to 95%
26. A wide variability in the views archived was reported, with 26% units archiving all views, 47% units storing suspicious or abnormal images, 33% units archiving selected views, and 3% not storing scan images at all
27. 81% of units reported using digital archiving systems for image storage

Standards, audit and monitoring (pages 42 - 44)

28. The number of units which reported regular auditing of the quality of specific areas of the fetal ultrasound service was variable. 58% monitored 'detection rates for main anomalies', 10% monitored 'time to referral for 2nd opinions'
29. The quality of the fetal screening services in all areas was most commonly audited on an annual basis. Few units provided auditing on a 3 or 6 monthly basis
30. 78% of units notified definite or suspected fetal anomalies to a congenital malformation register

Staffing for 1st and 2nd trimester fetal ultrasound screening (pages 45 - 54)

31. Sonographers from a radiography background comprise the majority of the sonographic workforce (67%)
32. 97% of radiographer/sonographers and 91% of midwife/sonographers had a Postgraduate Certification in medical ultrasound
33. 58% of consultant obstetricians performing fetal screening had an ATSM qualification
34. NT accreditation had been obtained by 51% of consultant obstetricians, 50% of radiographer/sonographers and 37% of midwife/sonographers performing fetal screening
35. Nationally, 69% of radiographer/sonographers, 68% of consultant obstetricians and 49% of midwife/sonographers performing fetal screening were trained in examining cardiac outflow tracts
36. 38% of units have a policy ensuring each professional undertakes sufficient scans to maintain competence
37. 56% of units have vacant posts for sonographers
38. 14% of units reported funding for vacant posts had been reduced or withdrawn if they had been unable to fill these posts for extended periods of time
39. Only 33% of staff were reported as having access to protected time for continuous professional development
40. The majority of units (72%) reported all sonographers had attended a course in breaking bad news

Brief summary and comparison of survey data: 2002 and 2008

Data compared	2002	2008
% of questionnaires returned	100%	81%
% of units offering a 1st trimester dating scan to all women	57%	99%
% of units offering a 1st trimester anomaly scan to all women	6%	9%
% of units offering a 2nd trimester fetal anomaly scan to all women	97%	100%
% of units offering a nuchal translucency scan in the 1st trimester	16%	37%
% of units offering pre-scan information regarding ultrasound screening for fetal abnormality	91%	97%
% of units stating written information is available in languages other than English and offered to appropriate women	10%	29%
% of units offering women a written report detailing their scan results	'just over 90%'	90%
% of units examining the four-chamber fetal heart view at 2nd trimester anomaly scan	98%	100%
% of units examining the fetal cardiac outflow tracts at 2nd trimester anomaly scan	57%	75%
% of units routinely looking for sonographic markers for aneuploidy	95%	92%
% of units giving information immediately to all women when a definite abnormality was seen	66%	85%
% of units giving information immediately to all women when a suspicious abnormality was seen	47%	68%
% of ultrasound machines used for fetal screening purposes >5 years old	20%	11%
% of units reporting that regular quality assurance tests were performed on machines, with abnormal results audited	85%	81%
% of units notifying abnormalities to a congenital malformation register	70%	78%
% of units with systems in place to monitor the quality of their fetal screening services	54%	59%
% of units satisfied that the manner in which their scanned images were stored ensured minimum deterioration	66%	83%
% of units currently with vacant posts for sonographers	45%	56%

Recommendations



5 Recommendations

The recommendations listed in the table below are a summary of the bold text boxes contained within the results section of this report. It constitutes the range of nationally recognised standards and guidance in existence during 2008, from the UK NSC, NICE, the Royal Colleges and other professional bodies.

This summary table offers a useful tool to providers and commissioners of services to map local service provision against the recommendations, although it is acknowledged that some changes in local service provision may have occurred from the date of questionnaire completion (January – April 2009) to report publication in December 2009.

It is important to note that the first comprehensive NHS FASP-produced evidence-based standards for the 18⁺⁰ to 20⁺⁶ weeks anomaly scan will be available in 2010, and a number of the recommendations currently listed will then be superseded.

Fetal ultrasound screening package	
Recommendation, best practice point or other professional guidance	Reference
'1st trimester combined is the preferred method (of screening for Down's syndrome) as it supports screening being completed in one stage without the need for more than one attendance. It will also give a risk before 14 weeks of pregnancy allowing earlier decision making for parents'	NHS Fetal Anomaly Screening Programme – Screening for Down's syndrome (2008) <i>UK NSC Policy Recommendations: 2007-2010 Model of Best Practice</i> Pub: Department of Health
'Ultrasound screening for fetal anomalies should be routinely offered, normally between 18 weeks 0 days and 20 weeks 6 days'	National Institute for Health & Clinical Excellence (2008) <i>Guideline CG62 Antenatal care: routine care for the healthy pregnant woman</i> Pub: RCOG press
'Pregnant women should be offered an early ultrasound scan between 10 weeks 0 days and 13 weeks 6 days to determine gestational age and to detect multiple pregnancies'	National Institute for Health & Clinical Excellence (2008) <i>Guideline CG62 Antenatal care: routine care for the healthy pregnant woman</i> Pub: RCOG press
'Recommended examination timings: 30 minutes – 2nd trimester routine anomaly screening'	United Kingdom Association of Sonographers (2008) <i>Guidelines for professional working standards: ultrasound practice</i> http://www.bmus.org/policies-guides/SoR-Professional-Working-Standards-guidelines.pdf
'Women should receive a report that they understand'	<i>RCOG (2000) Ultrasound screening: supplement to Ultrasound Screening for Fetal Abnormalities</i> Pub: RCOG press, http://www.rcog.org.uk/womens-health/clinical-guidance/ultrasound-screening#qual1

Information and support for parents

Recommendation, best practice point or other professional guidance	Reference
'Women should be given information about the purpose and implications of the anomaly scan to enable them to make an informed choice as to whether or not to have the scan'	National Institute for Health and Clinical Excellence (2008) <i>Guideline CG62 Antenatal care: routine care for the healthy pregnant woman</i> Pub: RCOG press
'Trusts should ensure that systems are in place to provide the required information when there are language or other communication barriers'	NHS Fetal Anomaly Screening Programmes (2007) <i>Consent standards for screening fetal anomalies during pregnancy</i> Section 3.3, page 7 Pub: UK NSC
'Women require information in a medium or language which suits their needs'	National Service Framework for Children, Young People and Maternity Services: <i>Key issues for primary care</i> (2004) Pub: Department of Health

Technical Information

Recommendation, best practice point or other professional guidance	Reference
'The measurements of choice for pregnancy dating are gestation dependent... Estimation of gestational age: CRL - 6 weeks to 13 weeks gestation. HC - 13 to 25 completed weeks. If head measurements are not feasible or appropriate, estimation of gestational age should be made using FL. These measurements can be used beyond the gestation indicated, but the imprecision around the estimate will increase significantly.'	Loughna P, Chitty L, Evans T, Chudleigh T (2008) <i>Ultrasound Fetal size and dating: charts recommended for clinical obstetric practice</i> Volume 17:3 Pub: British Medical Ultrasound Society http://www.bmus.org/policies-guides/pg-fetalmeas.asp
'Fetal echocardiography involving the four chamber view of the fetal heart and outflow tracts is recommended as part of the routine anomaly scan'	National Institute for Health and Clinical Excellence (2008) <i>Guideline CG62 Antenatal care: routine care for the healthy pregnant woman</i> Pub: RCOG press
'The presence of an isolated soft marker, with an exception of increased nuchal fold, on the routine anomaly scan, should not be used to adjust the a priori risk for Down's syndrome.'	National Institute for Health and Clinical Excellence (2008) <i>Guideline CG62 Antenatal care: routine care for the healthy pregnant woman</i> Pub: RCOG press

Management following identification of an abnormality at the 2nd trimester anomaly scan

Recommendation, best practice point or other professional guidance	Reference
'Women should receive written details about their scan result and, whenever possible, information concerning the type of fetal abnormality present'	RCOG (2000) <i>Ultrasound screening: supplement to Ultrasound Screening for Fetal Abnormalities</i> Pub: RCOG press, http://www.rcog.org.uk/womens-health/clinical-guidance/ultrasound-screening#qual1
'Discussion of the implications of a suspicious scan should occur with an obstetrician within 24 hours (or one working day). If indicated, referral to a tertiary centre with maternal fetal medicine specialists and other relevant practitioners should be possible within 72 hours (or two working days)'	RCOG (2000) <i>Ultrasound screening: supplement to Ultrasound Screening for Fetal Abnormalities</i> Pub: RCOG press, http://www.rcog.org.uk/womens-health/clinical-guidance/ultrasound-screening#qual1
'Referral for specialist scanning should be considered as good clinical management in all cases where the NT is greater than or equal to 3.5mm (even when screening for Down's syndrome has been declined)'	NHS Fetal Anomaly Screening Programme (2008) <i>Programme Statement: Nuchal translucency greater than or equal to 3.5mm</i> http://fetalanomaly.screening.nhs.uk/programmestatements

Standards, audit and monitoring

Recommendation, best practice point or other professional guidance	Reference
'The sonographer is expected to have a detailed knowledge of ultrasound equipment in order to ensure that it is appropriate for purpose'	United Kingdom Association of Sonographers (2008) <i>Guidelines for professional working standards: ultrasound practice</i> http://www.bmus.org/policies-guides/SoR-Professional-Working-Standards-guidelines.pdf
'Upgrading or replacement of equipment is dependent on the type of equipment and its applications. High-specification ultrasound scanners will often have a longer useful life than basic or middle-range equipment. Review is typically undertaken between four to six years following installation'	Royal College of Radiologists (2005) <i>Standards for Ultrasound Equipment</i> Section 8, pg 9 Pub: Royal College of Radiologists
'A quality assurance programme should be developed in discussion with medical physics or service engineers for each individual machine.... The programme should indicate clearly the limits of acceptability for each test, what and by whom action should be taken when these are exceeded'	United Kingdom Association of Sonographers (2008) <i>Guidelines for professional working standards: ultrasound practice</i> http://www.bmus.org/policies-guides/SoR-Professional-Working-Standards-guidelines.pdf
'Correct room lighting is essential when using ultrasound equipment for fetal anomaly screening. When studied, 25% of NHS sonography rooms have been shown to have lighting that is higher than recommended. This results in poor image quality'	NHS Fetal Anomaly Screening Programme (2008) <i>7 Essentials Campaign</i> http://fetalanomaly.screening.nhs.uk/essentials

Standards, audit and monitoring (cont'd)

Recommendation, best practice point or other professional guidance	Reference
'Equipment used to store current records on all types of media should provide storage that is safe and secure from unauthorised access and which meets health and safety and fire regulations, but which also allow maximum accessibility of the information commensurate with its frequency of use.'	NHS Code of Practice (2006) <i>Records Management: Part 1</i> section 47, pg 13 Pub: Department of Health
'The minimum retention schedule for radiological records (for maternity) are 25 years after the birth of the child, including stillbirths'	The Royal College of Radiologists (2008) <i>Retention and storage of images and radiological patient data</i> Pub: RCR
'The radiological archive is one of text and image data. It is recommended that the retention period of text and image data are equal and comply with the published retention schedules'	The Royal College of Radiologists (2008) <i>Retention and storage of images and radiological patient data</i> Pub: RCR
'Audit and monitoring of the screening programme should be performance managed by the relevant SHA. Screening programmes are expected to have the appropriate tools to support the minimum criteria for the audit process'	NHS Fetal Anomaly Screening Programme (2007) <i>Antenatal Screening: Working Standards for Down's syndrome screening</i> Pub: UK NSC
'A survey of womens' views and experiences of Trust's screening programme should be conducted at least once a year (for Down's syndrome)'	NHS Fetal Anomaly Screening Programme (2007) <i>Antenatal Screening: Working Standards for Down's syndrome screening</i> Pub: UK NSC
'Participation in regional congenital anomaly registers and/or UK National Screening Committee approved audit systems is strongly recommended to facilitate the audit of detection rates'	National Institute for Health & Clinical Excellence (2008) <i>Guideline CG62 Antenatal care: routine care for the healthy pregnant woman</i> Pub: RCOG press

Staffing for 1st and 2nd trimester fetal ultrasound screening

Recommendation, best practice point or other professional guidance	Reference
'Any person undertaking a fetal anomaly ultrasound scan on pregnant women for the purpose of screening and diagnosis should hold a minimum of CMU/DMU/Pg.Cert./ATSM/RCR'	NHS Fetal Anomaly Screening Programme (2007) <i>Antenatal Screening: Working Standards for Down's syndrome screening</i> Pub: UK NSC
'All sonographers/clinicians performing nuchal translucency measurements must have received appropriate training through an accredited training course'	NHS Fetal Anomaly Screening Programme (2007) <i>Antenatal Screening: Working Standards for Down's syndrome screening</i> Pub: UK NSC
'The patient consent to an examination that he or she has the right to expect will delivered and reported by a competent sonographer'	United Kingdom Association of Sonographers (2008) <i>Guidelines for professional working standards: ultrasound practice</i> http://www.bmus.org/policies-guides/SoR-Professional-Working-Standards-guidelines.pdf
'To ensure satisfactory performance, each sonographer must perform a minimum of 50 nuchal translucency measurements per year'	NHS Fetal Anomaly Screening Programme (2007) <i>Antenatal Screening: Working Standards for Down's syndrome screening</i> Pub: UK NSC
'Health care organisations should ensure that: they take into account nationally agreed guidance when planning and delivering treatment and care'	RCOG (2008) <i>Standards for Maternity Care: Report of a working party</i> Pub: RCOG press
'Training on how to communicate information in an effective sensitive manner should be provided to all healthcare professionals'	RCOG (2008) <i>Standards for Maternity Care: Report of a working party</i> Pub: RCOG press
'Each hospital Trust should ensure provision of a multidisciplinary education and training programme for all healthcare professionals which fulfil the requirements of their annual appraisal ongoing CPD or induction programme to the ultrasound department'	NHS FASP draft standards under development – due for publication January 2010

Supporting documentation



6 Supporting documentation

6.1 Abbreviations

ANC	antenatal clinic
ATSM	Advanced Training Skills Module
BPD	biparietal diameter
BINOCAR	British Isles Network of Congenital Anomaly Registers
BMUS	British Medical Ultrasound Society
CARs	congenital anomaly registers
CARROB	Congenital Anomaly Register for Oxfordshire, Berkshire & Buckinghamshire
CASE	Consortium for the Association of Sonographic Education
CFEP	Client Focused Evaluation Programme
CNST	Clinical Negligence Scheme for Trusts
CPD	continuous professional development
CRL	crown-rump length
DH	Department of Health
EMSYCAR	East Midlands & South Yorkshire Congenital Anomalies Register
FL	femur length
FMU	fetal medicine unit
GP	General Practitioner
HC	head circumference
HEI	higher education institutions
HPC	Health Professions Council
NDSCR	National Down's syndrome Cytogenetic Register (UK)
NICE	National Institute for Health and Clinical Excellence
NHS FASP	National Health Service Fetal Anomaly Screening Programme
NorCAS	Northern Congenital Anomaly Survey
NSC	National Screening Committee

6.1 Abbreviations

NSF	National Service Framework
NT	nuchal translucency
ONS	Office for National Statistics (within UK National Statistics)
PAPP-A	pregnancy associated plasma protein –A
PCT	Primary Care Trust
Pg.Cert.	Postgraduate Certificate (in obstetric ultrasound)
RASCO	Regional Antenatal Screening Coordinator
RST	Regional Screening Teams
RCOG	Royal College of Obstetricians and Gynaecologists
RCR	Royal College of Radiologists
RDPH	Regional Director of Public Health
SHA	Strategic Health Authority
SCoR	Society and College of Radiographers
TNA	training needs analysis
TUMSG	Trust Ultrasound Multidisciplinary Screening Group
UKAS	United Kingdom Association of Sonographers
UKNSC	United Kingdom National Screening Committee
WANDA	Wessex Antenatally Detected Anomalies Register
WTE	whole time equivalent

6.2 Glossary

Antenatal care

Professional care provided to a woman and her partner to support them and their baby through the pathway of pregnancy and to help achieve the best possible health, psychological and social outcomes for the mother, baby and family.

Anomaly scan

A detailed scan offered to pregnant women by NHS Trusts and within private sector services, undertaken between 18⁺⁰ to 20⁺⁶ weeks, for the purpose of assessing the fetal anatomy for structural malformations.

Advance Training Skills Module (ATSM)

This training course, offered by the Royal College of Obstetricians and Gynaecologists (RCOG), provides the theoretical basis for those clinicians undertaking the Diploma in Obstetric Ultrasound. The RCOG suggest the course is suitable for clinicians involved in the diagnosis, management and counselling of fetal anomalies and antenatal high-risk obstetrics.

Biometry

In relation to this document, a collective term to describe a range of ultrasound fetal measurements used to establish the gestational age of a fetus or to assess fetal growth.

Booking visit

The visit/consultation at which the woman receives information and has an opportunity to discuss her pregnancy care. She is then registered for care either with her midwife and/or hospital/unit for antenatal care and delivery.

Consortium for the Association of Sonographic Education (CASE)

CASE is an organisation that promotes best ultrasound practice through the accreditation of training programmes that develop safe and competent ultrasound practitioners. Their courses are delivered at postgraduate level.

Congenital Anomaly Register (CAR)

This can be a regional or national disease-specific register or database that provides continuous epidemiological monitoring of the frequency, nature, cause and outcomes of congenital anomalies for the local population. Not all regions are served by a CAR.

Counselling

Counselling is defined broadly as a supportive, listening and information-giving patient encounter. It is facilitative and non-directive, with the content of sessions largely determined by the pregnant woman.

Cytogenetics

The study of the chromosomes. Clinical cytogenetics is the study of the relationship between chromosome aberrations and disease.

Detection rate (DR)

For the purposes of this document, the detection rate is the proportion of fetuses with a positive screening result that are affected by the condition(s) being screened for.

6.2 Glossary

Doppler

A non-invasive ultrasound technique used to interrogate vasculature to gain information on blood flow direction and/or velocity. Colour, pulsed (spectral) and power Doppler may be used in obstetric ultrasound applications with caution and only when clinically indicated.

Fetal Medicine Unit (FMU)

A Fetal Medicine Unit consists of obstetricians trained in fetal medicine and specialist midwives who provide both a referral service for the local population and a tertiary level service. It provides a service for women diagnosed with a current maternal or fetal pregnancy complication and for those with a previous history of maternal or fetal conditions.

First trimester

For the purpose of this document, first trimester relates to gestational age less than or equal to 13 weeks and 6 days.

Four-chamber view

This refers to the ultrasound views obtained when examining the fetal heart at anomaly scan. The normal human heart is composed of four chambers, two smaller atria and two larger ventricles.

Gestational age (GA)

The gestational age is the duration of a pregnancy, which can be calculated from the first day of the last menstrual period (LMP). For fetal screening purposes and to provide more accurate dating, it is recommended that pregnancy is dated by 1st trimester ultrasound assessment and is expressed in completed weeks and days.

Independent sector

This sector is managed and owned by private companies. It has been established in the secondary care market and occasionally provides services to the NHS through winning contracts to provide specific services via commissioning.

Late booker

For the purpose of this document, this is a woman who presents for antenatal care with a confirmed pregnancy too advanced in terms of gestational age to be eligible for the full range of information and choice of screening tests, thereby reducing her pregnancy management options.

Midwife

A midwife is a person who has successfully completed a recognised prescribed course of studies in midwifery and has acquired the requisite qualifications to be registered and/or legally licensed to practise midwifery.

Nuchal translucency (NT)

The area at the back of the fetal neck, examined using ultrasound as part of combined screening for Trisomy 21. Increased measurements of the fetal NT are associated with a range of syndromic and chromosomal aberrations, but can also occur in the normal fetus.

6.2 Glossary

Obstetrician

A qualified doctor who has successfully completed specialised training in the management of pregnancy, labour and postnatal care.

Obstetric specialist

An obstetrician with subspecialist or special skills training and a regional or subregional referral practice.

Outflow tracts

The cardiac outflow tracts refer to the great (blood) vessels arising from the left and right ventricles of the human heart. In the normal fetus, the aorta arises from left ventricle and the pulmonary artery arises from the right.

Postgraduate Certificate in Obstetric Ultrasound (Pg.Cert.)

This is a CASE-accredited structured course for healthcare practitioners. For the purpose of this document, Pg.Cert. refers to a recognised qualification in obstetric ultrasound.

Regional Antenatal and Child Health Screening Coordinator

A senior health professional funded by the UK NSC to collaborate with local services to facilitate the implementation of, and oversee any changes to, antenatal and newborn screening services and subsequently monitor these services against the standards.

Screening midwife/coordinator

A qualified midwife with additional knowledge, skills, experience and responsibility for overseeing and coordinating an antenatal screening service at Trust level.

Screening

For the purposes of this document, screening is a public health service which provides a systematic application of a test or inquiry (obstetric ultrasound), to identify those individuals (fetuses) at sufficient risk of a specific disorder (anomaly) which will benefit from further investigation (invasive test such as amniocentesis) or from direct preventative action (in utero treatment)

Second trimester

For the purposes of this document, second trimester relates to gestational age 14 weeks of pregnancy to 28 weeks of pregnancy.

Soft markers

These are transient changes of uncertain significance seen within the fetus at prenatal ultrasound scan. The presence of these transient changes may indicate an added risk of a number of karyotypic abnormalities or conditions such as cystic fibrosis, however, evidence suggests that soft markers are also commonly seen in the normal fetus.

Sonographer

A healthcare professional with a recognised qualification in ultrasound. An obstetric sonographer has the knowledge, skills, experience and responsibility for performing the ultrasound examinations for the antenatal screening service of the Trust.

6.2 Glossary

Strategic Health Authority (SHA)

There are currently ten SHAs in England that manage the local NHS on behalf of the Secretary of State. They are responsible for: developing plans for improving health services in their local area, making sure local health services are of a high quality and are performing well, increasing the capacity of local health services - so they can provide more services, and making sure national policies are integrated into local health service plans. SHAs are a key link between the Department of Health and the NHS.

Standard

A standard is a subjective judgement of a level of performance that could be achieved. Different levels of quality standard can be set.

Ultrasound scan

A medical, non-invasive investigative screening examination which creates real-time images displayed on a monitor. For the purpose of this document, the term 'ultrasound scan' relates to images obtained during obstetric ultrasound examination. Images can be archived, retained and referred to when necessary for comparison in the event of subsequent pregnancy or neonatal complication.

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6.5 Acknowledgements

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Appendix



Appendix 1

Trust Ultrasound Multi-Disciplinary Screening Group (TUMSG) – suggested membership and key professionals who should be given an annual service report ¹		
	Health professional	Annual service report
1.	Sonographer 'lead' for fetal anomaly screening	✓
2.	Superintendent sonographer	✓
3.	Medical lead for antenatal ultrasound screening services	✓
4.	Screening midwife/coordinator	✓
5.	Antenatal clinical midwifery lead	✓
6.	Community midwifery lead	✓
7.	Obstetric lead for antenatal screening	✓
8.	Fetal medicine specialist*	✓
9.	Clinical geneticist*	✓
10.	Genetic counsellor/genetic associate*	x
11.	Biochemist 'lead' for Trisomy 21 screening*	✓
12.	Cytogenetics laboratory manager*	x
13.	Perinatal pathologist*	x
14.	Lay person*	✓
15.	General Practitioner*	✓
16.	PCT screening lead*	✓
17.	PCT commissioner*	✓
18.	Clinical governance/risk management lead for antenatal and obstetric ultrasound screening services	x
19.	Paediatric lead for antenatal screening*	✓

Note: The Regional Director of Public Health at the Strategic Health Authority, Trust Chief Executive and the NHS FASP should also receive a copy of the report

¹ Most of the healthcare professionals listed above would also be involved in other antenatal and newborn screening programmes (e.g. Trisomy 21 screening and newborn blood spot screening). The asterisk (*) denotes professionals/units working at tertiary level who may be responsible for regional referrals (e.g. clinical genetics, cytogenetic and molecular genetics and perinatal pathology services). Professionals working in these areas may be invited along or choose to attend the TUMSG meeting. Similarly, representation from the local Primary Care Trust or community (e.g. lay person or GP) may also be invited to attend meetings.

Notes



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