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 11/12) 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 2011-2012 to be provided to the WMSCT by 30th Sept 2012 • 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 Lorenzo system
Organisation responsible for data collection	BWNFT
Frequency of collection	Report to be provided annually
Baseline period / date/value if appropriate	2011/2012 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 2011 - March 2012

Editor **Prof. M.D. Kilby; Clinical Lead in Fetal Medicine**

1. Introduction

The Fetal Medicine Centre at the Birmingham Women's Foundation Trust offers specialist care for the 'unborn baby', to pregnant women from South Birmingham, the wider West Midlands 'Region' and a supra-regional service to many areas of the United Kingdom (UK).

The successful delivery of this service to patients both in South Birmingham and from other Primary Care Trusts, within the West Midlands and indeed nationally, is a credit to the hard work of our multidisciplinary team and its interaction with affiliated teams in specialties such as neonatal paediatrics and the paediatric subspecialties of surgery, cardiology and genetics (provided by our own Foundation Trust and our sister Foundation Trust, at the Birmingham Children's Hospital).

In addition, we continue to work closely with the West Midlands Newborn Network 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, commissioned by the Regional Specialist services team. This comprises the Perinatal centre / neonatal intensive care service but also includes other specialist services such as those provided within the fields of fetal medicine, perinatal pathology & genetics. We work closely with our neonatal and other specialist paediatric colleagues. The Fetal Medicine centre is thus commissioned by West Midlands Regional Specialist Commissioning group. This model has provided a template by which the recently established National Fetal Medicine CRG will establish Specialist Services Agency work with individual local PCT's within the Region to commission the service.

We provide training opportunities in Royal College of Obstetricians & Gynaecologist's (RCOG) recognized training schemes for subspecialty training and ATSM places. As well as our two subspecialty trainees from the West Midlands (UK), we have international fellows / trainees from Ireland, China and most recently Argentina.

As well as the clinical component to the Fetal Medicine Centre, there is also an academic component with the designated Professor of Fetal Medicine leading basic science and translational research in this specialty. There are a number of NIHR portfolio studies focusing on Fetal Medicine within our institution.

2. Midwifery Report *Veronica Donovan*

The Fetal Medicine midwifery / sonographer team continues to lead and support:

- A amniocentesis clinic
- Sonographer led fetal echocardiography / cardiology screening service
- 1st Trimester fetal cardiology screening service

Mrs Helen Baker has completed Amniocentesis training. Two further Fetal Medicine Midwives following appropriate qualifications and training now perform ultrasound scans in the Fetal Medicine Centre.

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.

4. Summary of Clinical Governance

4.1 Audit

This report is the cornerstone of our audits providing metrics on:

1. Miscarriage rates for amniocentesis.
2. Miscarriage rates for CVS.
3. Outcomes of pregnancies treated by in-utero transfusion & monochorionic twins complicated by TTTS and treated by fetoscopic laser ablation.

These outcomes are measured again international and national (RCOG) standards. In line with national guidance (http://www.rcog.org.uk/files/rcog-corp/GT8Amniocentesis0111.pdf; authors Alfirevic, Walkinshaw & Kilby), the pregnancy loss rates for amniocentesis and chorionic villous sampling are less than 1% and 2% respectively. The 'threshold' in the national document for concern is 5%. In addition, we have been instrumental in defining outcomes for pregnancy loss associated with such procedures (Tonks A, Wyldes M, Larkin SA, Kilby MD. Arch Dis Child Fetal Neonatal Ed. 2009; 94:Fa4) and linking them to national datasets published by the NHS Fetal Anomaly Screening Program (http://fetalanomaly.screening.nhs.uk/leafletsforparents.)

4.2 Training

We provide training opportunities in Royal College of Obstetricians & Gynaecologist's (RCOG) recognized training schemes for subspecialty training and ATSM places. As well as our two subspecialty trainees from the West Midlands (UK), we have international fellows / trainees from Ireland, China and most recently Argentina.

Subspecialty Trainees (2011/2012)

- Dr Noel Shek – RCOG Subspecialty trainee sponsored by University of (Hong Kong).
- Dr Tara Selman – RCOG Subspecialty trainee (complete August 2012).
- Dr Katie Morris – RCOG Subspecialty trainee & NIHR lecturer.
- Dr Cèsar Meller : Clinical Fellow. (Buenos Aires, Argentina)(until July 2012).
- Dr Caroline Fox – RCOG Subspecialty trainee (to start January 2013).

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 has been no SUI's reported by The Fetal medicine Centre in 2011-2012.

5. Human Resources

The service is provided on a sessional basis by a team of NHS consultant's and University staff, and 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 2011-2012 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 2012.

Work has begun on CQUINS – The department is working to adapt all attendances to regional definitions for Fetal Medicine, in readiness to move to Tarif.

6.1 Service Developments 2011-2012

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 trailing of new technology.
- Fetal cardiology – A consultant in Fetal Medicine is also attached to Consultant Fetal Cardiology Sessions to give input appropriate to each case.

6.2 Research and Development 2011-2012

There are a number of basic science projects and NIHR recognized portfolio studies that encompass 'Fetal Medicine' activity within the Foundation Trust. This is an important part of the Centres working and within the NIHR ethos both directly and indirectly improves patient care. We are one of the most research active Fetal Medicine Centres in Europe.

Present studies include:

a) **The PLUTO study** (Funded by the HTA and PI M Kilby). Assessment of percutaneous vesicoamniotic shunting in fetuses with congenital bladder neck obstruction. Completed in December 2011.

b) **Microarray study** (funded by SPARKS and PI M Kilby). Assessment of a focused and high-resolution microarray platform and whole exome sequencing in diagnosis of chromosomal (and gene) 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 (Complete September 2012).

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).

g) **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 (pregnancy loss before 24 weeks), stillbirth and preterm labour.

h) **The Meridian Study** : comparing diagnostic accuracy of prenatal ultrasound and magnetic resonance imaging for fetal brain abnormities (CI. M Kilby).

There is also a range of laboratory based basic science projects performed in the Institute of Biomedical Research at the University of Birmingham, using patients from the centre and funded by grants to Professor Kilby.

7. Activity Report

7.1 Overall Clinical Activity

The Fetal Medicine Centre operators as the regional referral centre for the West Midlands and also treats patients an increasing number of patients from outside the West Midlands area (mainly for fetal cardiology opinions and most significantly for the management of twin to twin transfusion syndrome). West Midlands 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 7173 examinations and procedures were undertaken in the Fetal Medicine Centre in 2011-2012. The majority of this activity (92%) was from within the West Midlands area and funded through the block contract.

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

	2009-2010	2010-2011	2011-2012
WMSSA	6161	6003	6582
Other Region	479	385	591
Total	6640	6388	7173

Table 1. Fetal Medicine Contracted Examinations 2009-2012

A full breakdown of scans/procedures performed in Fetal Medicine within 2011-2012 is shown in table 1 in the appendices.

The Fetal Medicine Service also covers the pre pregnancy counselling/pregnancy loss clinics (PPCC). This also involves a proportion of patients seen for consultations prior to a pregnancy who have serious medical disorders. In 2011-2012 there were 1221 attendances to the PPCC (outpatient appointments) which was made up of new and follow up patients.

A full breakdown of fetal medicine examinations by PCT is shown in table 2 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, usually by consultant subspecialists.

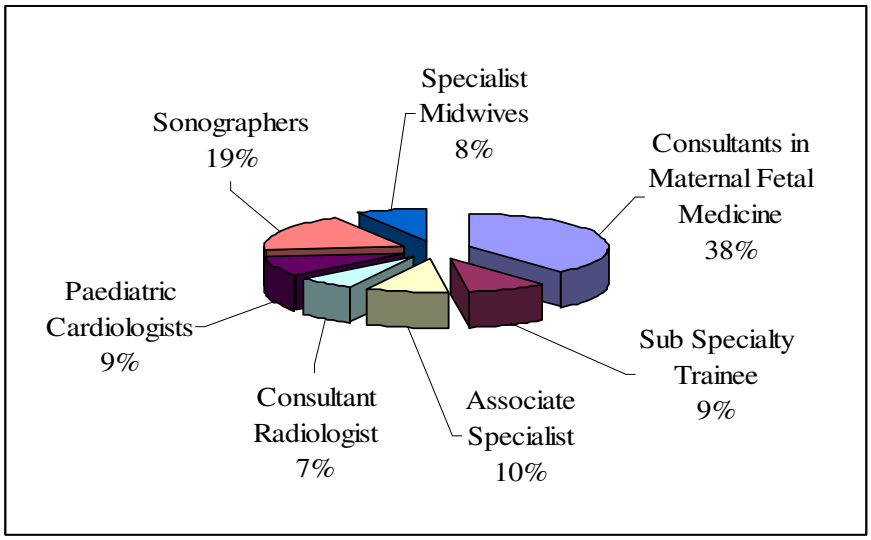

Figure 1. Total workload by Operator – 2011-2012

8. Detailed Scans *Miss Sam Pretlove*

4392 detailed scans were performed on 1860 patients by the Fetal Medicine Consultants, SSTS, Sonographers and Midwives; this figure includes 198 patients for Rhesus disease, 7 undertaken due to raised AFP on serum screening and 151 for 1st Trimester detailed scan, this is shown in comparison with the two previous years in table 2.

	2009-2010	2010-2011	2011-2012
Detailed Scan	3878	3893	4036
Raised AFP Detailed	32	26	7
Detailed Rhesus Scan	220	95	198
1st Trimester Scan	0*	0*	151
	4130	**4014**	**4392**

Table 2. Fetal Medicine Detailed Ultrasound Scans 2009-2012 (*1st Trimester is a new examination that commenced early 2011)

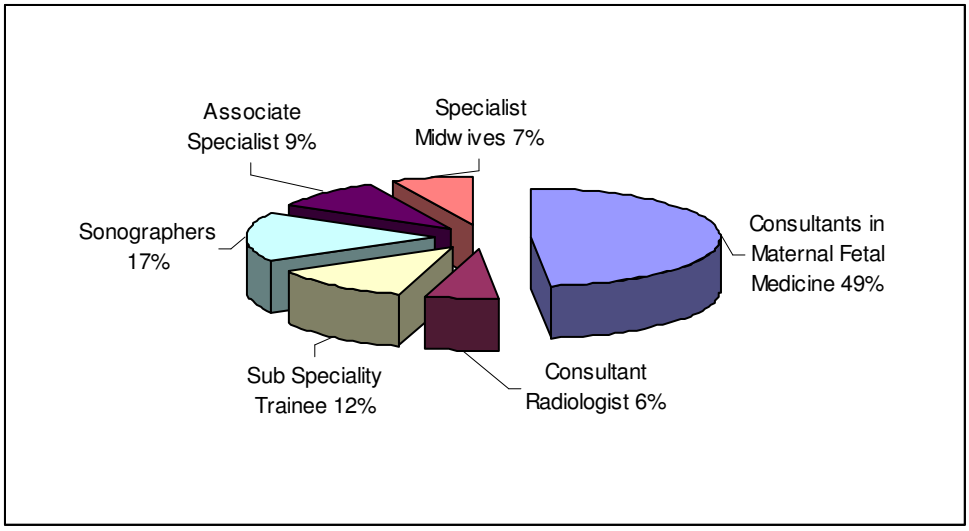

Figure 2. Detailed Scans by Operator 2011-2012

Table 3 in the appendix details all the abnormalities detected at the centre in 2011-2012.

9. Perinatal / Paediatric Cardiology: *Marguerite Usher Somers, Dr Tracey Johnston, Dr Paul Miller & Dr Tarak Desai*

Paediatric Cardiology continues to be a regional and supraregional service. It is provided primarily by two consultant paediatric cardiologists, Dr Paul Miller and Dr Tarak Desai, who are based at Birmingham Children's Hospital. The lists are supported by two fetal medicine consultants, Dr Tracey Johnston and Dr Sam Pretlove, providing patients with a comprehensive diagnostic service. The service is also supported by 3 Specialist Midwife sonographers and a Specialist sonographer trained in perinatal cardiology.

The West Midlands Fetal Medicine Centre also continues to offer a First Trimester Cardiac screening service to those women who have congenital heart disease (CHD), family history of CHD, previous affected pregnancy with CHD, pregnancies where the nuchal translucency (NT) is greater than or equal to 3.5mm, pregnancies where a chromosomal anomaly has been identified and patients are continuing with the pregnancy.

There has been a 16% increase in the number of examinations performed since the previous year. This can largely be attributed to the increasing numbers of cardiac scans being performed at 16 weeks gestation.

Fetal echo examinations are now recorded digitally onto Viewpoint thus eliminating the use and storage of DVDs. This has enabled a more efficient system for reviewing (and viewing) of examinations.

The West Midlands Fetal Medicine centre also ran a successful two day cardiology course in January 2012 (sponsored by Siemens Ultrasound PLC).

	2009-2010	2010-2011	2011-2012
WMSSA	1076	1233	1445
Out of Region	71	17	32
	1147	**1250**	**1477**

Table 3. Fetal Echocardiography including First Trimester Cardiac Scans activity 2009-2012 by referral area.
(First Trimester Scans is incorporated into 2010 to present figures only)

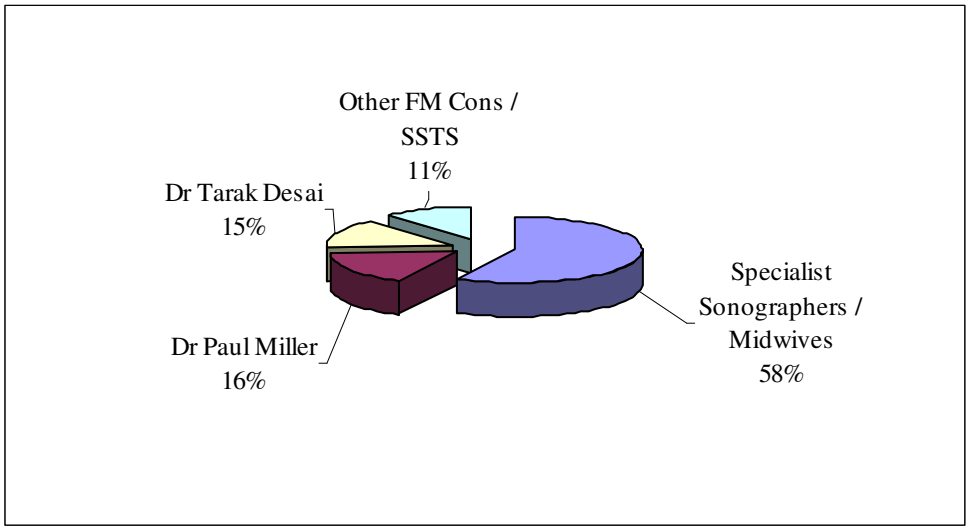

Figure 3. Fetal Cardiac Scans by Operator 2011-2012

Table 4 in the appendices shows a breakdown of cardiac anomalies for 2011-2012.

10. First Trimester Chorionic Villus Sampling (CVS): Gill Nava

The number of referrals to the Regional CVS service continues to decrease with widespread first trimester screening.

The table below shows the indication for CVS for the past 3 years.

Indication for CVS	**2009-2010**	**2010-2011**	**2011-2012**
Maternal Age	14	11	8
Clinical Genetics	48	40*	50
Previous Chromosome Abn	16	21	13
Pre Fetal Abn (structural)	2	0	0
Increased risk from 1st Trimester	22**	14*	53***
Cystic Hygroma/ Increased NT	31	55*	69
Other	0	0	5
Total CVS Performed	**133**	**141**	**198**

Table 4. BWH indications for CVS 2009-2012 * incl 1 twin pregnancy
** incl 4 twin pregnancies
*** incl 2 twin pregnancies

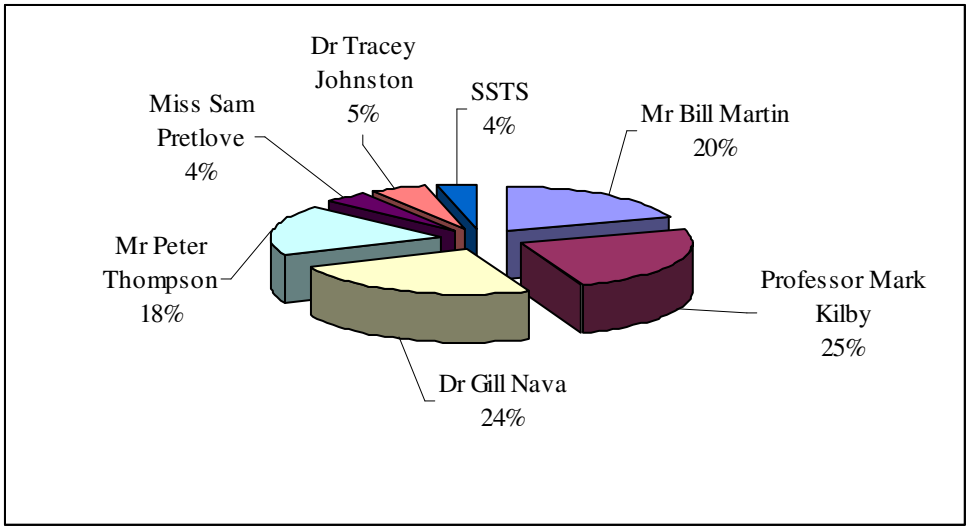

Figure 4. CVS by Operator 2011-2012

Abnormality	Number	Outcome
Trisomy 21	20	TOP x 18, LB x 2
Trisomy 18	10	TOP x 10
Trisomy 13	7	TOP x 7
45 XO	6	TOP x 6
Trisomy 9	1	TOP x 1
Unbalanced Robertsonian Translocation	2	TOP x 2
Triploidy	1	TOP x 1
Balanced Translocation	2	LB x 2
45,x(16)/46xx(4)	1	TOP x 1
Mosaic	1	LB x 1

Table 5. Abnormalities detected on CVS – non clinical genetics patients

There were 69 CVS performed for cystic hygroma / increased NT; of those 36 (52%) had chromosome abnormalities. 33 out of the 36 (91.7%) parent opted for termination of their pregnancy.

Abnormality	Number	Outcome
Duchenne Muscular Dystrophy	2	TOP x 2
Sickle Cell Disease	2	TOP x 2
Mytonic Dystrophy	2	TOP x 2
Treacher Collins	1	TOP x 1
Achondrogenesis Type 1a	1	TOP x 1
Unbalanced Translocation	1	TOP x 1
Balanced Translocation	4	LB x 4

Table 6. Abnormalities detected on first trimester CVS – Clinical Genetics patients

Outcome after CVS	2010-2011	2011-2012
TOP for chromosome or genetics anomaly	43%	30%
TOP for abnormality normal chromosomes	1%	1%
Miscarriage	5%	2.50%
NND	0%	0%
SB/IUD	0%	2%
Live birth	51%	64%

Table 7. Outcome information for first trimester CVS % is quoted as known outcomes

There were 184/198 known outcomes (some patients have not delivered) at the time of the annual report 2011-2012.

Of the total 198 CVS performed five miscarriages were reported. Two were after CVS done for previous chromosomal anomalies and the results were normal. One was after a CVS done for SMA. The result was normal and the pregnancy miscarried 8 weeks later. One occurred when there was a cystic hygroma measuring 7.6mm with a normal result. The final one was in a patient diagnosed with likely amnion rupture.

Only 1 miscarriage occurred within 14 days of the procedure, giving a miscarriage rate of 0.5% (calculated by this definition). Of the pregnancy losses, all were prior to 24 weeks and the fetal loss rate overall was 2.5% (of these 2/5 had abnormal phenotypes of the babies).

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

10.1 Second Trimester (>14 weeks) placental biopsy for fetal abnormality

There were 7 Chorionic Villus Samplings performed because of abnormalities detected on ultrasound after 14 weeks gestation.

Indication	Number	Chromosome result	Outcome
Oligohydramnious	2	Normal x 2	TOP x 2
Anhydramnious	1	Normal	TOP x 2
Exomphalos	1	Normal	LB
TRAP	1	Normal	TOP
Twins - 1twin exomphalus & kyphosis	1	Normal	Selective Reduction - LB x 1
Bladder neck obstruction	1	Normal	Miscarriage

Table 8. Indications and outcomes for placental biopsy 2011-2012

11. 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 provided a training service for SPR's rotating through the hospital.

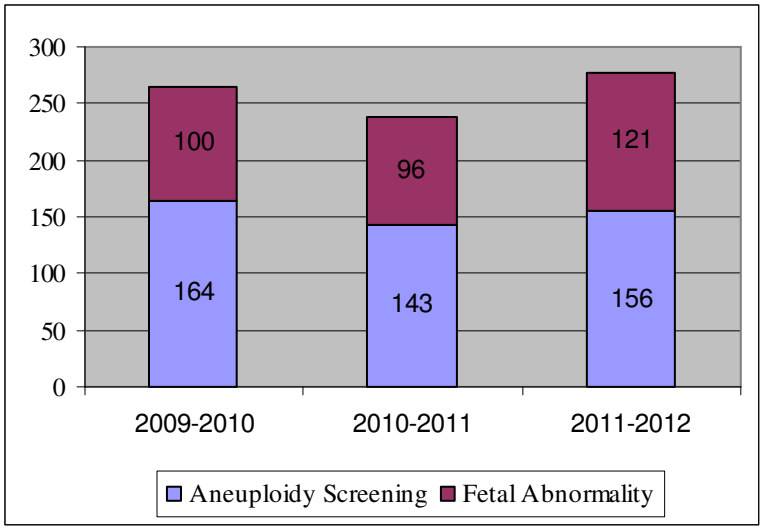

Figure 5. Total number of amniocentesis performed 2009-2012

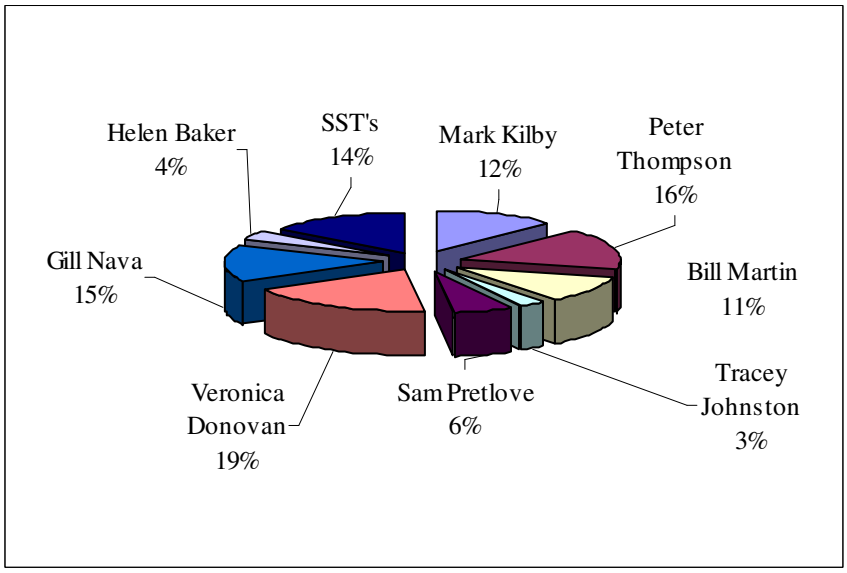

Figure 6. Amniocentesis by operator 2011-2012

11.1 Amniocentesis for Aneuploidy

There were 156 amniocentesis performed for screening for aneuploidy. The main indications are illustrated in figure 7 compared with the two previous years. (NB. Figures include West Midlands and out of area patients)

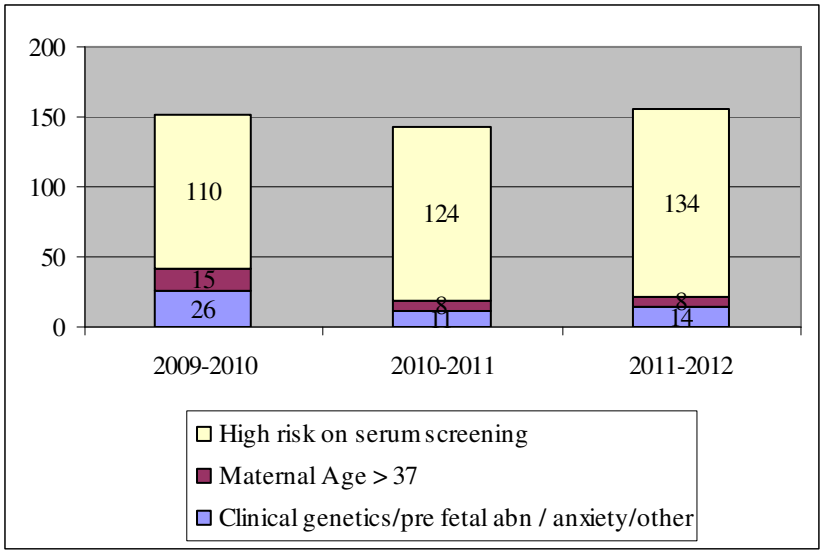

Figure 7. Indications for amniocentesis for aneuploidy screening 2009-2012

Indication	Number	Aneuploidy/genetic condition detected	Outcome
High Risk Serum Screening / NT	134	T18 x 2 T21 x 9 46,xy,inv,(9),(q32q34)pat 46,xy,del,(17)(p11.2p11.2) Mosaic Turners	LB x1, SB x 1 TOP x 9 Not yet delivered TOP IUD
Maternal Age > 37	8	All normal karyotypes	LB x 6, Misc x 1, 1 not yet delivered
Previous fetal abn/ anxiety/CG/other	14	Unbalanced Translocation Mosaic	TOP - twin 1 TOP
Total	156		

Table 9. Aneuploidy detected by indication (for screening Amniocentesis)

11.2 Amniocentesis for karyotyping in fetal abnormality / suspected fetal abnormality

121 amniocentesis were performed for karyotyping on patients with a fetal abnormality or a suspected fetal abnormality following detailed scan, inc 7 Twin pregnancies. The chromosome abnormalities detected and pregnancy outcome are detailed in table 10.

Abnormality	Number	Outcome
46,XX,inv(10)(q22q23)pat	1	LB
46XX,del(6)(q25.1)dn	1	TOP
47XXX	1	LB
Balanced Inversion	1	TOP
22q microdeletion	2	TOP x 2
Pallister Killan	1	NND
Beckwith Wiedeman	1	TOP
Rearrangement of Chromosome 9	1	LB
T1 - NK, T2 - Unbalanced Translocation	1	Top of Twin 2 -LB of Twin 1

T13	4	TOP x 4
T18	4	TOP x 3, NND x 1
T21	7	TOP x 6, LB x 1
TRIPLOIDY	1	TOP
Monosomy X	1	IUD - 17WEEKS
Twin 1 - Unbalanced Translocation. Twin 2 - Balanced Translocation	1	TOP of Twin 1
Unbalanced Translocation	1	LB

Table 10. Chromosome abnormalities detected on amniocentesis for fetal abnormality

11.3 Outcomes after amniocentesis

Outcome	Amnio for Fetal abnormality	Amnio for screening	Amnio for CG/Mat age/ Other	Total births from Amnio
LB	74	107	17	198
TOP	32	10	3	44
Misc	1	2	1	4
SB/IUD/NND	12	3	0	15
Unknown (not del)	2	12	1	15

Table 11. Pregnancy outcome after amniocentesis for fetal karyotyping

Of the four miscarriages none occurred within 14 days of the procedure. Two occurred 6-7 weeks after the Amniocentesis. The remaining two miscarriages were following Amniocentesis for Screening; both miscarriages occurred 2-3 weeks following the procedure. The total fetal loss rate (associated with the amniocentesis) was 1.4%.

11.4 Amniocentesis for Maternal age

A total of 8 amniocentesis were performed for maternal age. Two were outside referrals and six were Birmingham Women's Hospital patients. The ages ranged between 35 and 43 years. All had been appropriately counselled with regard to the risks.

12. Fetal Blood Sampling: *Bill Martin*

A total of 34 fetal blood samples were performed in 2011 to 2012. Twelve of these were in association with late termination of pregnancy. Twelve were performed for the investigation of structural anomalies identified on ultrasound after 20 weeks. A total of 10 were performed for hydrops and/or rhesus disease. Of these, 7 had rhesus disease and 3 parvovirus infection.

In 12 the sample was intracardiac, in 14 from the fetal intrahepatic vein and in 8 from the umbilical cord (cordocentesis).

The karyotype was normal in 24, abnormal in 8, 2 patients declined.

The outcomes were that 15 underwent termination of pregnancy for severe fetal anomaly; 3 were neonatal deaths; there was 1 stillbirth and 14+ live births. One remains undelivered.

The indications for fetal blood samples compared with previous years are shown in Figure 8.

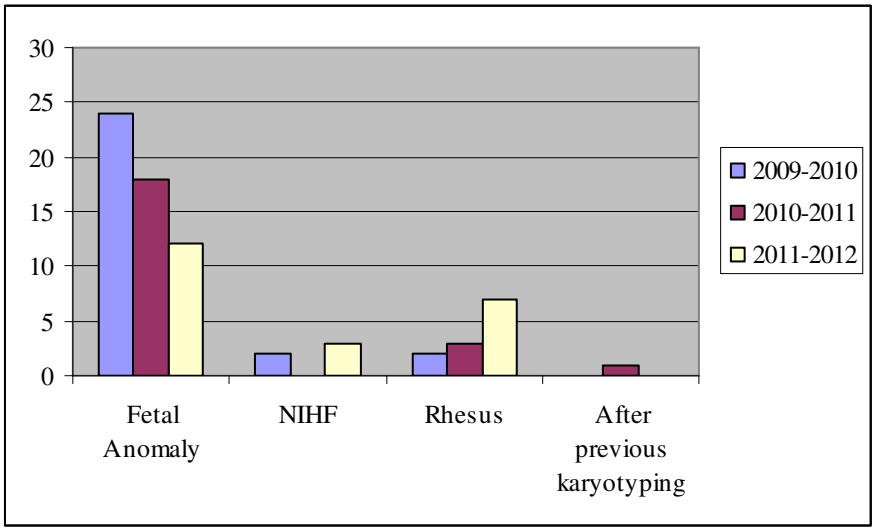

Figure 8. Indication for fetal blood sample 2009-2012

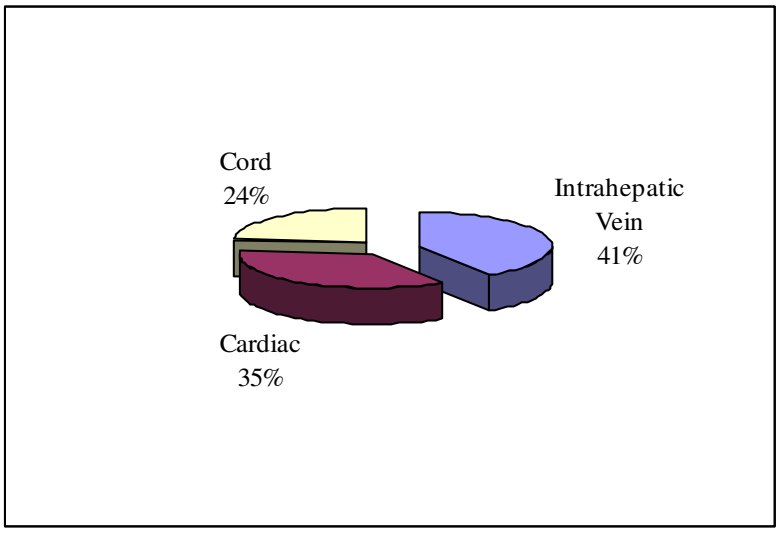

Figure 9. Site of Sampling 2011-2012

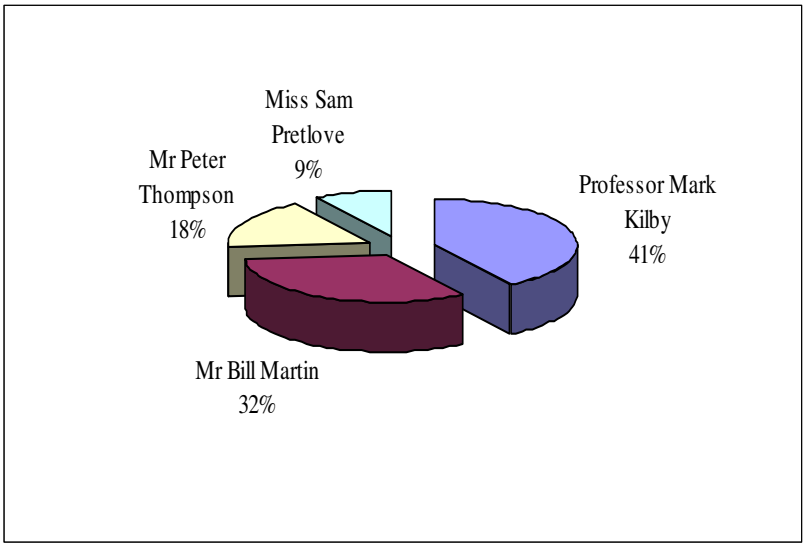

Figure 10. Fetal Blood Sampling by Operator 2011-2012

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

Between April 2011 and March 2012 there were 37 in-utero transfusions performed on thirteen† pregnancies with fetal anaemia (secondary to maternal alloimmunisation) (†additional transfusion for FAIT discussed separately). This is a significant increase from last year.

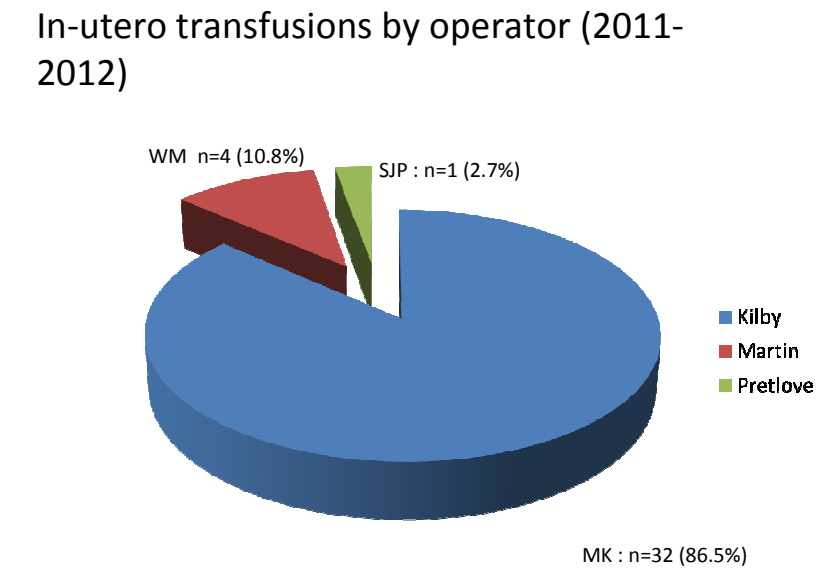

Figure 11.

Number of in-utero transfusions performed between 2004 - 2012

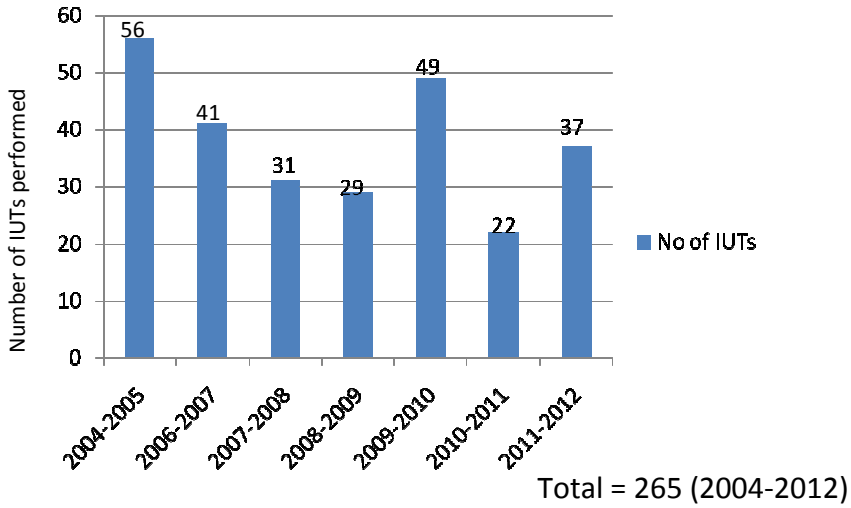

Figure 12.

Of these 7/13 (53.8%) of pregnancies had red cell alloimmunisation complicated by Anti-D antibodies (none had anti-Kell) and 5/13 (38.5%) had transplacental infection with maternal human parvovirus B19 infection. In addition, there was an IUT for severe FAIT and the baby presented with ultrasound appearances of ICH and platelet count on fetal blood sampling of $70X10^9$/L†. In 38.5% (100% of parvovirus pregnancies) the babies were hydropic at the first ultrasound examination.

Indications for in-utero transfusion

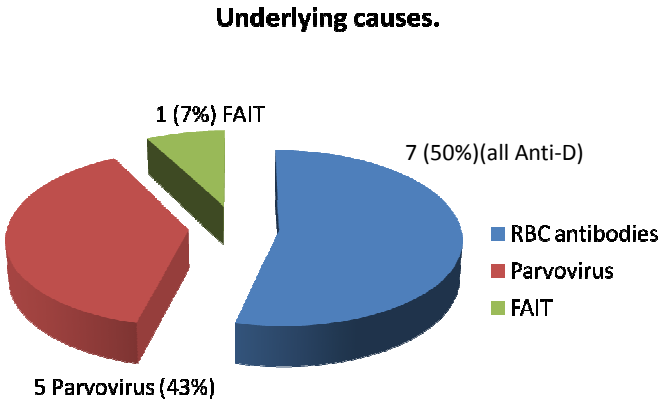

Figure 13.

The gestational age (GA, median) at first transfusion was 24 weeks (95%CI 21.2 – 26.7). A total of thirty seven in-utero transfusions were performed (thirty one (83.8%) were intravascular and six (16.2%) were intraperitoneal (IPT), performed prior to 20 weeks. All these patients had adjuvant IVIG (1g/Kg/wk) until intravascular transfusions were initiated (range of doses 2- 4).

Of the intravascular transfusions, 45.9% (n=17) were performed via the intrahepatic vein and 37.8% (n=14) were performed after cordocentesis. The median fetal haemoglobin (excluded the babies who had IPT prior to 20 weeks) prior to transfusion was 8.5g% (95%CI 7.2 – 9.7) (all below 5th centile for GA). All babies were live born at median GA of 33.5 weeks (95%CI 32.4 – 34.9).

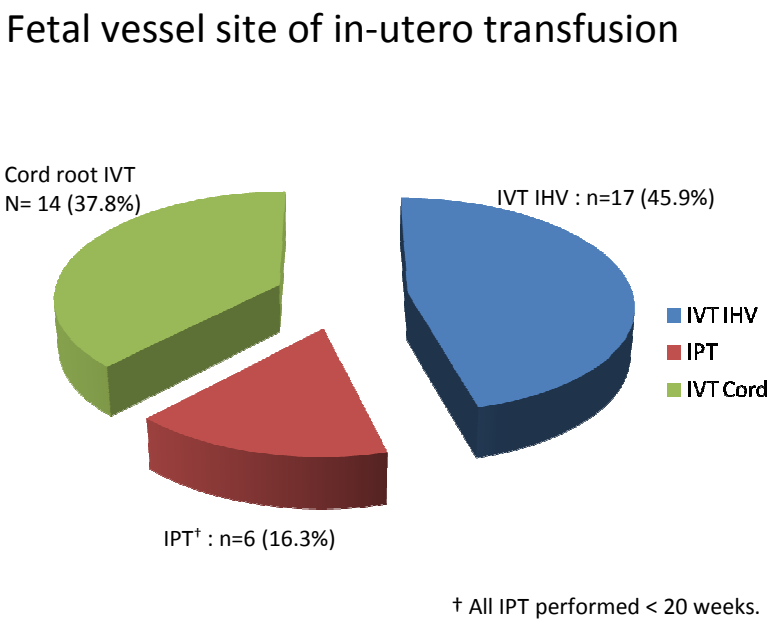

Figure 14.

In two cases, who had a past history of hydrops and IUD prior to 20 weeks (in a previous pregnancy) maternal IVIG therapy and intraperitoneal transfusions were commenced at 16-18 weeks.

In addition, there was a case of NAIT† that had a platelet transfusion intravascularly at 24weeks (and commenced IVIG infusion 1g/Kg weekly from diagnosis with massive intracranial haemorrhage. The fetal platelet count was $70x10^9$/L. Parents did not consent for further IUT or treatment and the baby was delivered by caesarean section at 38 weeks.

Thus, overall 37 transfusions were performed in thirteen pregnancies, all with live-births. In one there was an emergency caesarean section at 28 weeks due to a presumed 'cord accident'. This is an increase over previous years (and reflects pandemic of human parvovirus infection). It is interesting that all alloimmunised mothers had anti-D antibodies (not an increasing proportion of anti-Kell as noted last year).

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

Between 1st April 2011 and 31st March 2012, there were 39 pregnancies with TTTS considered for fetoscopic laser coagulation; all were monochorionic (MC) twins. Five MC twins had stage II disease (12.7%), 31 pregnancies had Quintero Stage III (79.5%) and 3 pregnancies stage IV (7.8%). These women whose pregnancies were complicated by severe TTTS (presentation at <26 weeks) were all offered and accepted fetoscopic laser ablation (FLA).

The principle operators were MK in 27/39 (69%) and WM in 12/39 (31 %). Another consultant (SP) is presently being trained.

In 49% of pregnancies a selective technique was utilised (as cases were involved in randomization to the Solomon Trial). A median of six AVA were coagulated using a Diode laser (range 4 - 10 AVA) and amniodrainage post-procedure to a maximum pool depth of 6cms.

The median gestational age at presentation and operation was weeks 19 (95% CI 18.7 – 19.4 wks). Of the pregnancies complicated by double fetal loss; this complication occurred at a range of between 1-6 weeks post-FLA. Most of these were miscarriages (4/5 [80%]) were associated with bleeding and/or PPROM (rather than immediate double IUD). In one case there was amniorrhexis with 24 hours of the procedure and the parents opted for termination of pregnancy.

Following examination of the cohort in total (2011-2012), the overall fetal survival post-FLA 66.6% (52/78 fetuses). Of these, there were single survivors in 41% of pregnancies (16/39). In 46.1 % (18/39) of pregnancies there were two survivors and in 12.9% of pregnancies there was a double pregnancy loss (5/39). However, if the voluntary TOP is removed from the figures the 'double IUD' rate is 10.5%.

Thus, in 87.2% of pregnancies there was at least one survivor. The median prolongation of pregnancy in weeks was 15 weeks (95%CI 11.1 – 16.2wks.) The median gestation of delivery (of pregnancies with at least one survivor) was 33 wks (95% CI 31.8 – 33.1 wks). This was with a policy of 'elective delivery' between 34 - 36 weeks, usually by caesarean section.

One pregnancy was delivered at 29 weeks at an external centre with two survivors. There was a significant discordancy in fetal haemoglobin concentration (>5g%) and therefore the diagnosis of TAPS (twin anaemia-polycythemia) was made. In another case, again with double survivors, the babies were born prematurely and the recipient's arm demonstrated evidence of chronic hypo-perfusion/ischaemia and was amputated in the neonatal period. This is a rare but reported complication of TTTS.

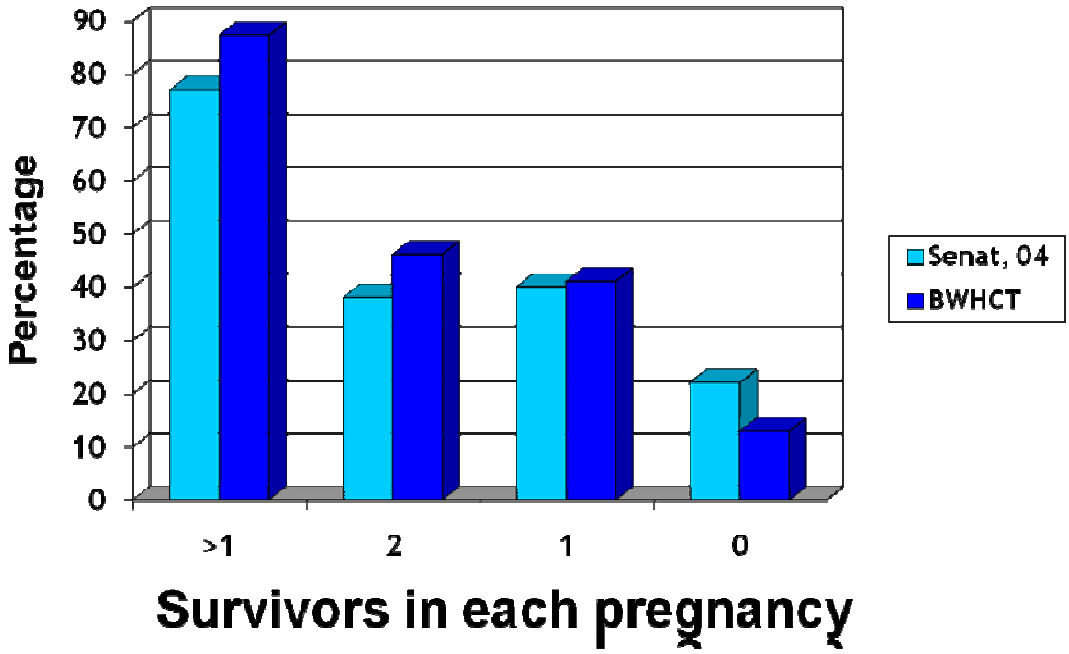

Figure 15.

These data indicate that outcomes in this single centre cohort are similar to internationally published data (and those published previously by our group)(BJOG. 2010;117(11):1350-7. doi: 10.1111/j.1471-0528.2010.02680.x).

14.1 Radio-interstitial thermal ablation (2011-2012) *M Kilby*

This was performed in fourteen monochorionic, diamniotic twin pregnancies. There was thus only the possibility of singleton survivors. In two patients there was associated miscarriage of the 'normal twin' (fetal loss rate of 14%). The indications for RITA are shown in Figure.

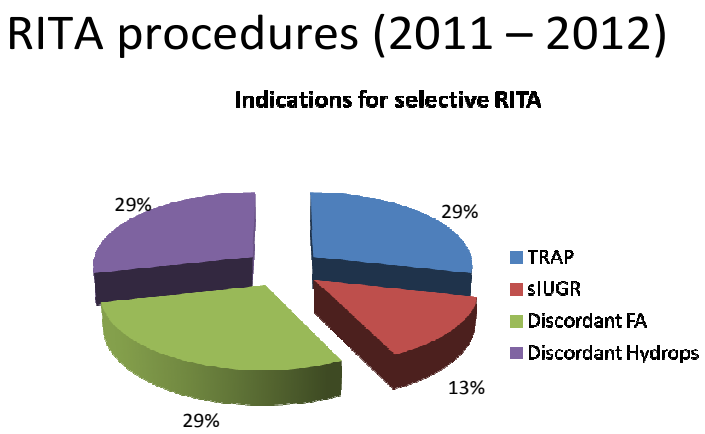

Figure 16.

The maternal age (median 30 years : 95%CI 26 – 32.7 years) of women in twin pregnancies was years. The gestational age that RITA was performed was 17 weeks (95%CI 16.1 – 19.2 wks). The gestational age of delivery was 33.5 weeks (95%CI 30.8 – 36 wks), with 3 (25%) delivering prior to 32 weeks. The live-birth rate was 86%. The breakdown by operator performing the procedure is shown in Figure 17.

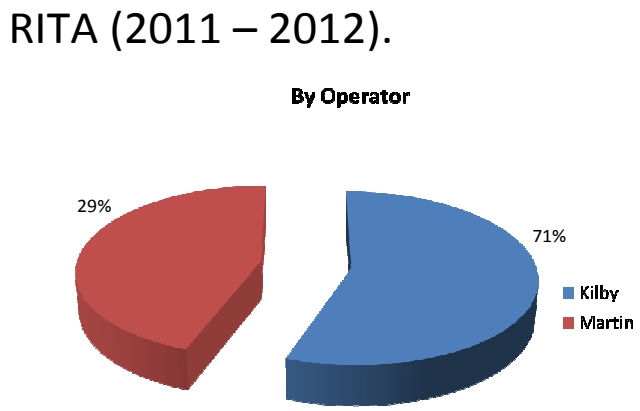

Figure 17.

15. Other invasive fetal therapy

During the course of 2011-2012 there were 9 procedures performed on 8 patients all from within the West Midlands area.

Two fetal drainages were performed; one was due to severe hydrocephalus and the other was due to hydrops fetalis and bilateral pleural effusions.

There was 1 fetal shunt inserted on a fetus that was diagnosed with congenital bladder neck obstruction.

There were 7 amniodrainages performed for polyhydramnious. One woman had polyhydramnious secondary to Diaphragmatic Hernia and Pallister Killian Syndrome. Two anmiodrainages were performed on 1 patient who had growth discrepancy in MCDA twins. One woman had TTTS, thus an amniodrainage was performed during Laser Therapy. The other woman had a fetus with oesophageal atresia and polyhydramnious and the final drainage was performed on a patient with unexplained polyhydramnios.

16. Pre-pregnancy Counseling / Pregnancy Loss Clinic (PPCC)

Ruth Kirchmeier

Within the Fetal Medicine Department, the PPCC continues to provide a regional service for couples who have experienced 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 individualised plan of care, treatment and support for a subsequent pregnancy.
- To provide support and counseling following pregnancy loss and in any subsequent pregnancy.
- To provide pre-pregnancy counseling for women with maternal disease.

Midwifery input and bereavement support are provided by the team of specialist midwives in Fetal Medicine, Ruth Kirchmeier, Gill Jongman, Brenda Bolger, Nia Carnevale, Jane Meredith and Sarah Bourne. Invaluable to the smooth running of the clinic, secretarial support is provided by Vicki Morrison-Thomas.

There were 1221 attendances to the Pre-Pregnancy counseling / pregnancy loss clinic in 2011-2012. This is made up of new and follow up patients. PCT breakdown is shown in Appendix 7.

Figure 18 demonstrates the distribution of referral according to their source, for women coming for an appointment with the Consultants and the Specialist Midwives.

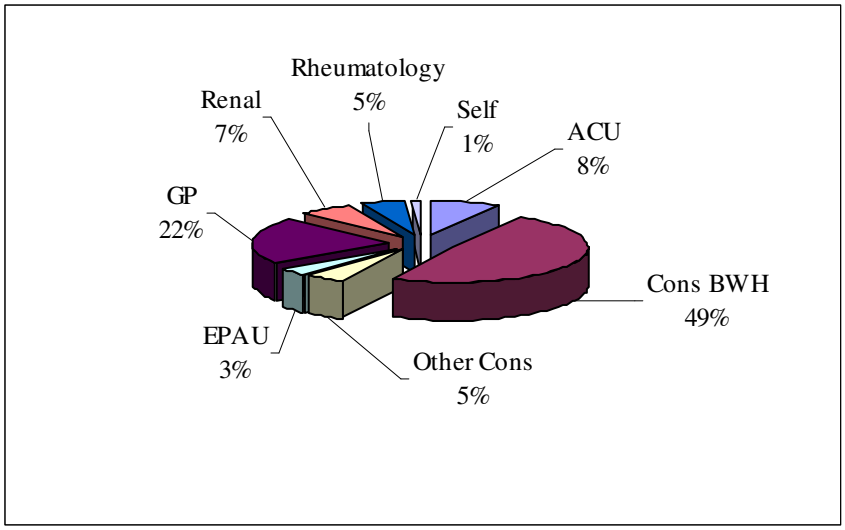

Figure 18. Referral by source 2011-2012

The reasons for referral fall into 3 main categories:

- Pregnancy loss
- Fetal anomaly
- Maternal disease

However due to the complex nature of the work which is carried out within the PPCC department, it is difficult to accurately give precise figures and categorize patients into referral reasons as many of these patients fall into several categories.

Pregnancy Loss
Women who experience recurrent first trimester miscarriages are comprehensively investigated in the clinic according to the RCOG Guidelines. If all the tests are normal, this service is midwifery led and support and reassurance scans will be offered in future pregnancies.

All women booked under the Fetal Medicine Team who experiences a second trimester pregnancy loss, stillbirth or neonatal death will be followed up in monthly clinics carried out by the Fetal Medicine Consultants and the Lead Specialist Midwife, these clinics are shown in appendix 1.

Women who have experienced unexplained fetal loss will have a preliminary appointment with the midwives to carry out appropriate pregnancy loss investigations prior to their review appointment with the consultant.
Support, reassurance scans and counseling will be offered in subsequent pregnancies.

Fetal Anomaly
All women booked under the Fetal Medicine Team who terminate a pregnancy or whose baby's die following birth due to fetal anomaly, will be offered follow up in one of the consultant clinics. In addition a number of women booked elsewhere who have been seen for diagnosis in the Fetal Medicine Department and who opt for a post mortem after termination of pregnancy will be offered follow up in one of the Fetal Medicine consultant clinics.

If it is a complex anomaly where a possible genetic reason is suspected they will be seen in the combined Genetic/ Fetal Medicine Loss Clinic held once a month by Professor Mark Kilby and Consultant Geneticist Dr Denise Williams. There were 13 patients seen within this clinic during April 2011 to March 2012.

Maternal disease:

- **SLE/Rheumatological/Immunological disease**

Once a month Professor in Rheumatology Dr Caroline Gordon and Consultant Obstetrician Dr Tracey Johnson carry out a combined Rheumatology/Obstetric clinic to provide pre-pregnancy counseling for women with pre-existing rheumatological or immunological disease who are planning future pregnancies.

- **Renal disease**

Once a month Consultant Renal Physicians Dr Graham Lipkin and Dr Clara Day and Consultant Obstetricians Dr Tracey Johnson and Dr Ellen Knox carry out a combined Renal/ Obstetric clinic to provide pre-pregnancy counseling for women with pre-existing renal disease who are planning future pregnancies.

- **Haematological disease**

Once a month Consultant Haematologist Dr Will Lester provides pre-pregnancy counseling for women with pre-existing haematological disease, who are planning future pregnancies. Many of these women will need to commence clexane thromboprophylaxis as soon as they know they are pregnant and can contact PPCC specialist midwives directly to coordinate this.
In addition when required, Dr Lester has joint appointments with the obstetricians to provide haematology advice in making a plan of care for future pregnancies.

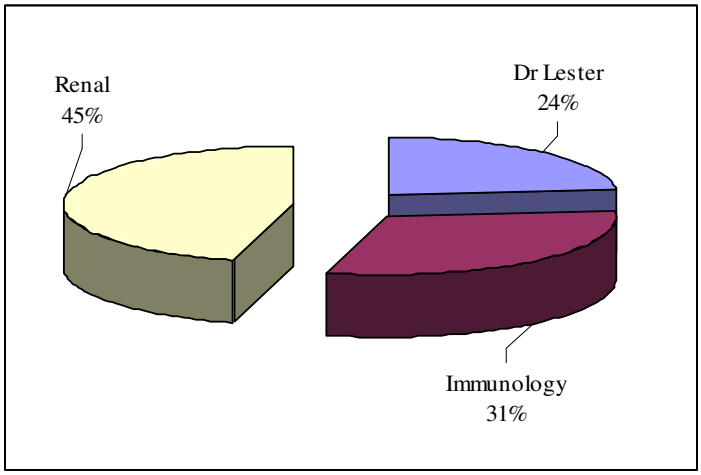

Figure 19. Number of patients seen in each Specialist Clinic – 2011-2012

For all of these clinics an initial work up is carried out by the PPCC specialist midwives to ensure that all relevant investigations are carried out and are up to date.

The subsequent review with the consultants addresses the following issues:

- Is there current active disease and if so what would the risks of embarking on a pregnancy be, both for the mother and baby?
- If disease currently stable is medication suitable for pregnancy?
- If not, appropriate alternative medication is discussed and the importance of allowing time to assess whether remaining stable on these drugs is stressed.
- General pre-pregnancy lifestyle advice.

As the importance of pre-pregnancy counseling for women with complex medical conditions is recognised, the numbers being referred from the regional renal and rheumatology clinics has steadily risen

Previous PET
In collaboration with AEPC, the PPCC is the designated regional centre for the investigation of women who have experienced severe pre-eclampsia in previous pregnancy.

16.1 Miscarriage Support Group

A Miscarriage Support Group in conjunction with the Miscarriage Association continues to be held on a monthly basis at Birmingham 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.

17. Conclusion: *M Kilby*

This is a comprehensive report that baselines by a summary the multidisplinary work taking place in the Fetal Medicine centre at the Birmingham Women's Foundation Trust. There is an outline of annual activity (2011-12) and the report documents the funding arrangements and activity by PCT. There is much to be proud of when evaluating this service within the Foundation Trust, but there are also many opportunities and potential changes which need to be considered in strategic planning.

The report is a testament to multidisplinary working and we acknowledge the contribution of all the healthcare professional teams that work with us as well as those who refer patients for our opinions.

1st September 2012

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.

Appendix 1.
Academic Staff

- Professor Mark 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 Sam Pretlove – Consultant in Fetal Medicine

Obstetric Radiology Staff

- Dr Josephine McHugo – Consultant Obstetric Radiologist

Sub Specialty Trainees

- Dr Tara Selman – SST
- Dr Katie Morris – SST/Clinical lecturer
- Dr Cesar Mellor – SST
- Dr Noel Shek – SST
- Dr Sophia Yang - SST

Midwifery/ Sonographer Staff

- Veronica Donovan – Clinical Midwife Manager / Sonographer
- Helen Baker – Specialist Midwife / Sonographer
- Ruth Kirchmeier – Specialist Midwife
- Nia Carnevale – Midwife
- Gill Jongman – Midwife
- Brenda Bolger – Midwife
- Jane Meredith – Midwife
- Sarah Bourne – Midwife
- Marguerite Usher-Somers – Specialist Sonographer
- Jill Agnew – Specialist Sonographer
- Sandra Hopkins – Midwifery Assistant
- Frances Rich – Midwifery Assistant / Clerk

Administrative Staff

- Nick Reading – General Manager, Maternity
- Samantha Mostyn – Administrator
- Emma Prentice – Clinic Secretary / Audit

- Alison Hill – PA and secretary to Prof Kilby & Dr Johnston
- Elaine Smith – PA and Secretary to Mr Martin, Mr Thompson and Dr Pretlove
- Vicki Morrison-Thomas – Pre-pregnancy clerk
- Debbie Caughtry(locate) – Clinical assistant

Appendix 2.

Consultants supporting the Pre Pregnancy Counselling / Pregnancy Loss Clinic

- Mr Bill Martin carries out a monthly Pre-Pregnancy Counselling/ Pregnancy Loss Clinic.
- Mrs Tracey Johnston carries out a monthly Pre-pregnancy Counselling/ Pregnancy Loss Clinic and in addition is the lead Consultant Obstetrician for the regional Immunology and Renal clinics.
- Professor Mark Kilby carries out a monthly combined Genetic/Pregnancy Loss Clinic.
- Mr Peter Thompson is the lead Consultant Obstetrician for the regional adult cardiology clinic.
- Dr Sam Pretlove carries out a monthly Pre-Pregnancy Counselling/ Pregnancy Loss Clinic.
- Dr Ellen Knox carries out a monthly Pre Pregnancy Counselling/ Pregnancy Loss Clinic and in addition covers the immunology and renal clinic and is also the lead in the multiple pregnancy clinics.
- Dr Will Lester carries out a sporadic Pre Pregnancy Counselling /Pregnancy Loss Clinic and in addition is the lead in Haematology

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)
- Dr Caroline Gordon (Consultant Rheumatologist)

Appendix 3.

Exam desc	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
Amnio drainage	1	0	1	0	0	0	0	0	1	0	2	1	6
Amniocentesis	22	20	21	29	24	30	28	16	25	31	16	30	292
Ascites Scan	0	0	0	0	0	0	0	0	0	0	0	0	0
Cervix assessment	0	3	5	0	2	2	1	2	2	2	0	0	19
Chorionic villus sampling	14	18	23	21	25	10	16	21	18	13	10	21	210
Consultant 1st Trimester	1	3	0	0	0	1	0	1	0	0	0	0	6
Consultant Fetal Cardiac	38	40	51	43	42	57	37	50	54	42	51	54	559
Dating scan	3	4	3	0	1	0	2	2	3	5	0	3	26
Detailed 1st Trimester	3	9	4	7	20	17	20	8	22	12	9	20	151
Detailed Rhesus scan	8	10	12	13	23	17	16	25	19	20	24	11	198
Detailed scan	297	328	364	331	352	356	302	310	322	375	341	358	4036
Ductus Venosus Doppler	2	0	3	3	4	2	12	3	7	7	2	2	47
Early Pregnancy Scan	1	1	1	1	0	0	0	1	0	1	0	1	7
Fetal blood sample	2	6	3	3	3	1	4	4	0	3	5	1	35
Fetal blood transfusion	0	2	2	2	8	4	0	1	4	5	5	3	36
Fetal drainage	0	0	0	0	0	0	0	1	0	1	0	0	2
Fetal heart rate	0	1	0	0	0	0	0	0	0	1	1	1	4
Fetal shunt	0	1	0	0	0	0	0	0	0	0	0	0	1
RITA	2	4	1	1	0	0	2	0	1	2	0	1	14
Fetocide	2	2	2	4	3	2	5	3	0	2	5	2	32
Fetoscopy	2	3	6	6	3	3	2	1	4	5	1	3	39
Growth scan	12	1	10	1	1	8	12	15	9	5	7	6	87
Liquor volume	2	3	3	0	5	2	1	2	5	6	2	2	33
MCA doppler	8	7	8	5	5	5	6	7	8	8	3	7	77
Nuchal translucency scan	5	6	7	6	6	9	9	3	5	4	2	4	66
Placenta Site	1	2	0	0	0	0	2	1	0	2	3	0	11
Radiographer 1st Trimester	5	4	6	4	1	3	6	0	6	1	2	1	39
Radiographer fetal cardiac	69	65	73	88	86	82	67	58	60	70	78	77	873
Raised AFP detailed scan	1	0	0	2	1	1	0	1	0	0	0	1	7
Selective reduction	2	0	0	1	1	0	1	0	2	1	0	1	9
Umbilical artery doppler	12	12	12	9	11	5	16	11	11	11	5	9	124
Uterine artery doppler	1	3	2	0	0	1	2	0	2	1	0	0	12
Viability scan post procedure	1	3	3	3	5	2	1	0	3	4	1	4	30
Viability scan	12	10	6	4	5	7	6	7	4	10	7	7	85
	529	571	632	587	637	627	576	554	597	650	582	631	7173

Table 1. Fetal Medicine Procedures by month – 2011-2012

Appendix 4.

West Mids

Region	PURCHASER	Organisation Name	Count
West Mids	5PG	BIRMINGHAM EAST AND NORTH PCT	320
West Mids	5MD	COVENTRY TEACHING PCT	228
West Mids	5PE	DUDLEY PCT	578
West Mids	5MX	HEART OF BIRMINGHAM TEACHING PCT	679
West Mids	5CN	HEREFORDSHIRE PCT	202
West Mids	5PH	NORTH STAFFORDSHIRE PCT	36
West Mids	5PF	SANDWELL PCT	524
West Mids	5M2	SHROPSHIRE COUNTY PCT	46
West Mids	5QW	SOLIHULL PCT	188
West Mids	5M1	SOUTH BIRMINGHAM PCT	1397
West Mids	5PK	SOUTH STAFFORDSHIRE PCT	723
West Mids	5PJ	STOKE ON TRENT PCT	67
West Mids	5MK	TELFORD AND WREKIN PCT	18
West Mids	5M3	WALSALL TEACHING PCT	281
West Mids	5PM	WARWICKSHIRE PCT	555
West Mids	5MV	WOLVERHAMPTON CITY PCT	135
West Mids	5PL	WORCESTERSHIRE PCT	605
			6582

OATS

Region	PURCHASER	Organisation Name	Count
OATS	7A3	ABERTAWE BRO MORGANNWG UNIVERSITY LHB	4
OATS	7A6	ANEURIN BEVAN LHB	12
OATS	5HG	ASHTON, LEIGH AND WIGAN PCT	8
OATS	5QG	BERKSHIRE EAST PCT	1
OATS	5QF	BERKSHIRE WEST PCT	1
OATS	7A1	BETSI CADWALADR UNIVERSITY LHB	4
OATS	TAP	BLACKBURN WITH DARWEN TEACHING CARE TRUST PLUS	15
OATS	5HP	BLACKPOOL PCT	13
OATS	5QN	BOURNEMOUTH AND POOLE TEACHING PCT	1
OATS	5NY	BRADFORD AND AIREDALE TEACHING PCT	8
OATS	5JX	BURY PCT	7
OATS	5PP	CAMBRIDGESHIRE PCT	7
OATS	7A4	CARDIFF & VALE UNIVERSITY LHB	11
OATS	5K9	CROYDON PCT	1
OATS	5NE	CUMBRIA TEACHING PCT	5
OATS	5N7	DERBY CITY PCT	31

OATS	5N6	DERBYSHIRE COUNTY PCT	101
OATS	5QQ	DEVON PCT	1
OATS	5QH	GLOUCESTERSHIRE PCT	8
OATS	5NQ	HEYWOOD, MIDDLETON AND ROCHDALE PCT	3
OATS	5N2	KIRKLEES PCT	4
OATS	5N1	LEEDS PCT	5
OATS	5PC	LEICESTER CITY PCT	20
OATS	5PA	LEICESTERSHIRE COUNTY AND RUTLAND PCT	110
OATS	5N9	LINCOLNSHIRE TEACHING PCT	9
OATS	5NT	MANCHESTER PCT	6
OATS	5CQ	MILTON KEYNES PCT	10
OATS	5C5	NEWHAM PCT	4
OATS	5PQ	NORFOLK PCT	1
OATS	5PW	NORTH EAST ESSEX PCT	2
OATS	5EF	NORTH LINCOLNSHIRE PCT	5
OATS	5NV	NORTH YORKSHIRE AND YORK PCT	4
OATS	5PD	NORTHAMPTONSHIRE TEACHING PCT	7
OATS	5EM	NOTTINGHAM CITY PCT	5
OATS	5N8	NOTTINGHAMSHIRE COUNTY TEACHING PCT	35
OATS	5J5	OLDHAM PCT	3
OATS	5QE	OXFORDSHIRE PCT	4
OATS	7A7	POWYS TEACHING LHB	25
OATS	5F7	STOCKPORT PCT	7
OATS	5C4	TOWER HAMLETS PCT	2
OATS	5NR	TRAFFORD PCT	1
OATS	5NN	WESTERN CHESHIRE PCT	5
OATS	5QK	WILTSHIRE PCT	4
OATS	Other	Other	71
			591

Table 2. Fetal Medicine Activity by PCT – 2011-2012

Appendix 5.
Fetal Anomalies detected on ultrasound scans:

Fetal abnormality	**2011-2012**	
	BWH	**Regional**
RENAL		
Renal	21	56
CARDIAC*		
Cardiac	6	19
ABDOMINAL		
Gastroschisis	3	15
Diaphragmatic Hernia	7	13
Exomphalos	4	13
Ovarian Cyst	1	1
Other Abdomen	1	6
RESPIRATORY		
Cystic Lung Lesion	1	6
Other Respiratory	2	5
SKELETAL		
skeletal	6	6
LIMB	2	8
Talipes	11	16
Other Limb	2	2
HEAD AND NECK		
Cystic Hygroma	4	18
Other Head and Neck	0	0
Facial	2	16
Nuchal oedema / thickness	17	64
HYDROPS (and pleural eff / ascites)		
Hydrops (and pleural eff / ascites)	7	12
GASTROINTESTINAL		
Gastrointestinal (inc hyperechogenic bowel)	12	24
CNS		
Anencephaly	3	9
Spina Bifida and / or Hydrocephalus	6	7
Encephalocele	2	2
Microcephaly	0	0
Holoprosencephaly	1	4
Dandy Walker Cyst	1	5
Agenesis of corpus callosum	2	6
CPC	0	1
Ventriculamegaly	14	34
other CNS	7	10
TWIN COMPLICATIONS NOT TTTS		
Twin complications not TTTS	3	27
SACROCCYGEAL TERATOMA		
Sacroccygeal teratoma	0	1
OTHER - Miscellaneous		11

Table 2. Anomalies picked up from ultrasound scans 2011-2012
*(Cardiac plus additional structural anomaly)

Appendix 6.

Echo Diagnosis	Total
Common AV valve	1
Coronary sinus TAPVD	1
HLHS	1
VSD	2
Right sided aortic arch	1
Absent right pulmonary artery	1
Aneurysmal atrial septum	1
Aortic stenosis	4
Arrhythmia	5
Atrial communication	1
Atrioventricular and ventriculo-arterial discordance (Corrected transposition)	1
AVSD	1
AVSD TGA DORV	1
Balanced complete AVSD in trisomy 21	1
Biventricular hypertrophy	1
Biventricular hypertrophy PA <Ao	2
Cardiomegaly and mild Right ventricular hypertrophy	1
CCTGA, mild sub PS, hypoplastic MRV, VSD	1
Coarctation	5
Coarctation of the aorta, VSD	1
Common arterial trunk	3
Common atrioventricular junction	4
Complete AVSD	2
Complete AVSD, Left atrial isomerism	1
Complex TGA, VSD, Smallish RV and ?LAI	1
Dextrocardia, AVSD with ventricular imbalance, anterior aorta, probable pulmonary atresia	1
DORV, TGA	1
Double inlet ventricle, TGA	1
Double outlet right ventricle, VSD, Coarctation of the aorta	1
Dysplastic mitral valve and Sub AS (?Shone's syndrome)	1
Dysplastic pulmonary valve with mild PS	1
Dysplastic tricuspid valve	1
Dysplastic tricuspid valve with severe regurgitation	1
Fetal dysrhythmias in twin 1	1
Hypoplastic arch, univentricular heart	1
Hypoplastic left heart syndrome (mitral and aortic atresia or severe stenosis)	14
Hypoplastic left heart syndrome (mitral and aortic atresia or severe stenosis), plus additional anomalies	5
Hypoplastic Right Heart	1
Inlet to outlet VSD, ventricular disproportion, aortic override.	1
Interrupted aortic arch	1
Interrupted aortic arch, VSD	1
Isolated dextrocardia	1
mild arterial disproportion	2
Mild right heart dominance	1
Mild septal hypertrophy	1
Mild tricuspid regurgitation, pericardial effusion	1
Mild ventricular disproportion	3
Mitral atresia, VSD, DORV small LV.	1
Muscular VSD, ventricular imbalance R>L, LVOT smaller than right, arch not clearly seen	1
Normal	174
Other:	1
Pericardial effusion	3
Pericardial effusion, ventricular disproportion, RVH	1
possible common arterial trunk	1
Possible muscular inlet VSD	1
post valve aneurysmal change in pulmonary artery	1
ASD with hypoplastic LV and single outlet heart.	1
probable 2:1 heart block	1
Probable coarctation of the aorta	1
Probable LSVC to Coronary sinus	1

Pulmonary atresia	1
Pulmonary atresia plus additional cardiac anomalies	4
Pulmonary stenosis	1
RA and SVC dilatation	1
Right atrial dilatation	1
Right heart dilatation	1
Right ventricle>left ventricle (disproportion)	3
Right ventricle>left ventricle (disproportion) plus additional cardiac anomalies	5
Significant ventricular disproportion	1
Suspected cardiac defect	1
Tetralogy of Fallot	1
Tetralogy of Fallot plus additional cardiac anomalies	2
TGA	5
Transposition of the great arteries plus additional cardiac anomalies	2
Tricuspid atresia	1
Tricuspid atresia plus additional cardiac anomalies	2
Tricuspid dysplasia	1
truncus arteriosus	1
twin 1 right aortic arch	1
Twin 2 VSD with ventricular disproportion	1
Twin II: probable univentricular heart with pericardial effusion	1
Unbalanced AVSD	2
Univentricular AV connection	1
Univentricular AV connection. Hypoplastic right heart. Probable pulmonary atresia	1
Univentricular heart	2
Univentricular heart plus additional cardiac anomalies	3
Ventricular disproportion? Coarctation	1
Ventricular disproportion RV > LV	1
Ventricular disproportion, borderline LV, sub aortic tunnel, arch hypoplasia	1
Ventricular septal defect	12
Ventricular septal defect plus additional cardiac anomalies	9
very mild ventricular disproportion	1
VSD with aortic override	1

Table 4. Cardiac anomalies detected in Fetal Medicine 2011-2012

Appendix 7

Date	PCT	PCT NAME	Count
Apr-11	5PG	BIRMINGHAM EAST AND NORTH PCT	104
Sep-11	5MD	COVENTRY TEACHING PCT	3
Apr-11	5PE	DUDLEY PCT	61
Apr-11	5MX	HEART OF BIRMINGHAM TEACHING PCT	173
Apr-11	5CN	HEREFORDSHIRE PCT	1
Apr-11	5PF	SANDWELL PCT	147
Aug-11	5M2	SHROPSHIRE COUNTY PCT	4
Apr-11	5QW	SOLIHULL PCT	41
Apr-11	5M1	SOUTH BIRMINGHAM PCT	426
Apr-11	5PK	SOUTH STAFFORDSHIRE PCT	33
Aug-11	5PJ	STOKE ON TRENT PCT	1
Jun-11	5M3	WALSALL TEACHING PCT	23
Apr-11	5PM	WARWICKSHIRE PCT	19
Apr-11	5MV	WOLVERHAMPTON CITY PCT	9
Apr-11	5PL	WORCESTERSHIRE PCT	76

Table 5. PPCC data by WM PCT 2011-2012

Date	PCT	PCT NAME	Count
Feb-12	5N6	DERBYSHIRE COUNTY PCT	3
Sep-11	5K8	ISLINGTON PCT	2
Sep-11	5PA	LEICESTERSHIRE COUNTY AND RUTLAND PCT	1
Mar-12	5EF	NORTH LINCOLNSHIRE PCT	1
Jul-11	5N8	NOTTINGHAMSHIRE COUNTY TEACHING PCT	2
Jul-11	5F5	SALFORD PCT	1
Sep-11	5A3	SOUTH GLOUCESTERSHIRE PCT	2

Table 6. PPCC data by out of area PCT 2011-2012