Service Area	**Birmingham Women's NHS Foundation Trust** **Fetal Medicine Department**
Indicator name	**Annual Report for Specialised Services**
Indicator definition Include - Precise definition of what is being measured and how this will be reported e.g. % patients seen within 18 weeks - Define any numerators and denominators as appropriate - Define time periods	An Annual Report (for 09/10) detailing provision of Specialised Services (broken down into separate service areas where applicable) • Details of each the specialised service* provided inc. brief description of the service, key contacts, and staffing • Activity in each area • Details of clinical audits or monitoring carried out (or planned) • Details of SUI reporting mechanisms • Details of Patient and Public Engagement activity • Feedback on one or two key outcome measures • Development plans and challenges/issues from service perspective
Rationale for inclusion	Enhance communication, accountability and openness between Provider Trusts and Commissioners and allow better monitoring of activity and quality of patient care
Required outcomes	• Annual Report for the year 09/10 to be provided to the WMSCT by 30th Sept 2010. • A meeting between WMSCT and Trust to take place to discuss the Annual Report and review progress. Meeting to be arranged annually.
Data source and collection method	Viewpoint Fetal Medicine System – Fetal Medicine Department BWNFT BWNFT hospital PAS system
Organisation responsible for data collection	BWNFT
Frequency of collection	Report to be provided annually
Baseline period / date/value if appropriate	2009/2010 Similar extensive reports are available for previous years if required
Baseline value if appropriate	Activity data: • Contracting data • Clinical activity data including key outcome measures for all procedures
Assessment of goal achievement for indicators with substantial inherent variability	Annual report covers work of Fetal Medicine Department at BWNFT All aspects detailed in the indicator definition are covered by the report
Partial completion – arrangements made for partial completion leading to stepped payments? (add detail)	No

Birmingham Women's NHS
NHS Foundation Trust

The Fetal Medicine Centre Birmingham and the West Midlands Region

Annual Report April 2009 - March 2010

Editor **Prof. M.D. Kilby**

1. Introduction

The Fetal Medicine Centre at the Birmingham Women's Foundation Trust continues to offer local, Regional a supra-regional service for prenatal diagnosis and fetal therapy.

The successful delivery of the service to patients both in South Birmingham and from other Primary Care Trusts is a credit to the hard work of our multidisciplinary team and its interaction with affiliated teams in neonatal paediatrics and the paediatric subspecialties of surgery, cardiology and genetics.

In addition, we continue to work closely with the Newborn Networks and the Regional Specialist Services Agency to deliver a 'seamless' service. In September 2006, the Birmingham Women's Hospital was designated the Perinatal centre for West Midlands, funded by the Regional Specialist services team.

As well as Fetal Medicine services there are also several maternal medicine clinics providing specialist care (not funded by the RSSG).

2. Midwifery Report. Veronica Donovan

Mrs. Jill Agnew (specialist midwife sonographer) has joined the team. Jill is very experienced in first trimester fetal ultrasound screening. She has joined the fetal echo cardiology team providing the antenatal cardiology service.

The fetal medicine midwifery team continues to lead:

- An amniocentesis clinic
- Sonographer led fetal echocardiography / cardiology screening service
- Pregnancy loss clinic

The department continues with the plan to extend the role of the fetal medicine midwives. One midwife has completed the first trimester scanning course and another is in the final stages of completing her post graduate certificate in ultrasound.

Mrs. Helen Baker has commenced training to perform amniocentesis and fetal echocardiography.

The midwives also continue to support the Fetal Medicine medical staff on detailed scan lists offering support to women with a suspected or diagnosed fetal abnormality, those undergoing diagnostic procedures or treatment and couples who experience pregnancy loss.

3. Patient and Public Involvement

The department produces patient information leaflets for specific conditions to complement the specific information given to patients in a formal letter at consultation. These leaflets have been produced in collaboration with the West Midlands Neonatal Networks and will be cascaded for use throughout this geographical area. Patient representation has been utilized in the development of patient information leaflets.

The department plans to undertake a satisfaction survey 2010/2011 and continue its contacts with patient support groups.

4. Summary of Clinical Governance

4.1 Audit

The Centre

monitors operator competency, miscarriage rates and procedure related risks against the RCOG green top guidelines (2005) on amniocentesis and CVS. This guidance is being updated (2010) and Professor Kilby is one of the co-authors. Outcomes of other procedures, such as fetoscopic laser ablation and in-utero transfusion outcomes are monitored against best evidence, and outcomes published in the public domain. In addition, Professor Kilby has Chaired the First Trimester intervention audit within the West Midlands Perinatal Institute that has audited demographics, workload and outcomes of first trimester CVS. This is in anticipation of changes in first trimester screening as indicated by NICE recommendation. The results of audit and outcomes of the Regional CVS service for three consecutive years has been be submitted for publication and is undergoing peer review. Guidelines for all Fetal Medicine procedures, including procedure related risks and benefits are updated annually. Professor Kilby has nationally been one of the co-authors of the RCOG "Greentop" Guidelines on the management of Monochorionic twin pregnancies and Amniocentesis/CVS. Professor Kilby is Chair of the NICE committee reviewing national recommendations to the NHS on the management of twin and triplet pregnancies.

All core audits, including outcome data for all invasive procedures, are reported in the full fetal medicine (this) annual report.

Mr. Thompson and Bill Martin have worked closely with the Neonatal networks in the West Midlands to represent obstetric and fetal medicine views and collect data to define pressures within these services in our Region.

Dr Martin, Dr Johnston and Professor Kilby are all members of the National Executive Committee of the British Maternal Fetal Medicine Society. Dr Martin is also the senior obstetric representative for BAPM.

4.2 Training

There is a large commitment towards training within the centre. This year have completed RCOG accredited training for two trainees (both appointed as Consultants) and initiated training in two others (one part-time as a NIHR clinical lecturer). We also have Regional SpRs undergoing special modular training in obstetric ultrasound and two visiting international fellows.

In addition, we continue to have visiting SpRs for the ATSM in Fetal Medicine and for amniocentesis training. The centre is accredited for first trimester screening by the Fetal Medicine Foundation.

It is now part of the training curriculum requirements for paediatric cardiology SpRs to attend 50 sessions in fetal echocardiography. The first 25 sessions are performed under the guidance of a Radiographer Advanced Practitioner after which they join the Consultant Paediatric cardiology sessions. It also forms part of the training for sub-specialty trainees in Fetal Medicine.

We also continue to train our fetal medicine Midwives in ultrasound examination of the fetus and members of the department form part of the Faculty delivering formal MSc teaching to the Birmingham City University Course Module on Fetal Medicine.

4.3 Incident reporting / Serious Untoward Incidents

The Fetal Medicine Centre follows the Trust policy on the reporting of incidents and Serious Untoward Incidents (SUIs) through the Directorate and Trust risk management structure.

There have been no SUIs reported by the Fetal Medicine Centre in 2009-10.

5. Human Resources

The service is provided on a sessional basis by a team of NHS consultants and University staff, is supported by a dedicated midwifery and administrative team and works closely with the Birmingham Women's Hospital obstetric staff. The team works within the Maternity Services Directorate, and is supported by the Regional Specialized Services Agency.

6. Business summary

In 2009-2010 Fetal Medicine continued to be regionally commissioned through a block contract by the West Midlands Specialist Commissioning Group and the annual report has been submitted to this group in September 2010.

6.1 Service developments 2009-2010

Service developments throughout the year have included:

- Fetal Medicine working as a reference centre for Siemens Ultrasound through the planning of collaborative educational courses, training and trialing of new technology.
- Extension of the Fetal Cardiology Service via implementation of a third Consultant led Fetal Cardiology session.
- Continued management of the nuchal translucency training programme for all Trust sonography staff, with a view to the implementation of 1st trimester screening at Birmingham Women's Hospital in early 2011. To focus all specialists in the Fetal Medicine service to provide fetal trimester assessment, screening and management.
- Implementation of a multidisciplinary weekly clinical case review meeting (MDT), to improve clinical governance and communication around ongoing cases.
- It is planned in the New Year, with the appointment of a new paediatric Surgeon at the Birmingham Children's Hospital, to reorganize the joint Fetal Medicine/Paediatric Surgical meeting so that the biannual meeting will be inclusive of other centres providing Fetal Medicine Care in the West Midlands.
- Need to business plan for withdrawal of Dr McHugo's present 3PA sessions when she retires and case to be taken up by other consultants.

6.2 Service developments 2010-2011

1st trimester Fetal Cardiology supported by Trust during 2010-11 annual planning round, to be implemented alongside 1st trimester screening. Once this is in pace, the fetal first trimester cardiac scanning will be offered to all women at BWH and those at high risk of cardiac malformations in the West Midlands. We continue the Procurement of replacement high Specification Ultrasound Machines and updating of the hardware supporting the fetoscopic laser ablation service.

6.3 Research and Development 2009-2010.

1. Fetal Medicine Research.

There are several NIHR portfolio studies run with the PI's within our Department. These studies are listed:

a) **The PLUTO study** (Funded by the HTA and PI M Kilby). Assessment of percutaneous vesicoamniotic shunting in fetuses with congenital bladder neck obstruction.

b) **Microarray study** (funded by SPARKS and PI M Kilby). Assessment of a focused and high-resolution microarray platform in diagnosis of chromosomal anomalies in babies with structural abnormalities.

c) **RCT to assess timing of transfusions in babies with alloimmunisation** (Funded by MRC in Australia and PIs S Pretlove & M Kilby).

d) **SOLOMON Trial.** (EU funding. PIs S Pretlove and M Kilby). RCT to assess selective versus non-selective laser ablation in fetoscopic laser ablation in the treatment of TTTS.

e) **Maternal HAIR study.** (NIHR funding and PI B Martin). Assessment of drug metabolites in human hair in mothers with babies who have structural malformations.

f) **Screening for Twin to twin transfusion syndrome in the first trimester in monochorionic twins** (funded by Wellbeing of Women and a CRLN portfolio study).

2. Pre- and early pregnancy.

a) **The PROMISE Study** (HTA funding PI M Kilby). RCT to evaluate vaginal progesterone in the first trimester of patients with a history of recurrent miscarriage.

b) **TABLET study.** (MRC/HTA EME funding and PIs A Coomarasamy and M Kilby). In collaboration with EAPU to study thyroid autoantibody status and thyroid hormone replacement in women who have had miscarriage.

There is also a range of laboratory based basic science projects using patients from the centre and funded by grants to Professor Kilby.

7. Activity report

7.1 Overall Clinical Activity *R Williams*

The Fetal Medicine Centre operates as the regional referral centre for the West Midlands and also treats patients from outside the West Midlands area (mainly for fetal cardiology opinions and most significantly for the management of severe twin to twin transfusion syndrome. West Midland patients are funded under a block contract with the Specialist Commissioning Group and further income is received from out of area patients in line with a set tariff.

A total of 6642 examinations and procedures were undertaken in the Fetal Medicine Centre in 2009-2010. The majority of this activity (93%) was from within the West Midlands area patients and funded through the block contact.

Table 1 shows the number of examinations performed over the last three financial years.

	Examinations

Year	2007-2008	2008-2009	2009-2010
WMSSA	5976	6162	6161
Other Region	467	575	479
Totals	**6443**	**6737**	**6640**

Table 1. Fetal Medicine Contracted Examinations 2007-2010

The Centre saw a slight decrease in overall activity (1.5%) from the previous year but this is with annual variation from previous years.

	Attendances		Examinations		Patients	
Year	2008-2009	2009-2010	2008-2009	2009-2010	2008-2009	2009-2010
WMSSA	4342	4642	6162	6161	2108	2064
Other Region	322	317	575	479	139	134
Totals	**4664**	**4959**	**6737**	**6640**	**2247**	**2198**

Table 2. Fetal Medicine Attendances, Examinations, Patients 2008-2010

The Fetal Medicine Service also covers the pre-pregnancy counseling /pregnancy loss clinics (PPCC). This also involves a proportion of patients seen for consultations prior to a pregnancy who have serious medical disorders. In 2009-2010 there were 951 attendances to the PPCC (outpatient appointments) which equate to 496 patients.

A full breakdown of Fetal Medicine examinations and PPCC attendances by PCT is shown in Tables 21 and 22 in the appendices.

Fetal Medicine is a consultant lead service; Figure 1 demonstrates the expertise given to patients by individual consultants, associate specialists, specialist radiographers and midwives performing amniocentesis (excluding Pre-pregnancy clinics). The clinical care delivered by subspecialty trainees is supervised.

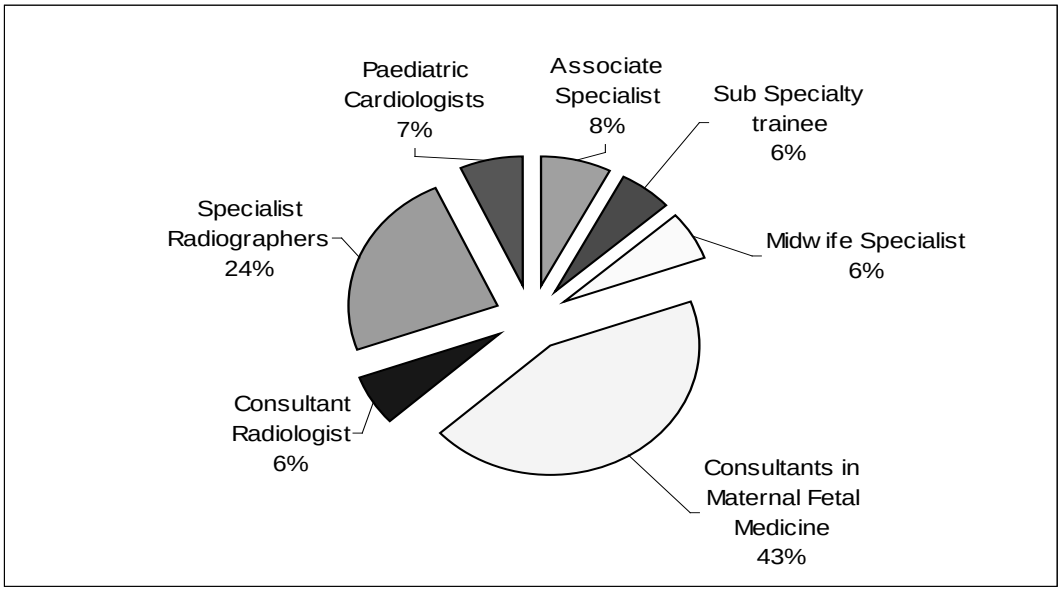


Figure 1. Total Workload By Operator Group 2010-2011

7.2 Detailed Scans *P Thompson, T Selman & R Williams*

4130 detailed scans were performed on 1948 patients by the Fetal Medicine consultants, radiographers and midwives; this Figure includes 220 performed on patients with Rhesus disease and 32 undertaken due to a raised AFP on serum screening. Table 19 in the appendix details all the abnormalities detected at the Centre in 2009-2010. Figure 2 shows these detailed scans by operator.

	2007-2008	2008-2009	2009-2010
Detailed scan	3349	3764	3878
Raised AFP Detailed	82	50	32
Detailed Rhesus scan	207	164	220
Totals	**3638**	**3978**	**4130**

Table 3. Fetal Medicine detailed ultrasound scans 2007-2010

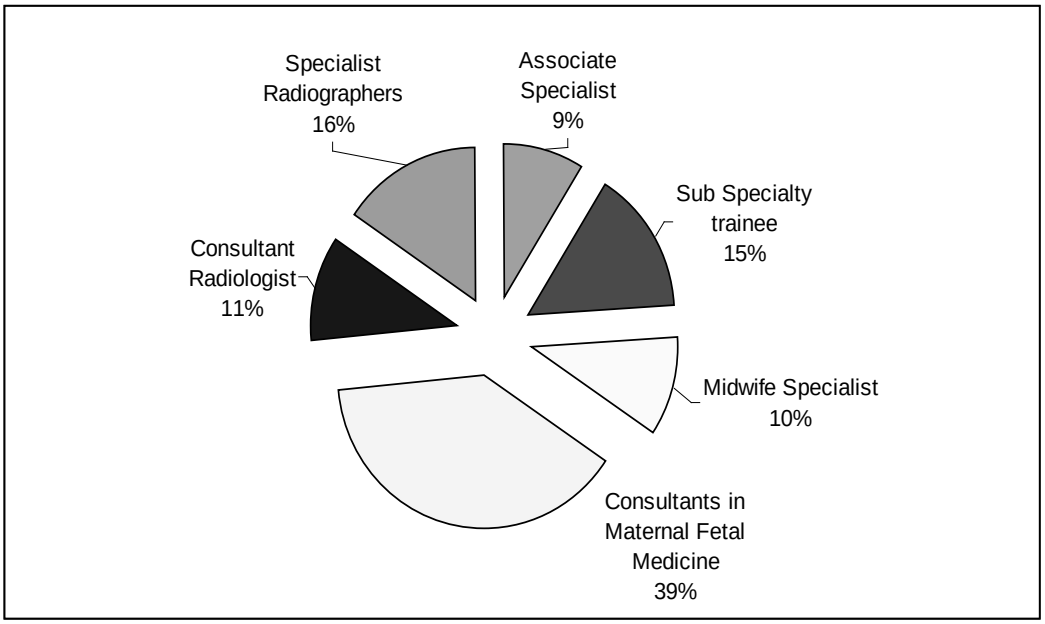


Figure 2. Detailed Scans By Operator 2009-2010

7.3 Perinatal/Paediatric Cardiology *M. Usher-Somers*

Paediatric cardiology continues to be a regional and supraregional service. The service is provided primarily by Dr. John Wright (emigrated in 2009†), Dr. Paul Miller and Dr Tarak Desai, who are based at Birmingham Children's Hospital and have sessional commitments here at Birmingham Women's Hospital. Dr Tracey Johnston and Dr Sam Pretlove provide Fetal Medicine support to the Paediatric Cardiologists and patients. The service is also supported by a Specialist Midwife and Specialist Radiographers trained in perinatal cardiology.

	2007-2008	2008-2009	2009-2010
WMSSA	1040	1134	1076
OUT OF REGION	70	62	71
	1110	1196	1147

Table 4 Fetal Echocardiography activity 2007-2010 by referral area.

Operator	Number of scans
Dr Paul Miller	185 (16.1%)
Dr John Wright	29† (2.5%)
Dr Tracey Johnson	170 (14.8%)
Specialist Sonographers	567 (49.3 %)
Other FM Consultants	196 (34.4%)
Total scans	**1147**

Table 5 Breakdown of examinations by Practitioners

7.4 First Trimester Chorionic Villus Sampling (CVS) : *Gill Nava*

The Regional CVS Service continues to be administrated from the Fetal Medicine Centre (between BWH and Heartlands Hospital) but increasingly other centres are offering first trimester CVS. Referrals to the service are counselled, mainly by telephone, by the clinical midwife specialists or are referred directly by the Clinical Genetics team. CVS is performed at two main centres in the West Midlands, either at Birmingham Women's or Heartland's Hospital depending on the referring PCT (however other centres at New Cross, Royal Shrewsbury and North Staffordshire Hospitals also perform CVS but in relatively small numbers). The CVS performed due to an increased allocated risk from first trimester screening and cystic hygroma/increased nuchal translucency (>3.5mm) are included in this group.

INDICATION FOR CVS	2006-2007	2008-2009	2009-2010
Maternal age > 35 years	37	25*	14
Clinical Genetics	73*	52	48
Previous Chromosome abn.	15	30	16
Previous Fetal abn. (structural)	3	0	2
Increased risk from 1st Trimester screening			22**
Cystic hygroma/increased Nuchal translucency			31
Other	10	1	0
Total CVS performed	**138**	**108**	**133**

Table 6 BWH Indications for CVS 2007-2010 * includes 1 twin pregnancy
**** includes 4 twin pregnancies**

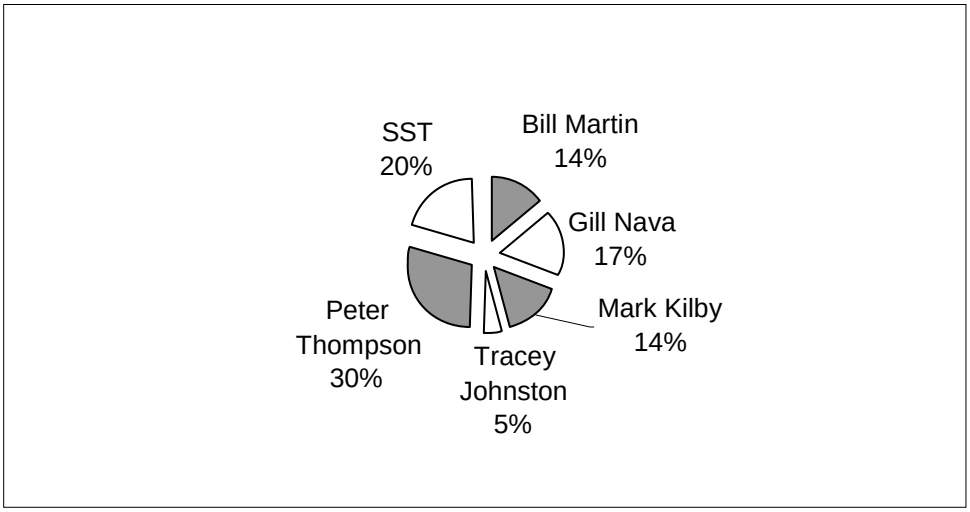


Figure 3. CVS by operator 2009-2010.

Abnormality	Number	Outcome
Trisomy 21	4	4 TOP
Trisomy 18	5	4 TOP, 1 IUD prior to CVS
Trisomy 13	1	1 TOP
45 XO	2	2 TOP
Mosaic result	1	1 LB normal

Table 7. Abnormalities detected on CVS – non Clinical Genetics patients-

Abnormality	Number	Outcome
Unbalanced translocation	5	3 LB 2 unknown
Huntingdons	2	2 TOP
Morguio's	1	1 TOP
Epidermolysis bullosa	1	1 TOP
Trisomy 21	1	1TOP

Table 8. Abnormalities detected on first trimester CVS – Clinical Genetics Patients

OUTCOME AFTER CVS	2007-2008	2008-2009	2009-2010
TOP for chromosome or genetic abnormality	15.2	8.34%	15.6%
TOP for social reasons	1.5	1.0%	0%
TOP for abnormality,normal chromosomes			1%
Miscarriage	3.0	0%	1%
NND	0	0%	1%
SB	0	0%	1%
Liveborn (normal)	80%	47%	55%

Table 9. Outcome information for first trimester CVS (%) quoted as % of known outcome

There were 102/133 known outcomes at the time of the annual report 2010 Abnormal outcome is more likely to be represented as miscarriage and termination unless fully reported by patients. Some patients as of yet had not delivered.

Of the total 133 CVS performed 1 miscarriage was reported (**0.53% of 133 or 0.98% of 102 fetuses**). This occurred 3 weeks after a CVS that had been

performed for an increased risk of SMA. The result demonstrated no abnormality. There was 1 mosaic result this year, amniocentesis showed 45 XO with a Y chromosome marker on PCR.

There was one monochorionic twin pregnancy in which 1 twin had an increased NT on scanning (and Trisomy 21 rish that was < 1in 150). The chromosomes were normal but the twins developed severe TTTS and there was a single twin demise at 20 weeks after therapy by fetoscopic laser ablation.

These figures are again to be collated into the Regional Audit of CVS services (Chaired by Prof.Kilby. **http://www.pi.nhs.uk/cvs/**.

7.5 Second trimester (>14 weeks) placental biopsy / placental biopsy for fetal abnormality

There were 24 chorionic villus samplings performed because of abnormalities detected on ultrasound after 14 weeks gestation

Indication and Gestation	No.	Chromosome Result	Outcome
Cystic Hygroma / increased nuchal translucency	4	1 Trisomy 1 45 x 0 1 normal 1 normal	1 TOP 1 TOP 1 IUD 18 Weeks 1 TOP at 20 weeks
Hydrops	3	2 Triploidy 1 normal	2 TOP 1 SB fetal akinesia syndrome
Structural ultrasound anomalies	17 *	16 normal result 1 no result	2 IUD 5 TOP 2 SB 1 NND 1 Miscarriage
Totals	24		

Table 13 Indications and outcomes placental biopsy
***** includes 1 twin pregnancy

The structural anomaly group included 5 performed for exomphalos , 2 for megacystis/bladder neck obstruction, 2 for neural tube defects and 2 for oligohydramnios.

OUTCOME AFTER CVS	2009-2010
TOP for chromosome abnormality	16.6%
TOP for structural abnormality	25%
Miscarriage/IUD	16.6%
SB	12.5%
NND	4%
Liveborn	25%

Table 14 Outcome information for CVS/placental biopsy after 14 weeks

There was 1 miscarriage in a fetus with Exomphalos 1 week after the CVS, the chromosomes were normal.
There was 1 miscarriage at 16 weeks in a fetus with exomphalos 2 weeks after the CVS and again the chromosomes were normal.
There was 1 IUD at 21+5 weeks in fetus with severe oligohydramnios 3 days after the placental biopsy.

The total number of CVS performed in 2009/2010 was therefore 157.

8. Amniocentesis : Veronica Donovan

The amniocentesis service continues to be provided by a group of specialist staff. All operators are trained to the basic standard as recommended by the RCOG. The department provides a training service for SpR's rotating through the hospital.

The Fetal Medicine Centre holds an annual amniocentesis workshop open to doctors and midwives. This provides theoretical instruction and hands on training using artificial models.

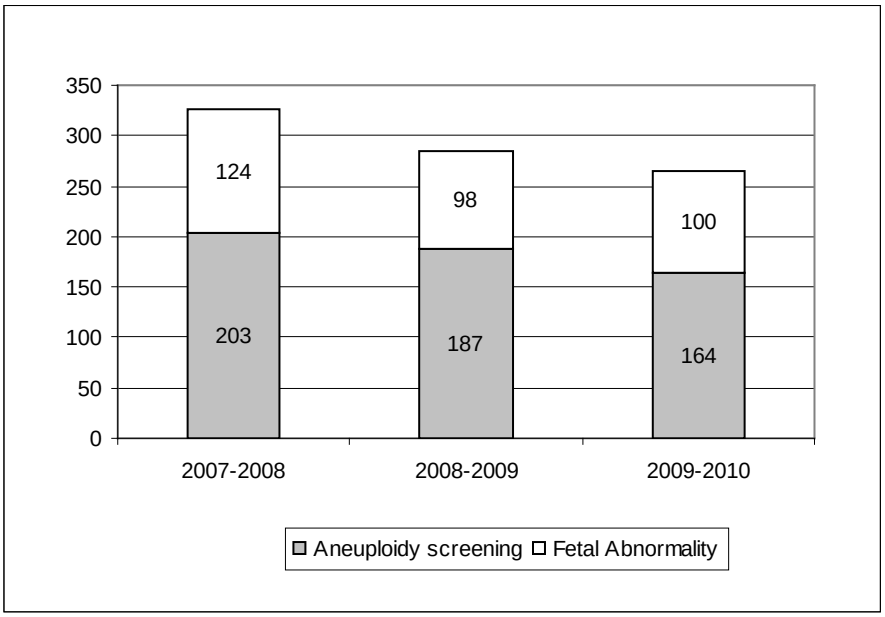
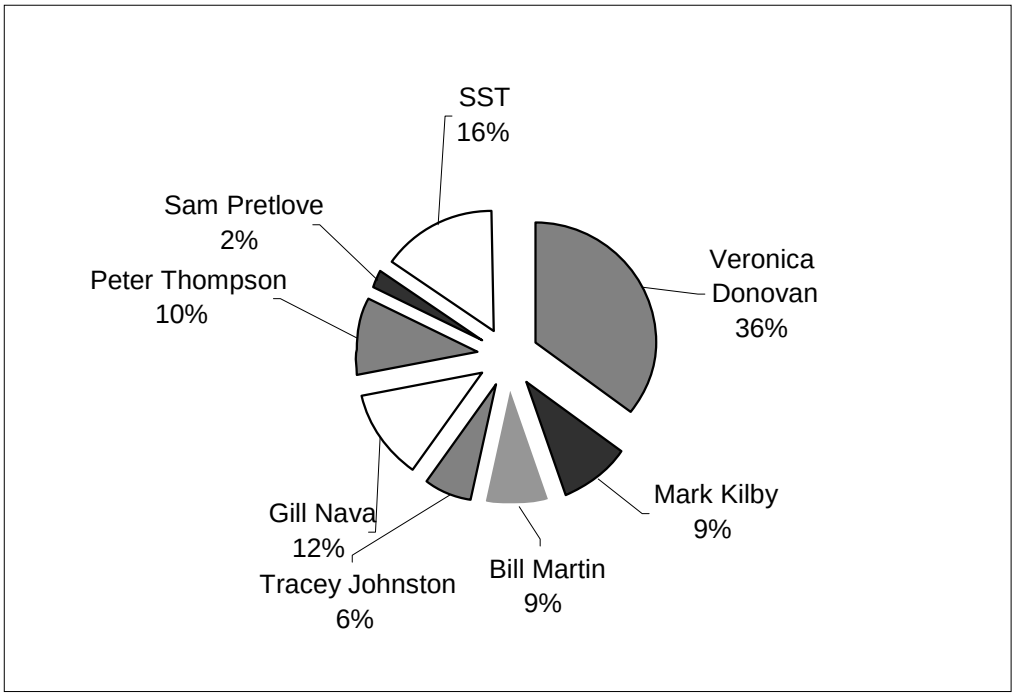


Figure 4. Total number of amniocentesis performed per year 2007-2010

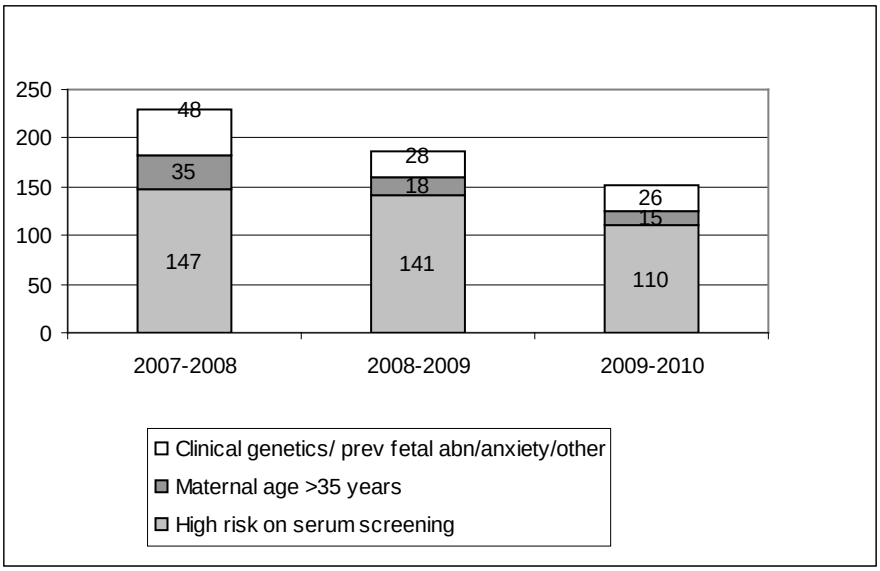
Figure 5. Amniocentesis by operator 2009-2010



8.1 Amniocentesis for Aneuploidy

There were 164 amniocentesis performed for screening for aneuploidy. The main indications are illustrated in Figure 6 compared with the two previous years. (NB Figures include referrals from other regional hospitals).

Figure 6. Indications for amniocentesis for aneuploidy screening 2007-2010



Indication	Number	Aneuploidy /genetic condition Detected	Outcome
High risk serum screening result / NT	110	Mosaic Trisomy 21 x 3 Trisomy 18 x 3 Trisomy 13	LB TOP X2 TOPX3 TOP
Maternal Age >37 years	15	1 Abnormal Mosaic	IUD
Previous fetal abnormality/ maternal anxiety/ clinical Genetics / other	26	Balanced translocation Trisomy 13 Triploidy Hydrops	LB MISC UK IUD
Total (inc. 10 sets of twins)	151 (inc 6 sets of twins)		

Table 10. Aneuploidy detected by indication (for screening amniocentesis)

8.2 Amniocentesis for karyotyping in fetal abnormality/suspected fetal abnormality.

100 amniocentesis were performed for karyotyping on patients with a fetal abnormality or a suspected fetal abnormality following detailed scan, including 5 twin pregnancies. The chromosome abnormalities detected and pregnancy outcome are detailed in Table 11.

Abnormality	Number	Outcome
Trisomy 21	4	1 LB Top x 3
Trisomy 13	4	TOP X 3 1MISC
Trisomy 18	5	TOP X 4, 1UK
Mosaic Result	2	1 UK 1LB
Inversion	1	UK
Balanced Translocation	2	2 X LB
Triploidy	1	TOP
Total	19	

Table 11. Chromosome abnormalities detected on amniocentesis for fetal abnormality.

8.3 Outcomes after amniocentesis

Outcome	Amnio. for fetal abnormality	Amnio. for screening	Total births from Amnio.
Live births	62	170	232
TOP	20	9	29
Miscarriage		2	2
Still births/IUD	5	0	5
Unknown outcome	7	6	13

T

able 12. Pregnancy outcome after amniocentesis for fetal karyotyping

(NB: Of the 13 missing outcomes there is 1 sets of twins and all pregnancies are over 36 completed weeks of gestation).

Thus the overall miscarriage rate for known outcomes following **amniocentesis was 0.7%**

8.4 Amniocentesis for Maternal Age

A total of 15 amniocentesis were performed for maternal age. 5 were outside referrals and 10 were BWH patients. The ages ranged between 34 and 45 years. All had been appropriately counselled with regard to the risks.

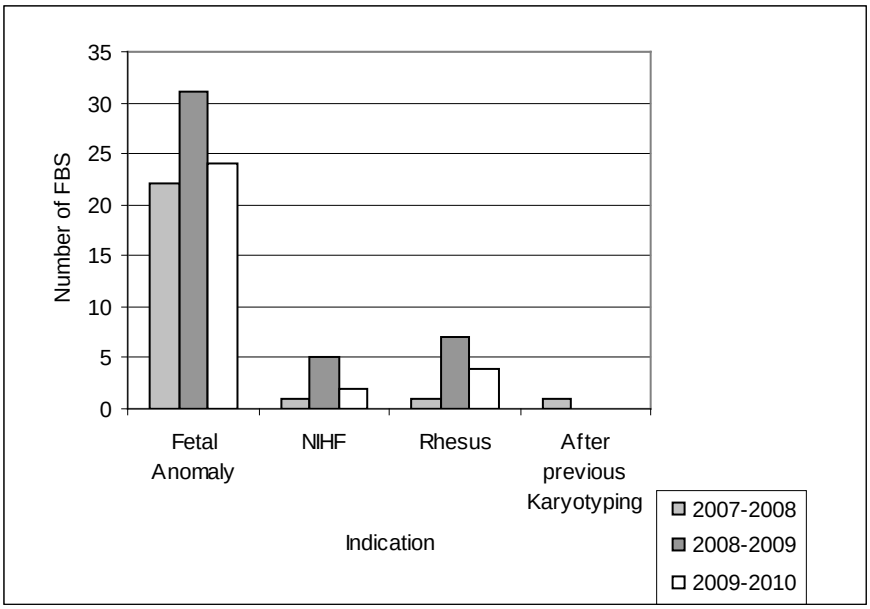
9. Fetal Blood Sampling: *Bill Martin*

A total of 30 fetal blood samples were performed in 2009 to 2010. Eleven of these were in association with late termination of pregnancy. There were 4 performed for investigation of possible anaemia, 2 were shown to be due to infection with parvovirus B19 and 2 with rhesus disease.

In eleven the sample was intracardiac , in five from the fetal intrahepatic vein and in fourteen from the umbilical cord (cordocentesis). In twenty four cases, fetal blood sampling was performed for rapid karyotyping when an associated fetal anomaly was detected (after 20 weeks). In four of these the test was performed as part of the investigation of fetuses presenting with hydrops fetalis. In four cases (as mentioned above) it was used to assess fetal anaemia. The karyotype was normal in seventeen and abnormal in thirteen (43%).

The indications for fetal blood samples compared with previous years are shown in Figure 7.

Figure 7 Indication for fetal blood sample 2007-2010



Fetal blood sampling was obtained from the intrahepatic vein in 5 cases, the umbilical cord in 14 cases, cardiac in 11.

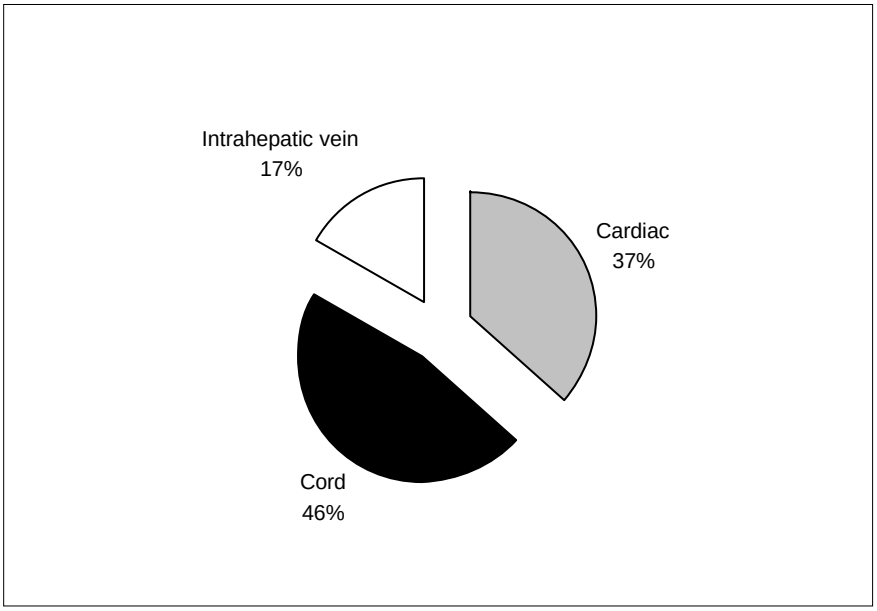


Figure 8 Site of Sampling 2009-2010

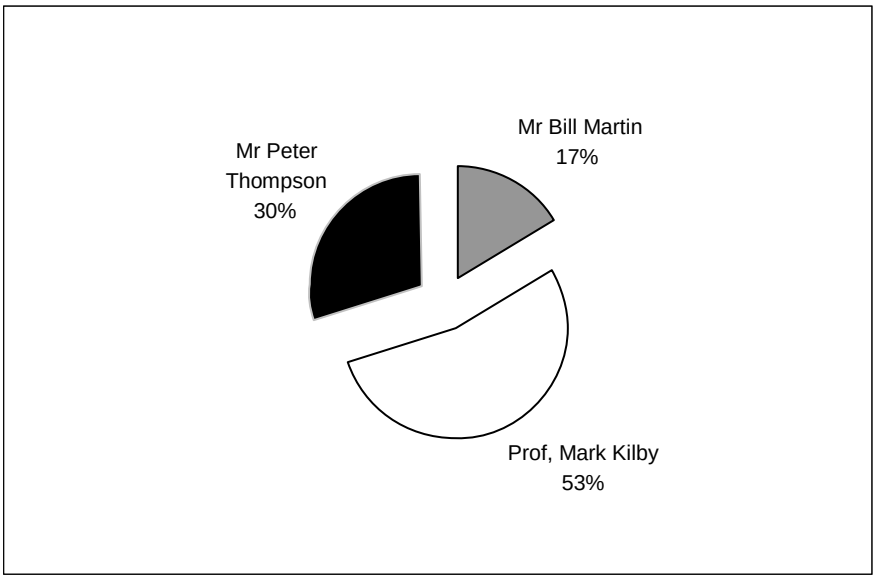


Figure 9 Fetal Blood Sampling by Operator 2009-2010

10. In-utero blood transfusions: *M Kilby*

Between April 2009 and March 2010 there were 49 in-utero transfusions performed on eight pregnancies with fetal anaemia (secondary to maternal alloimmunisation or human parvovirus B19 infection)

Of these 4/8 (50%) of pregnancies had red cell alloimmunisation complicated by anti-Kell antibodies, 3/8 (37.5%) had anti D antibodies and 1/8 (12.5%) had human parvovirus B19 infection (and was hydropic at diagnosis with a fetal haemoglobin of <2g%)

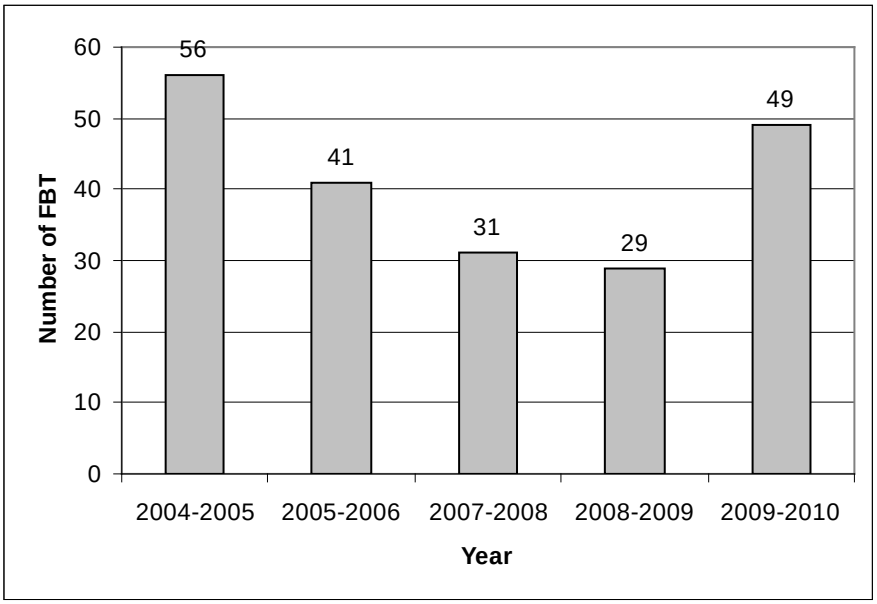
The gestational age (GA) at diagnosis was 22.5 weeks (95%CI 18.9-25.8). Forty nine in-utero transfusions were performed (Forty four (89.8%) were intravascular and five (10.2%) were intraperitoneal, performed prior to 20 weeks). Of the intravascular transfusions, 79.5% were performed via the intra-hepatic vein and 20.5% were performed after cordocentesis. The median fetal haemoglobin (excluded the babies who had IPT prior to 20 weeks) prior to transfusion was 2.5g% (95%CI 1.6-8.1) (all

below 5th centile for GA). All babies were live born at GA of 34 weeks (95%CI 31.2-36.0). Two babies had neonatal death secondary to severe cardiac dysfunction within the first week of life.

In addition, there was a case of NAIT that had platelet transfusions intravascularly from 23 weeks (despite IVIG infusion) [in previous pregnancy had a stillbirth with massive intracranial haemorrhage at 21 weeks] . The fetal platelet count was <15x10 6/L. Eleven intravascular transfusions were performed and the fetus was live born, without cerebral morbidity at 35 weeks gestation. Adjuvant IVIG therapy was utilised.

A further case of Trisomy 21 presented with severe hydrops. Investigation revealed transient abnormal myelopoiesis associated with Trisomy 21. Despite supportive in-utero transfusion, the baby was still born at 28 weeks.

Figure 10. Number of in utero transfusions (FBT) performed 2004-2010



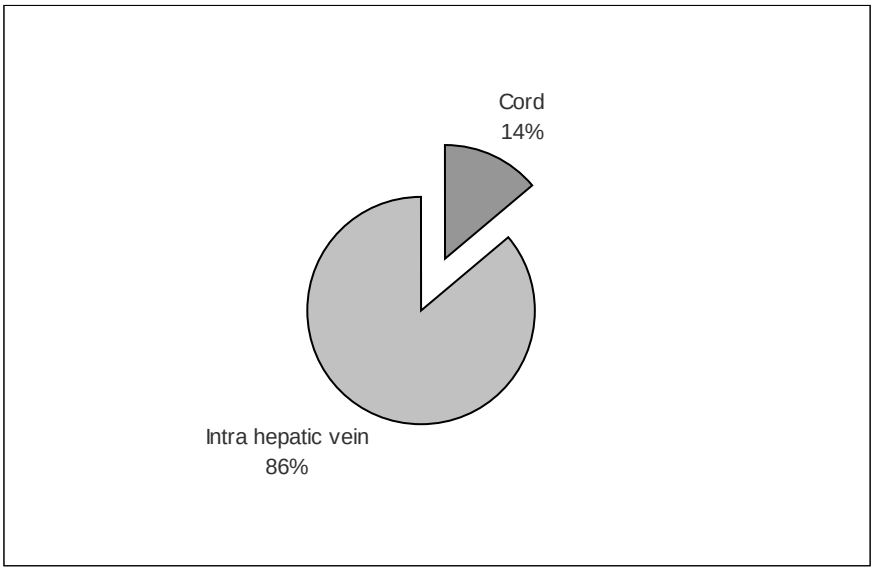


Figure 11. Site of Transfusion 2009-2010

The operators performing these transfusions are shown in Figure 12

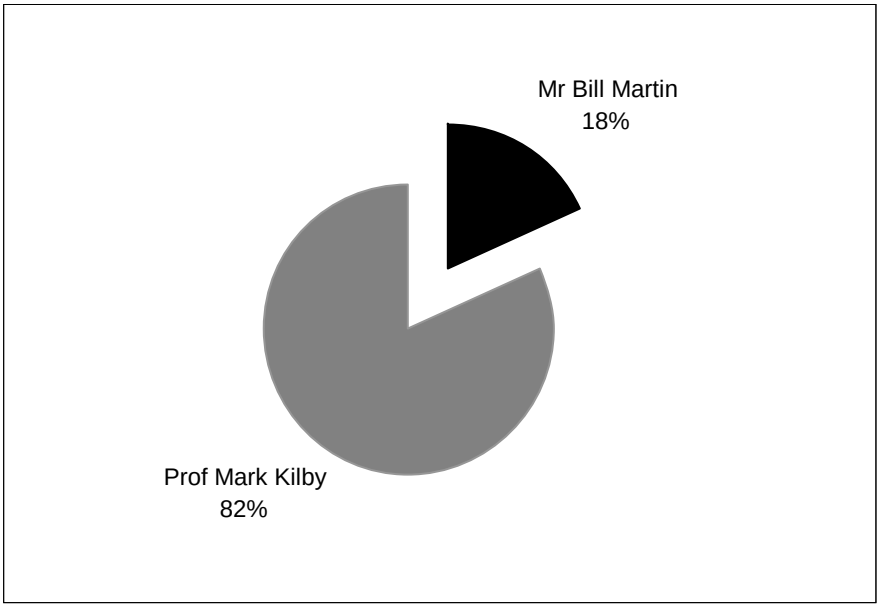


Figure 12. Transfusion by Operator 2009-2010

10.1. Management of Twin-twin transfusion syndrome (TTTS) M Kilby

Between 1st April 2009 and 31st March 2010, there were 38 pregnancies with TTTS considered for fetoscopic laser coagulation; all were monochorionic twins. 36 pregnancies had Quintero stage III or greater (86.8% Stage III & 7.9% stage IV). There were two pregnancies complicated by stage II disease (5.2%). These pregnancies were all offered and accepted fetoscopic laser ablation (FLA).
The principle operators were MK in 26/38 (68%) and WM in 12/38 (32%). In 73% of pregnancies a selective technique was utilised. A median of seven AVA were coagulated using a Diode laser (range 4 - 10 AVA)

The median gestational age at presentation and operation was 19 weeks (95% CI 18.6 – 20.3 wks). Of the pregnancies complicated by double fetal losses, this complication occurred at a range of between 1-4 weeks post-FLA. All these were miscarriages associated with bleeding and/or PPROM (rather than immediate double IUD).

Following examination of the cohort in total (2009-2010), the overall fetal survival post-FLA 59.2% (45/76 fetuses). Of these, there were single survivors in 55.2% of pregnancies (21/38). In 31.6 % (12/38) of pregnancies there were two survivors and in 13.2% of pregnancies there was a double pregnancy loss (5/38) (all through miscarriage).

Thus, in 86.8 % of pregnancies there was at least one survivor. The median prolongation of pregnancy in weeks was 15 weeks (95%CI 12.4 -15.1 wks.)

The median gestation of delivery (of pregnancies with at least one survivor) was 32 wks (95% CI 30.9 – 32.6 wks). This was with a policy of 'elective delivery' between 34-36 weeks, usually by caesarean section. These data indicate that outcomes in this single centre cohort (between 2009-2010) are similar to internationally published data. We have published our overall figures for this therapy in >200 pregnancies between 2004-2010 (Fetoscopic laser coagulation for severe twin-to-twin transfusion syndrome: factors influencing perinatal outcome, learning curve of the procedure and lessons for new centres. Morris RK, Selman TJ, Harbidge A, Martin WI, Kilby MD. ***BJOG. 2010;117(11):1350-7***).

Outcomes for fetoscopic laser coagulation: April 2009 - March 2010.

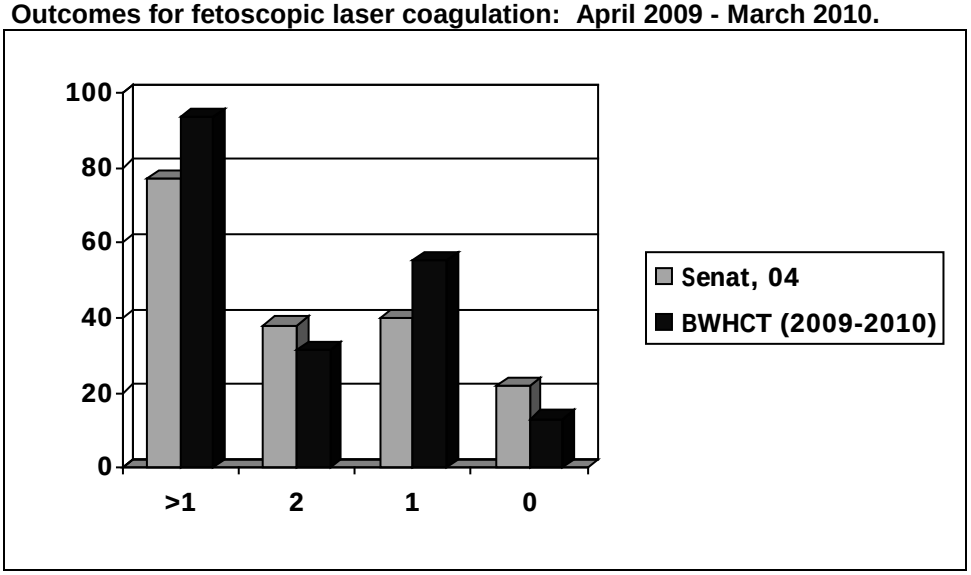
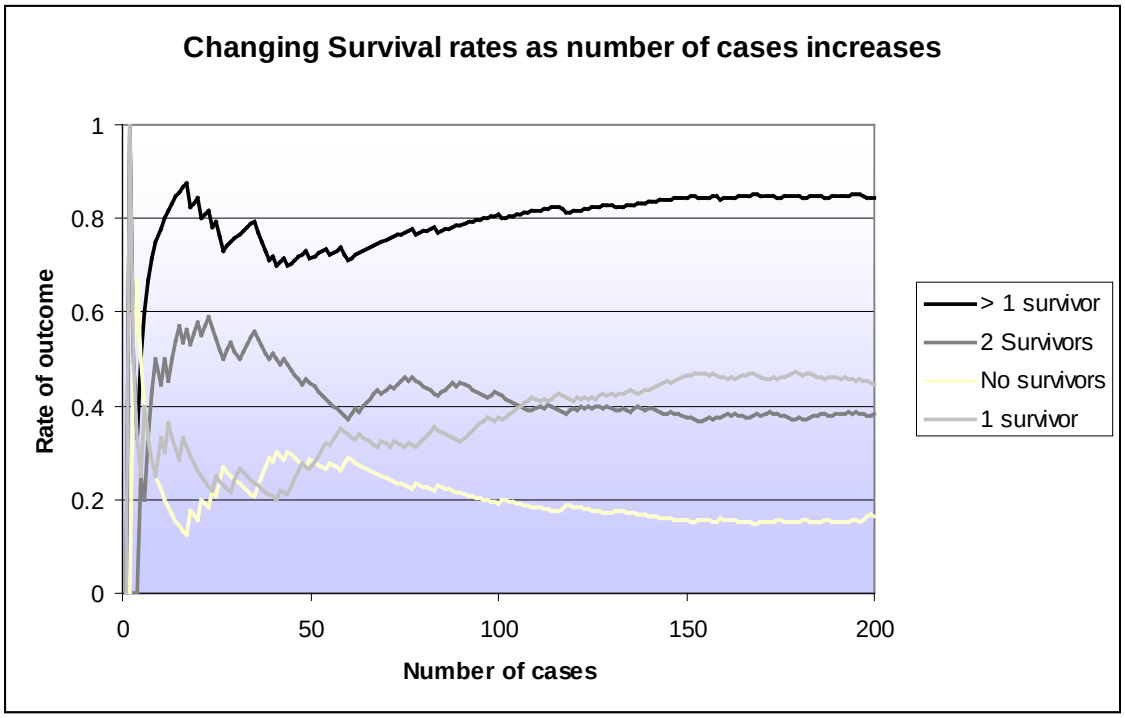


Figure. 13 Outcomes for laser ablation: April 2009- March 2010.

Our cumulative data for outcome on n=200 cases (October 2004 – June 2010) of severe TTTS treated by fetoscopic laser ablation are shown below and are very competitive outcomes compared to other international centres.



11. Other invasive fetal therapy: *Tara Selman*

During the course of 2009-2010 there were a total of fifteen procedures performed on seven patients as detailed below. These procedures were various percutaneous treatments.

1. Twin to Twin transfusion syndrome: Two women required Amniodrainage to treat this condition. One woman presented after 26 weeks gestation (prior to which fetoscopic laser ablation is now recommended) and one woman had an incomplete laser ablation and subsequently required Amniodrainage on two occasions.

2. Congenital Malformations: Two fetal shunts were inserted. One woman had a fetus diagnosed with a lower urinary tract obstruction and a vesicoamniotic shunt was inserted following recruited to a RCT of Percutaneous vesicoamniotic shunting for lower urinary tract obstruction (PLUTO).The other woman had a fetus with a large left sided pleural effusion and hydrops. This fetus had a chest shunt and Amniodrainage. A third pregnancy was complicated by polyhydramnios associated with duodrenal atresia and Amniodrainage was required on two occasions. A final pregnancy in a poorly controlled type 1 diabetic woman required Amniodrainage for polyhydramnios, this fetus had a cardiac defect and CAM.

3. Unexplained polyhydramnios: One woman had marked polyhydramnios that required serial amnioreduction, seven in procedures in total.

12. Pre-pregnancy Counselling / Pregnancy Loss Clinic (PPCC)

Within the Fetal Medicine Department, the PPCC continues to provide a regional service for couples who have experience of the following:

- Recurrent first trimester miscarriages
- Second trimester miscarriages
- Stillbirth or neonatal death.
- Fetal anomaly
- Pre-existing maternal disease
- Previous severe pre-eclampsia

The aims of the clinic are:

- To carry out relevant investigations to identify any causes of pregnancy loss.
- To suggest any treatment which might be beneficial in a subsequent pregnancy.
- To make an individualized plan of care, treatment and support for a subsequent pregnancy.
- To provide support and counselling following pregnancy loss and in any subsequent pregnancy.
- To provide pre-pregnancy counselling for women with a maternal disease.

The PPCC continues to be the regional centre for the investigation of women who have experienced severe pre-eclampsia in a previous pregnancy, in collaboration with APEC.

Midwifery Support

Ruth Kirchmeier Senior Specialist Midwife in Fetal Medicine sees her own caseload of pregnancy loss patients for review of investigations and to make a plan of care for a subsequent pregnancy.

Midwifery input and bereavement support are provided by the team of Specialist Midwives in Fetal Medicine, Ruth Kirchmeier, Gill Jongman, Brenda Bolger, Nia Carnevale and Jane Meredith.

The service is predominantly midwifery led, as the team of midwives has developed considerable experience and expertise in working with women/couples who have had recent pregnancy losses and in providing support in subsequent highly anxious pregnancies.

Invaluable to the smooth running of the clinic, secretarial support is provided by Vicki Morrison-Thomas.

12.1 Miscarriage Support group

In May 2003, a Miscarriage Support Group was set up in conjunction with the Miscarriage Association, and continues to be held monthly at the Women's Hospital. The group is coordinated by Alison Noakes, a previous patient of the clinic. Ruth Kirchmeier Specialist Midwife and Caroline Brannigan, Specialist Nurse from EPAU, provide professional support. Patients seem to greatly appreciate the opportunity to be able to discuss their experiences informally with others who have been through similar events.

12.2 PPCC activity

12.2.1 Overall numbers seen

Table 14 demonstrates the numbers of women seen in the clinic from April 2009 to March 2010, differentiated according to type of appointment.

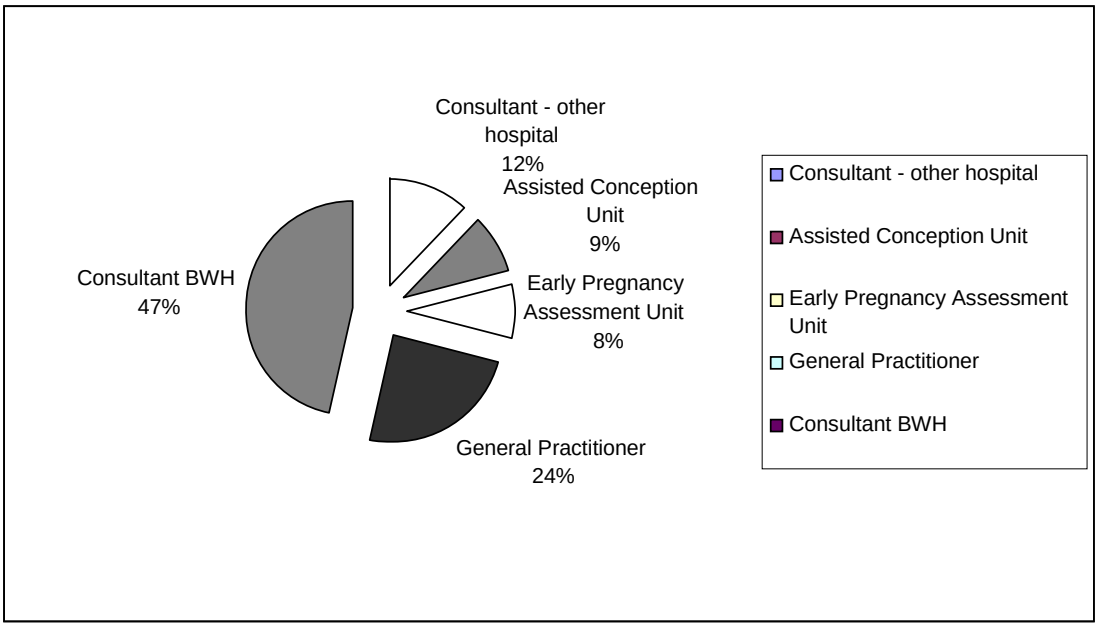
Primary Midwife Visit	Consultant review	Pregnancy support	Total number seen
446	296	446	1188

Table 14. Attendances 2009-2010

12.2.2. Source of referral

Figure 14 demonstrates the distribution of referral according to their source for women coming for their appointment with the specialist midwives and attending the Consultant Clinic.

Figure 14. Referral by source PPCC



12.2.3 Type of pregnancy loss

Figure 15 demonstrates a breakdown of the numbers of women experiencing the different types of pregnancy loss.

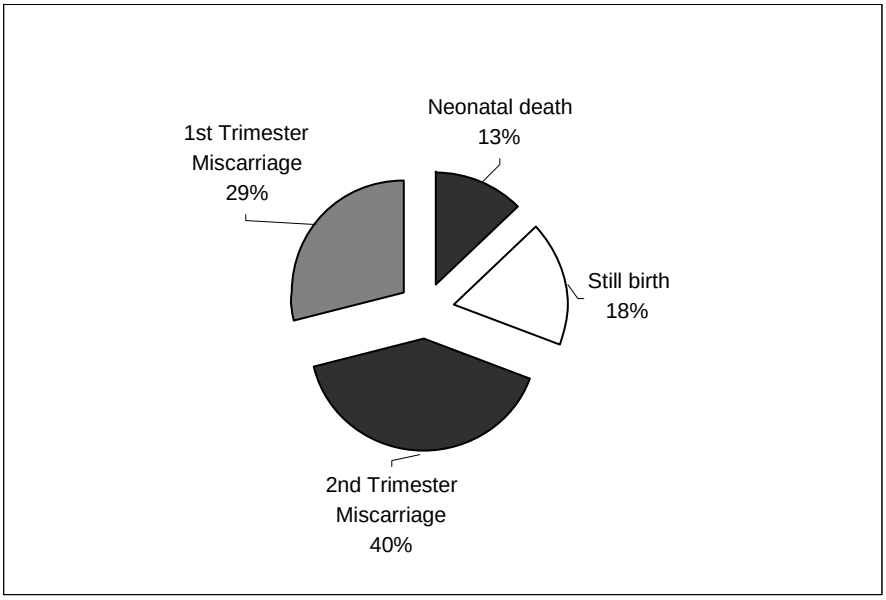


Figure 15. Type of pregnancy loss

12.2.4 Reason for referral

Table 15 demonstrates the distribution of reason for referral for those women attending their first visit with the specialist midwife and attending the Consultant Clinic. it is difficult to reflect the complexity of the cases seen in PPCC in Figures such as these as many women will fall into more than one category.

Reason for referral	Number of women (%)
Pregnancy loss (recurrent)	207(46)
Maternal disease	177(40)
Fetal anomaly	62(14)

Table 15. Reason for referral to PPCC (first visit)

12.2.5 Range of Fetal Anomalies

Table 16 reflects the range of fetal anomalies experienced by couples attending the clinic:

Fetal anomaly	Number	Fetal anomaly	Number
Chromosomal	13	Metabolic disorders	0
Renal	1	Cloacal plate	0
Cardiac	7	Fetal hydrops	4
Neural Tube defects	4	CAM	1
Gastro-intestinal defects	2	Lumbar/thoracic teratoma	0
Skeletal	2	CNS anomalies	13
Diaphragmatic hernia	3	Neonatal alloimmune	2
Cleft lip/palate	2	thrombocytopenia	1
Twins (Anomalies / TTTS)	8	Bilateral hydrothoraces	3
Caudal regression syndrome	0	Fetal akinesia	1
Laryngeal atresia	0	Genetic syndromes	1

Table 16. Previous fetal anomaly of patients attending PPCC

Range of maternal disease

Table 17 reflects the range of maternal disease experienced by women attending the clinic.

Maternal disease	Number	Maternal disease	Number
Hypertension	25	SLE/APS	21
Diabetes	4	Uterine anomaly	5
PCO	3	Cervical weakness	7
Thyroid disease	6	Cervical amputation	4
Renal disease	13	Arthritis	3
Chromosomal	2	Thrombophilia	11
Cardiac	2	Rhesus disease	7
DVT/PE	7	Epilepsy	3
Obstetrics Cholestasis	1	Stroke	2
Depression	1	Paraplegia	1
Fibroids		Infertility	8
Endometriosis		Crohns/Ileostomy	2
Group B strep.		Asthma	1
Osteogenesis imperfecta		Antiplatelet antibodies	2
Methadone user		Sickle cell	1
Myasthenia gravis		Osteopetrosis	1

Table 17. Maternal disease in patients attending PPCC

13 Conclusion.

This is a comprehensive report documenting a summary of the multidisciplinary work taking place in the Fetal Medicine Centre. It is hoped that this information will be of help to those working with the profession, the clinicians that refer us patients, the RSSG and the patients using the service.

Within these data are the entire core audits that underpin our clinical practice and provide a working model of clinical governance in action. It is a testament to all those who work with us to provide excellent clinical care.

1st November 2010

Mark Kilby MB BS, MD, MRCOG
Professor of Maternal & Fetal Medicine,
Birmingham Women's Hospital, University of Birmingham, Metchley Park Rd, Edgbaston,
BIRMINGHAM, UK, B15 2TG.

Appendices

Academic Staff

- Professor Mark D Kilby – Clinical Coordinator in Maternal and Fetal Medicine (NHS); Deputy Head of Division of Reproduction & Child Health (Academic).

NHS Staff

- Mr Peter Thompson – Consultant Obstetrician and Medical Director
- Mr Bill Martin – Consultant in Fetal Medicine
- Dr Tracey Johnston – Consultant in Fetal Medicine and Clinical Director of Maternity Services.
- Dr Gill Nava – Associate Specialist
- Dr Paul Miller – Consultant Paediatric Cardiologist
- Dr Tarak Desai – Consultant Paediatric Cardiologist
- Dr Ellen Knox – Consultant in Fetal Medicine
- Dr Sam Pretlove – Consultant in Fetal Medicine

Obstetric Radiology staff

- Dr Josephine McHugo – Consultant Obstetric Radiologist
  All obstetric radiographers at BWHCT

Sub Specialty Trainees

- Dr Ellen Knox – SST
- Dr Sam Pretlove – SST
- Dr Amelia Hui – SST(12 months from Hong Kong).

Midwifery/ Sonographer Staff

- Veronica Donovan – Clinical Midwife Manager/Sonographer
- Helen Baker – Specialist Midwife/Sonographer
- Nia Carnevale – Specialist Midwife
- Ruth Kirchmeier – Specialist Midwife
- Gill Jongman –Midwife
- Brenda Boldger –Midwife
- Jane Meredith – Midwife
- Sarah Hall - Midwife
- Marguerite Usher-Somers – Specialist Sonographer
- Lida Debono – Specialist Sonographer
- Sandra Smith – Midwifery Assistant
- Frances Rich – Midwifery Assistant

Administrative Staff

- Becky Williams –Assistant General Manager: Maternity, Fetal Medicine & Neonates
- Samantha Mostyn – Administrator
- Emma Prentice – Clinic Secretary
- Elaine Jennings – Receptionist
- Alison Hill – PA and Secretary to Prof Kilby & Dr Johnson.
- Elaine Smith - PA and Secretary Dr Thompson & Dr Martin
- Vicki Morrison- Thomas – Pre-pregnancy Clinic Secretary

Consultants supporting the Pre-Pregnancy Counselling/Pregnancy Loss Clinic

Mr Bill Martin carries out a monthly Pre-pregnancy Counselling/Pregnancy Loss Clinic and is in addition one of the lead consultant obstetricians for the management of multiple pregnancy.
Mr Peter Thompson carries out a monthly Pre-pregnancy Counselling/Pregnancy Loss Clinic and in addition is the lead consultant obstetrician for the regional adult cardiology clinic.
Mrs Tracey Johnson carries out a monthly Pre-pregnancy Counselling/Pregnancy loss Clinic and in addition is the lead consultant obstetrician for the regional immunology, renal and diabetic clinic.
Professor Mark Kilby carries out a monthly combined Genetic/Pregnancy Loss Clinic.

The following Consultants are available for combined appointments with the Maternal Fetal Medicine Consultants:
Dr Denise Williams(Consultant Geneticist); Dr Graham Lipkin (Consultant Renal Physician); Dr Sarah Thorne (Consultant cardiologist) and Dr Caroline Gordon (Consultant Rheumatologist)

Appendix:
Fetal anomalies detected on ultrasound scans:

1. Fetal Cardiology. Abnormal fetal echocardiograms.

Table 18 Cardiac Anomalies Detected 2009-2010.

Cardiac Anomaly identified	Number
Pulmonary atresia, VSD	3
Pulm atresia ? CCTGA	1
Hypoplastic RV VSD	4
Truncated RV	1
Dilated RV RA	1
Small RV	3
Small RV, tricuspid atresia, VSD	2
Hypoplastic RV, critical PS	1
PAIVS	1
Dilated right heart	1
Hypoplastic RV VSD TGA ? Coarct	1
Dysplastic Ebsteinoid TV. TR	1
Single ventricle RV morphology	1
HLHS	12
DILV with TGA	1
Critical aortic stenosis	1
Severe AS, MR	1
VSD	31
Large ASD	2
VSD, mild vent disproportion	1
VSD with aorta override	2
AVSD with hypoplastic LV, TGA or DORV	1
AVSD	12
VSD with ? Truncus	1
Unbalanced AVSD	5
VSD mildly dilated RV	1
Fallot type AVSD	1
AVSD small LV DORV TGA PS	1
TGA VSD	3
TGA DORV VSD arch hypoplasia / interruption	4
TGA	1
TGA DILV	1
TGA VSD	1
Benign atrial ectopics	23
Heart block	5
Intermittent SVT	3
Bradycardia	2
SVT	3
TOF with absent pulm valve syndrome	1
TOF	3
Double outlet right ventricle	1
Ventricular disproportion	12
Unbalanced AVSD, small LV, long LVOT tunnel DORV	1
Dextroardia, VSD, DORV TGA	1
Pericardial effusions (vsd seen earlier in preg)	1
Univentricular heart with TGA	1
Dextrocardia	1
Dilated venous channel to RA. Normal IVC and PVs	1

Ascending ao arch anuerysm	1
Dextrocardia CCTGA	1
Ventricular and atrial disproportion	1
? Isomerism Single av valve, common atrium, RV, TGA	1
Univentricular heart	1
Ventricular disproportion and VSD	5
CCTGA VSD	3
Enlarged heart, turbulence across LVOT	1
CCTGA VSD DILV	1
Pericardial effusion, enlarged heart, outlet VSD	1
Common arterial trunk	1
Arterial disproportion	1
LV to aortic tunnell	1
? Pericardial cyst ? RV diverticulum	1
Ventricular disproportion TGA VSD	1
Fallot type PA	1
CCTGA VSD small RV	1

2. Structural anomalies / congenital malformations on ultrasound (non-cardiac).

Fetal abnormality identified	**2009-2010**	
	BWH	**Regional**
RENAL		
Renal	14	74
CARDIAC		
Cardiac	7	59
ABDOMINAL		
Gastroschisis	1	23
Diaphragmatic Hernia	3	13
Exomphalos	2	11
Ovarian Cyst		1
Other Abdomenal	4	6
RESPIRATORY		
Cystic Lung Lesion	1	14
Other Respiratory	1	3
SKELETAL		
skeletal	7	19
LIMB		
Talipes	8	17
Other Limb	7	18
HEAD AND NECK		
Cystic Hygroma/NT>3.5mm	2	21
Other Head and Neck		1
Facial	6	18
Nuchal oedema / thickness	4	28
HYDROPS (and pleural effusion / ascites)		
Hydrops (and pleural effusion / ascites)	5	31
GASTROINTESTINAL		
Gastrointestinal (inc hyperechogenic bowel)	20	43
CENTRAL NERVOUS SYSTEM		
Anencephaly	2	7

Spina Bifida and / or Hydrocephalus	3	13
Encephalocele	2	1
Microcephaly	1	2
Holoprosencephaly	2	9
Dandy Walker Cyst	2	5
Agenesis of corpus callosum	2	9
CPC	4	7
Ventriculomegaly	13	45
other CNS	3	12
TWIN COMPLICATIONS NOT TTTS		
Twin complications not TTTS	6	29
SACROCCYGEAL TERATOMA		
Sacroccygeal teratoma	1	2

Table 19 Detailed Scan Abnormalities Detected 2009-2010

Exam desc	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
Amniodrainage	1	0	1	0	0	0	0	1	1	1	1	0	6
Amniocentesis	26	13	20	34	21	30	26	23	21	15	18	17	264
Ascites Scan	1	0	0	0	0	0	0	0	0	0	0	0	1
Cervix Assessment	3	2	0	0	0	0	0	0	0	1	0	0	6
Chorionic villous sampling	13	11	12	17	13	26	8	11	9	8	13	16	157
Consultant fetal cardiac	39	28	45	28	44	49	54	55	63	55	48	59	567
Dating scan	3	2	0	4	5	3	2	0	2	0	4	1	26
Detailed Rhesus scan	14	11	24	28	17	22	14	17	17	20	15	21	220
Specialist Detailed scan	301	284	316	323	339	352	345	345	315	312	284	362	3878
Ductus venosus Doppler	7	14	12	4	6	4	4	3	3	2	4	0	63
Early pregnancy scan	0	0	1	1	1	0	0	0	1	3	0	0	7
Fetal blood sample	5	1	0	2	3	2	6	4	2	2	0	3	30
Fetal blood transfusion	3	3	5	1	2	3	2	0	4	10	8	8	49
Fetal drainage	0	0	0	0	1	0	0	0	0	0	0	0	1
Fetal heart rate	0	0	0	1	2	2	1	0	0	0	0	2	8
Fetal shunt	0	0	2	0	0	0	0	1	1	0	0	0	4
Fetal therapy	1	0	0	0	0	0	0	1	0	1	0	0	3
Fetocide/Late TOP	4	2	2	4	0	2	5	4	2	6	0	3	34
Laser Fetoscopic ablt	4	8	3	4	3	5	2	3	2	6	4	4	48
Growth scan	2	15	3	5	5	5	3	5	14	7	6	6	76
Liquor volume assessment	0	3	9	5	1	1	4	1	3	2	2	2	33
MCA Doppler	17	14	14	10	8	7	5	7	4	8	3	7	104
Nuchal translucency scan	8	7	6	7	6	5	12	4	8	7	4	5	79
Placenta Site	0	0	0	3	2	0	1	0	0	0	1	0	7
Radiographer fetal cardiac	54	52	50	53	52	50	59	42	44	57	32	35	580
Raised AFP detailed scan	3	1	3	6	1	2	4	1	4	2	2	3	32
Selective reduction	4	0	0	0	0	0	1	0	0	1	0	0	6
Umbilical artery Doppler	15	22	21	13	11	5	12	8	4	8	6	12	137
Uterine artery Doppler	1	0	1	0	0	0	0	1	1	0	2	0	6
Viability scan	21	17	9	7	6	21	10	7	16	26	20	23	183
	550	510	559	560	549	596	580	544	541	560	477	589	6615

Table 20 Fetal Medicine Procedure Figures 2009-2010 by month.

Data by PCT.

	PCT Name	Count
	SOUTH BIRMINGHAM PCT	1439
	HEART OF BIRMINGHAM TEACHING PCT	659
	SANDWELL PCT	617
	WORCESTERSHIRE PCT	610
	WARWICKSHIRE PCT	539
	SOUTH STAFFORDSHIRE PCT	530
	DUDLEY PCT	491
	WALSALL TEACHING PCT	303
	BIRMINGHAM EAST AND NORTH PCT	270
	WOLVERHAMPTON CITY PCT	189
	HEREFORDSHIRE PCT	118
	SOLIHULL CARE TRUST	99
	STOKE ON TRENT PCT	83
	NORTH STAFFORDSHIRE PCT	69
	COVENTRY TEACHING PCT	57
	TELFORD AND WREKIN PCT	35
	SHROPSHIRE COUNTY PCT	48
		6156
	OATS	
	LEICESTERSHIRE COUNTY AND RUTLAND PCT	56
	NOTTINGHAMSHIRE COUNTY TEACHING PCT	48
	DERBYSHIRE COUNTY PCT	70
	DERBY CITY PCT	24
	LINCOLNSHIRE TEACHING PCT	23
	MANCHESTER PCT	14
	CENTRAL AND EASTERN CHESHIRE PCT	13
	GLOUCESTERSHIRE PCT	11
	EAST LANCASHIRE TEACHING PCT	10
	OLDHAM PCT	10
	KIRKLEES PCT	9
	NOTTINGHAM CITY PCT	9
	HAMPSHIRE PCT	8
	LEICESTER CITY PCT	8
	WEST HERTFORDSHIRE PCT	7
	WIRRAL PCT	5
	LEEDS PCT	5
	OXFORDSHIRE PCT	5
	BRADFORD AND AIREDALE TEACHING PCT	5
	TRAFFORD PCT	4
	STOCKPORT PCT	4
	CUMBRIA TEACHING PCT	3
	BLACKBURN WITH DARWEN PCT	3
	BLACKPOOL PCT	2
	SHEFFIELD PCT	2
	BARKING AND DAGENHAM PCT	2
	SEFTON PCT	2
	WESTERN CHESHIRE PCT	2
	SOMERSET PCT	2

	RICHMOND AND TWICKENHAM PCT	1
	HALTON AND ST HELENS PCT	1
	EALING PCT	1
	NORTH YORKSHIRE AND YORK PCT	1
	ASHTON, LEIGH AND WIGAN PCT	1
	BATH AND NORTH EAST SOMERSET PCT	1
	EAST RIDING OF YORKSHIRE PCT	1
	NORFOLK PCT	1
	BUCKINGHAMSHIRE PCT	1
	NORTH LANCASHIRE TEACHING PCT	1
		376

Table 21 Fetal Medicine activity (examinations) by PCT 2009-2010

	PCT Name	Count
	SOUTH BIRMINGHAM PCT	474
	HEART OF BIRMINGHAM TEACHING PCT	204
	SANDWELL PCT	80
	BIRMINGHAM EAST AND NORTH PCT	77
	DUDLEY PCT	73
	WORCESTERSHIRE PCT	59
	SOUTH STAFFORDSHIRE PCT	32
	WARWICKSHIRE PCT	26
	SOLIHULL CARE TRUST	24
	WALSALL TEACHING PCT	20
	HEREFORDSHIRE PCT	5
	WOLVERHAMPTON CITY PCT	5
	COVENTRY TEACHING PCT	4
	TELFORD AND WREKIN PCT	3
		1086
	OATS	
	LEEDS PCT	2
	LEICESTER CITY PCT	2
	BRADFORD AND AIREDALE TEACHING PCT	1
	SHROPSHIRE COUNTY PCT	1
	EALING PCT	1
	NOTTINGHAMSHIRE COUNTY TEACHING PCT	1
	LEICESTERSHIRE COUNTY AND RUTLAND PCT	1
	HAMPSHIRE PCT	1
	DERBY CITY PCT	1
		11

Table 22 PPCC activity (outpatients attendances) by PCT 2009-2010

*** The difference in numbers is attributed to internal BWH scans performed in the department. These will be recorded separately for next years report .**