

(range 10–33 days, mean 19 days, $p > 0.05$). The rate at which the side-lying group achieved three, four or five feeds per day was, however, more rapid than the rate seen in the semi-upright group.

Side-lying was well accepted by both parents and nursing staff. This pilot study will inform the design of further necessary research to examine the potential benefits of this approach to an important and common problem.

PN.02 A DEVELOPMENT IN SCOTTISH QUALIFICATION AND CREDIT FRAMEWORK LEVEL 10 NEONATAL NURSING EDUCATION IN SCOTLAND: INNOVATION AND COLLABORATION

¹C Greig, ²SL Alexander, ¹M Lobban. ¹Napier University, Edinburgh, UK; ²Glasgow Caledonian University, Glasgow, UK

Two reports recommended a structured career pathway for neonatal nurses with appropriate educational provision in Scotland.^{1,2} An identified deficit in the provision of intermediate neonatal nursing education (SCQF level 10) was addressed by the NHS Education Board for Scotland tendering a project. Napier University and Glasgow Caledonian University in conjunction with Robert Gordon University, NHS Lothian, NHS Greater Glasgow and Clyde and NHS Grampian were awarded the tender to deliver a suite of three modules.

These modules are: (1) A double integrated theory and practice module (40 level 10 credits)—Higher Level Knowledge and Skills for Neonatal Nursing. The module content focusses on the theoretical basis of specific systems, neonatal problems and conditions with opportunities to develop related practice in the neonatal intensive care setting. (2) A single module (20 level 10 credits)—Specialised Aspects of Neonatal Care, offering generic theory on subjects such as legal and ethical principles, leadership, research, working with parents and multidisciplinary team working. (3) A single module (20 level 10 credits)—Neonatal Resuscitation, Stabilisation and Transport will bring together standardised, neonatal-specific Continuing Professional Development education already available from local providers.

The ultimate aim of these modules would be to enable existing experienced neonatal nurses to achieve a Graduate Certificate in Neonatal Nursing Practice (60 level credits), which is a unique award in Scotland. These three modules are delivered across two sites at Napier University and Glasgow Caledonian University on a rotational programme.

1. **Scottish Neonatal Nurses Group (SNNG).** Report on Neonatal Nurse Staffing and Career Pathways. Unpublished. 2004.
2. **Scottish Neonatal Nurses Group (SNNG).** The Competency Framework and Core Clinical Skills for Neonatal Nurses. Unpublished. 2005.

PN.03 KANGAROO MOTHER CARE AND ITS EFFECTS ON PARENTING STRESS AND MATERNAL POSTNATAL ATTACHMENT IN CASES OF PREMATURE BIRTH

¹L Genesoni, ¹RL Curran, ³A Huertas-Ceballos, ^{1,2}MA Tallandini. ¹University College London Psychology Department, London, UK; ²University of Trieste Psychology Department, Trieste, Italy; ³Elizabeth Garrett Anderson Obstetric Hospital, UCLH, London, UK

This study investigates the impact of the kangaroo mother care (KMC) intervention for premature infants on mother–infant bonding.

Participants: 44 premature infants and their mothers were examined: 21 dyads in KMC and 23 in traditional care (TC).

Procedure: The KMC infants received daily skin-to-skin contact for a minimum of 1 h a day, for 14 days after birth. Maternal psychological data were collected twice: after delivery (time 1) and 2 weeks after the infant's discharge (time 2). Tests administered

were: Maternal Postnatal Attachment Questionnaire (MPAQ), Neonatal Perception Inventory (NPI), Parental Stress Index Short Form (PSI-SF), Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI) and Gordon-Personal Profile Inventory (GPP-I) (time 1 only).

Results: At time 1, some baseline characteristics between the intervention and the control group were significantly different with regard to gestational age at birth (more preterm in the KMC group), days in intensive care (more days in the KMC group) and mothers' BDI score (higher in the TC group). All of these were considered as covariates in the statistical analysis. At time 2, KMC mothers were less rejective (MPAQ) towards their infants ($F(1, 42) 9.56$; $p = 0.004$) and less preoccupied (NPI) in caring for their infants ($F(1, 42) 5.06$; $p = 0.031$) than TC mothers. The parenting stress level changed between times 1 and 2: TC mothers only experienced a significant increase from time 1 (mean 42.77) to time 2 (49.27) ($F(1, 22) 7.570$; $p < 0.01$).

BMFMS: Pregnancy Outcome

PPO.01 STILLBIRTHS: HAVE THINGS CHANGED OVER A DECADE?

A Tang, M Whitworth, D Roberts. *Liverpool Women's NHS Foundation Trust, Liverpool, UK*

The stillbirth rate has remained stable nationally at 5/1000 births since the 1990s. We aimed to investigate in detail the causes and associations of stillbirths in two cohorts, 10 years apart to determine whether there has been any reduction in the prevalence of potentially preventable stillbirths.

Methods: Information on stillbirths occurring in Liverpool Women's NHS Foundation Trust between 1995–7 and 2004–6 was collected from perinatal mortality reports, birth registers and an electronic database (Meditech). ReCoDe, placental histology and birthweight centiles were used to examine further the unexplained groups. Results were analyzed using Stats Direct.

Results: We investigated 269 stillbirths. Maternal age and proportion of primiparous women were similar in both cohorts. More than 50% of stillbirths in both groups are classified as unexplained by CEMACH. There is no significant change in the prevalence of fetal growth restriction babies in the unexplained groups over these years (see table).

Conclusions: Despite progression in obstetric services, there is no change in all causes of stillbirths. 41% of unexplained stillbirths may have been prevented if we identified methods to diagnose fetal growth restriction and predict which of these babies are at risk of stillbirth. This could impact on decreasing stillbirth rates in the next decade.

Abstract PPO.01

Causes of stillbirths	1995–7	2004–6	p Value
	N = 117 (%) SB rate 6.6	N = 152 (%) SB rate 6.3	
Abruption	19 (16.2)	20 (13.2)	0.2945
Fetal abnormality	21 (17.9)	34 (22.4)	0.2307
Infection	4 (3.4)	2 (1.3)	0.2285
Maternal disorder	2 (1.7)	5 (3.3)	0.3440
Other specific causes	5 (4.3)	6 (3.9)	0.5646
Unexplained <2500 g	44 (37.6)	46 (30.3)	0.1282
FGR	19 (43.2)	28 (60.9)	0.0708
Unexplained >2500 g	22 (18.8)	39 (25.7)	0.1178
FGR	7 (31.8)	7 (17.9)	0.1783

FGR, fetal growth restriction; SB, stillbirth.

PPO.02 EARLY DETECTION OF ADVERSE TRENDS IN HEALTHCARE: A PROSPECTIVE PILOT STUDY EVALUATING THE UTILITY OF THE CUSUM CHART METHOD IN MONITORING QUALITY IN MATERNITY

T Sibanda, T Draycott. *North Bristol NHS Trust, Bristol, UK*

The need for robust systems for monitoring the quality and performance of maternity services has been highlighted.¹ The Cumulative SUM (CUSUM) chart method, proved as an effective tool for the early detection of faulty systems in industry,² could play a role. We conducted a prospective pilot study evaluating the applicability and value of the CUSUM in monitoring outcomes in maternity. Rates of low Apgar scores (5 minute Apgar score <7) in term, cephalic singletons (excluding elective Caesarean sections), delivered at Southmead Hospital were monitored over a 12-month period (2006). With the reference standard set at 0.44%,³ we regarded doubling of this rate as undesirable and set 0.66% as the rate at which a signal was to be raised by the monitoring system.

Results: We detected a significant rise in the rate of low Apgar scores during August 2006. Root cause analysis identified specific training needs that were corrected by an educational intervention. Subsequent monitoring showed a return to the baseline reference rate (0.44%), which was maintained during the rest of the year. The overall rate for the whole of 2006 was eventually 0.53%.

Discussion: Prospective monitoring of clinical outcomes using the CUSUM chart method is both feasible and effective. Early detection of adverse trends provides an opportunity for prompt remedial action and hence prevention of further harm. Wider application of this tool, monitoring key outcomes and quality indicators in maternity, has the potential of leading to overall improvements in the quality and performance of maternity units.

1. **Royal Colleges.** Safer childbirth: minimum standards for service provision and care in labour. 2006.
2. **Hawkins DM,** Olwell DH. Cumulative sum charts and charting for quality improvement. New York, London: Springer, 1998.
3. **Draycott T,** Sibanda T, Owen L, *et al.* Does training in obstetric emergencies improve neonatal outcome? *Br J Obstet Gynaecol* 2006;**113**:177–82.

PPO.03 IS IT WORTH REPEATING FETAL FIBRONECTIN TESTING IN ASYMPTOMATIC WOMEN AT RISK OF SPONTANEOUS PRETERM LABOUR?

M Chandiramani, P Seed, A Briley, L Poston, AH Shennan. *King's College, London, UK*

Introduction: Fetal fibronectin (fFN) is a good predictor of spontaneous preterm birth (SPTB). The benefit of repeat testing in high-risk asymptomatic women is unclear.

Objective: To determine the value of repeat fibronectin testing performed at 24 and 27 weeks' gestation in high-risk asymptomatic women for prediction of SPTB at <34 and <37 weeks' gestation.

Study Design: We conducted a secondary analysis of a multicentre trial of 900 pregnancies, which underwent fFN testing at 24 and 27 weeks' gestation. Included pregnancies had at least one previous risk factor for SPTB (mid-trimester loss/preterm delivery, uterine anomaly, cervical surgery or cerclage) and received placebo following positive testing. Those delivering by pre-labour Caesarean sections were excluded. Predictive values of repeat tests for SPTB at <34 and <37 weeks' gestation were assessed.

Results: 625 women were analyzed for preterm delivery at <34 and <37 weeks' gestation. The table shows the test performance when both tests are combined.

Conclusions: A second fFN test gives additional information in this population. The highest risk is associated with repeated positive tests. Although numbers are small, repeat testing in asymptomatic women improves predictive ability and may allow improved clinical management, highlighting the need for further research in this area.

Abstract PPO.03 Test performance of repeat fFN testing

fFN (24 weeks)	fFN (27 weeks)	SPTB <34 weeks (%)	SPTB <37 weeks (%)
		n = 625 (95% CI)	n = 611 (95% CI)
-	-	18/586 (3.1) (1.8 to 4.8)	82/572 (14.3) (11.6 to 17.5)
-	+	3/19 (15.8) (3.4 to 39.6)*	5/19 (26.3) (9.1 to 51.2)
+	-	1/8 (12.5) (3.2 to 52.7)	1/8 (12.5) (3.2 to 52.7)
+	+	4/12 (33.3) (9.9 to 65.1)*	7/12 (58.3) (27.6 to 84.8)*

fFN, fetal fibronectin; SPTB, spontaneous preterm birth.

*p<0.001 when compared with -/-.

PPO.04 CLINICAL ASSOCIATIONS OF PLACENTAL DELAYED VILLOUS MATURATION

^{1,2}MF Higgins, ²EE Mooney, ^{1,2}FM McAuliffe. ¹University College Dublin, Dublin, Ireland; ²National Maternity Hospital, Dublin, Ireland

Aim: Delayed villous maturation (DVM) is a spectrum of disease with reduced vasculosyncytial membrane formation, decreased tertiary villous formation and increased large bullous villi in the more severe grades. There are few data on its significance, but in some series it is associated with an increased risk of stillbirth in the late third trimester. The aim of this study was to assess perinatal factors associated with, and the clinical significance of, the finding of DVM on placental histology.

Methods: A retrospective study investigating all pregnancies with DVM diagnosed on placental histology in a tertiary level unit from December 2000 to August 2006. Over 6 years 2915 placentas were triaged for histopathological assessment, representing 6.1% of all 48 054 deliveries in this time period. 190 (6.3%) of these selected cases showed DVM. Fifteen placentas <34 completed weeks' gestation were excluded, leaving 175 for further analysis.

Results: When compared with controls matched for gestation and delivering within the same time period (n = 175), DVM was significantly associated with pre-gestational diabetes (8% versus 2.8%, p<0.05; relative risk (RR) 2.8, 95% CI 1.03 to 7.6), gestational diabetes (8.6% versus 3.4%, p<0.05; RR 2.5, 95% CI 0.99 to 6.3) and antenatal or intrapartum intrauterine death (8.6% versus 0%, p<0.05).

Conclusions: DVM is associated with diabetes mellitus and perinatal death. The association with diabetes may be mediated by hyperglycaemia. The relationship between diabetes and delayed villous maturation is being further investigated as part of an ongoing prospective study.

PPO.05 CHARACTERISTICS OF PREGNANCIES OF WOMEN WITH DIABETES MELLITUS THAT RESULTED IN A BABY WITH CONGENITAL HEART DISEASE IN ENGLAND, WALES AND NORTHERN IRELAND

¹BN Ofoegbu, ¹A Subbarayan, ²AM Weindling. ¹Wythenshawe Hospital, Manchester, UK; ²University of Liverpool, Liverpool, UK

Aim: To characterise the pregnancies of women with pre-existing diabetes mellitus (DM) that resulted in a baby with congenital heart disease (CHD).

Methods: For a cohort of 3733 women (3808 pregnancies) with pre-conceptual diabetes who booked or delivered between 1 March 2002 and 28 February 2003, maternity units (n = 231) provided information on care of women and outcome of the pregnancy to

the Confidential Enquiry into Maternal and Child Health (CEMACH) between March 2002 and February 2003.

Results: 54 babies were born with CHD. Information was available for 49 babies born to women with type 1 (n = 40) and type 2 (n = 9) diabetes, respectively. Irrespective of diabetes type, women did not apparently plan adequately for becoming pregnant: there was low folic acid use, high BMI and preconceptional haemoglobin A1C (HbA1C). Median (interquartile range) HbA1C remained high in the first 10 weeks of conception in women with type 1 and type 2 diabetes: 8.7 (5.3–13.8) versus 7.95 (7.2–10.7), respectively. All women had an 18–22-week anomaly scan. 18 women with apparently normal anomaly scan went on to have babies with varying severities of CHD. Three other women with normal anomaly scans had CHD identified in their babies when routinely referred for specialised cardiac scanning. The pre-termination prevalence rate of CHD was seven per 1000 pregnancies compared with a post-termination prevalence of five per 1000.

Conclusions: Glycaemic control (rather than type of diabetes) appeared to be a major factor in the aetiology of CHD. All women with diabetes should be referred for specialised antenatal cardiac scanning.

PPO.06 MATERNAL SMOKING IN EARLY AND LATE PREGNANCY AND THE RISK OF FETAL GROWTH RESTRICTION

A Williams, M Sahota, J Gardosi. *Perinatal Institute, Birmingham, UK*

Background: Smoking is known to be associated with fetal growth restriction, but little is known about the relative effects of smoking cessation during pregnancy and how that affects fetal growth.

Methods: Routine collection of maternity data was recently established in Birmingham and the Black Country maternity units. The data are extracted from the standard hand-held pregnancy notes and recorded electronically. The information includes smoking status at the beginning and end of pregnancy. Maternal height, weight, parity and ethnic origin were used to adjust for constitutional variation and calculate a customised birthweight centile. Growth restriction was defined as a birthweight below the tenth customised centile.

Results: The database included details of 9074 pregnancies, from a total of 9421 births delivered during 2007. The overall rate of smoking at booking was 18% and 15.8% still smoked at the end of pregnancy. The rate of fetal growth restriction was 16.5% in pregnancies when the mother did not smoke at any stage. Mothers who smoked throughout pregnancy had a significantly increased risk of having a growth restricted baby (29.3%, odds ratio (OR) 2.1, CI 1.8 to 2.4). In contrast, mothers who smoked in early pregnancy but subsequently stopped had a slightly elevated risk of a growth restricted baby that was not significantly different from non-smokers (19.2%, OR 1.2, CI 0.8 to 1.8).

Conclusions: Cessation of smoking during pregnancy appears to reduce the risk of fetal growth restriction. Larger databases will allow further analysis to assess confounders and interactions with other variables.

PPO.07 INTRAUTERINE GROWTH RESTRICTION AS A RISK FACTOR FOR INFANT MORTALITY

N Beamish, A Francis, J Gardosi. *Perinatal Institute, Birmingham, UK*

Background: Reduction of infant mortality is a key public health target, but government strategies have to date paid little attention to antecedent factors. We wanted to investigate the association between intrauterine growth restriction (IUGR) and subsequent infant death, in a 10-year database from Birmingham and the Black Country (B&BC).

Methods: The cohort consisted of all infant deaths notified from B&BC maternity units during 1997–2006. A classification system was devised that included neonatal categories as well as relevant

antenatal conditions using ReCoDe,¹ including IUGR defined as <10th customised birthweight centile.

Results: There was a total of 2385 infant deaths over the 10-year period. Antenatal contributing conditions included infection, abruption and intrapartum asphyxia, but most frequently IUGR, which, after excluding congenital anomalies, was present in 42.3% of babies who subsequently died in infancy. Compared with surviving infants, those who died were overall more likely to have been born with IUGR (odds ratio (OR) 3.3, CI 2.9 to 3.7). This association was strongest for preterm births but present also for babies born at mature gestations. It applied in most infant death categories except infection and injury and was highest for extreme prematurity (OR 9.2, CI 7.2 to 11.6), gastrointestinal (4.8, 3.0 to 7.5), respiratory (3.0, 2.5 to 3.6) and neurological (2.7, 1.9 to 3.9) conditions as well as sudden unexpected death in infancy (2.8, 1.9 to 4.0).

Conclusions: IUGR is a frequent antecedent of infant death and may be an important factor contributing to the demise. A low weight at birth suggesting IUGR is a warning sign of an increased risk of death in infancy.

1. **Gardosi J, Kady S, McGeown, et al.** Classification of stillbirth by relevant condition at death (ReCoDe): population based cohort study. *BMJ* 2005;**335**:1113–17.

PPO.08 WITHDRAWN

PPO.09 INTRAUTERINE GROWTH RESTRICTION ASSOCIATED WITH MATERNAL SMOKING IN PREGNANCY: WHAT IS THE OPTIMAL TIMING OF SONOGRAPHY FOR FETAL GROWTH?

¹CM Lynch, ¹R O'Kelly, ¹B Stuart, ²R Conroy, ¹CL Regan. ¹*Coombe Women's and Infants' University Hospital, Dublin, Ireland;* ²*Royal College of Surgeons in Ireland, Dublin, Ireland*

Objectives: Smoking in pregnancy is a risk factor for fetal growth restriction. The optimal gestational age to detect this growth restriction by ultrasound examination of the fetus is uncertain.

Methods: A prospective study recruited women who were smoking (n = 71) and not smoking (n = 72) in pregnancy. Caucasian women with ultrasonographic determination of gestational age ≤14 weeks' gestation were eligible. Exclusion criteria were recreational drug use, multiple pregnancy, insulin-dependent diabetes, development of gestational diabetes, maternal age <18 or >40 years. Serial ultrasounds for fetal growth were performed at 28, 32, and 36 weeks' gestation. Smoking status was confirmed by immunoassay of the nicotine metabolite cotinine.

Results: The median cotinine level was 4208.0 ng/ml in the smoking group and 10.0 ng/ml in the non-smokers. The mean neonatal birthweight was lower in the smokers compared with the non-smokers, 3174 ± 490 g versus 3581 ± 486 g (p<0.05). The mean customised birthweight centile in the smokers was 23.0 versus 61.0. This significant difference in birthweight was identified by ultrasound biometry of abdominal circumference and estimated fetal weight at 32 and 36 weeks. The mean abdominal circumference in smokers at 32 weeks' gestation was 27.85 ± 1.76 cm versus 28.94 ± 1.61 cm (p<0.05) in non-smokers. The estimated fetal weight at 32 weeks' gestation was 1940.5 ± 326.9 g in the smokers compared with 2065.7 ± 287.4 g (p<0.05). This was not identified at 28 weeks. There was no significant difference in the amniotic fluid index or umbilical Doppler studies. Eight (13%) of the neonates born to the smoking group required admission to the neonatal unit compared with two (3.0%) in the non-smokers.

Conclusions: Smoking is associated with late-onset intrauterine growth restriction, which can be accurately detected by ultrasound at 32 weeks' gestation.

PPO.10 PREGNANCY OUTCOME IN WOMEN ON BUPRENORPHINE MAINTENANCE THERAPY: A COHORT STUDY OF 27 CASES

S Mwenechanya, A Walker, A Whincup, L Miall, J Porter, A Wright, J Shillito, JJ Walker. *Leeds University Teaching Hospitals, Leeds, UK*

Background: There is a paucity in the literature of robust data regarding maternal and neonatal outcomes in babies born to drug-using mothers who are maintained on buprenorphine (as opposed to methadone) through pregnancy.

Aims: To evaluate pregnancy outcome in opioid-dependent women who were maintained on buprenorphine through their pregnancy and to compare their outcome with matched women maintained on methadone.

Setting: Leeds University Teaching Hospitals, West Yorkshire, UK.
Methods: From March 2003 data for all pregnant women on buprenorphine maintenance therapy were collected prospectively. Pregnancy outcome of these women was compared with that of consecutive women with singleton pregnancies on methadone maintenance therapy over the same period.

Results: There were 34 women on buprenorphine maintenance therapy, seven women were co-using heroin or cocaine at the time of delivery and therefore were excluded from analysis. Preterm delivery rate was 7.7% in the buprenorphine group compared with 13% in the methadone group. Length of neonatal stay: 52% of the buprenorphine group were discharged after one week compared with 32% in the methadone group. 37% of the neonates in the methadone group were admitted for three or more weeks compared with only 16% in the buprenorphine group. Six of the 27 (22%) babies in the buprenorphine group needed treatment for neonatal abstinence syndrome compared with 22 of the 54 (44.7%) babies in the methadone group.

Conclusions: This cohort study has shown that babies born to women maintained on buprenorphine in pregnancy have less morbidity, compared with babies born to women on methadone maintenance therapy.

PPO.11 CONFIDENTIAL ENQUIRY INTO STILLBIRTHS WITH FETAL GROWTH RESTRICTION

A Williams, J Gardosi. *Perinatal Institute, Birmingham, UK*

Background: Stillbirths are the main contributor to perinatal mortality and fetal growth restriction is the single largest category of conditions relevant to stillbirth.¹ This enquiry was part of an initiative including all Primary Care Trusts in Birmingham and the Black Country (B&BC), with the aim of improving our understanding of the underlying causes and associated factors.

Methods: Anonymised case notes of 28 consecutively notified stillbirths of 30+ weeks' gestation with evidence of fetal growth restriction (diagnosed either during pregnancy, by postmortem, or by birthweight <10th customised percentile) were investigated for suboptimal care factors. Each panel included two obstetricians and two midwives from outside the area. Care was discussed and graded according to traditional CESDI criteria. After interim analysis, the project board determined that the enquiry should be terminated to allow urgent feedback of the results.

Results: 28 cases were assessed by seven panels of clinicians from outside the B&BC. In 24 cases (86%), panels considered that the death was potentially avoidable (grade 2, n = 16; or grade 3, n = 8). The main suboptimal care factors were: lack of appropriate risk assessment and management planning; long gaps between ultrasound scans in high-risk cases; incorrect use of customised growth charts and plotting of fundal height; mistakes that were likely to have resulted from work overload. Bereavement care varied considerably and was often substandard.

Conclusions: This focussed confidential enquiry suggests that most stillbirths with growth restriction are potentially avoidable. It

was able to identify several key action points that are currently being implemented.

1. **Gardosi J, Kady S, McGeown, et al.** Classification of stillbirth by relevant condition at death (ReCoDe): population based cohort study. *BMJ* 2005;**335**:1113–17.

PPO.12 SEVERE PROTEINURIA AND OUTCOME OF PREGNANCY

P Akhter, S Afridi, O Nimbe, P McKenna. *The Rotunda Hospital, Dublin, Ireland*

Introduction: Severe proteinuria is traditionally considered a hallmark for adverse perinatal outcome. Recent evidence is conflicting.

Objective: To determine perinatal outcome of pregnancy with severe proteinuria. To ascertain whether other factors such as amount or gestation of severe proteinuria, pre-eclampsia, or medical diseases were predictors of pregnancy outcome.

Study Design: A retrospective study on pregnancy with severe proteinuria (>3 g/day) attending Rotunda Hospital, January 2000 to December 2004, was performed. SPSS version 15 was used for statistical analysis.

Results: 1304 women had significant proteinuria (>0.3 g/day). Of them 130 (10%) had severe proteinuria. 29 (22.3%) women had pre-existing medical diseases. 120 (92.3%) developed pre-eclampsia, 9.23% haemolysis-elevated liver enzymes-low platelets, 0.77% eclampsia, 0.77% massive postpartum haemorrhage and 1.54% abruptio placenta. There were 70 (54%) preterm births, 39 (29%) intrauterine growth restriction (IUGR) and five perinatal deaths (PND). All PND were related to prematurity. Gestation at first diagnosis of proteinuria (GDXP) had the strongest influence on gestation at delivery and birthweight (p<0.05). Pre-eclampsia and the amount of proteinuria were significant (p<0.05) but less strongly predicted delivery gestation. Proteinuria due to medical diseases had a significant (p<0.05) influence on birthweight, not on delivery gestation. GDXP and amount of proteinuria reliably predicted IUGR (omnibus $\chi^2 = 22.698$, p<0.05). GDXP was associated with a decrease in the odds of IUGR levels by a score of 0.971 (95% CI 0.900 to 1.047). None of the predictors reliably predicted PND.

Conclusions: Preterm birth rate was high (54%). Prematurity rather than severe proteinuria was the cause of PND. Our study emphasised the need for careful evaluation of each case to prevent preterm birth.

PPO.13 MATERNAL TYPE 2 DIABETES IN PREGNANCY: IDENTIFYING RISK FACTORS FOR ADVERSE OUTCOME

N Shah, P Brydon, J Gardosi. *West Midlands Perinatal Institute, Birmingham, UK*

Aims: To document the characteristics of mothers with type 2 diabetes in the West Midlands (WM), identify risk factors for poor pregnancy outcome and assess glycaemic control before and throughout pregnancy.

Methods: Data from pregnancies with type 2 diabetes were collected as part of the UK CEMACH national enquiry programme 2002–3 and analyzed in two groups: (1) good pregnancy outcome (neonate alive at 28 days, no congenital anomaly; n = 116) and (2) poor pregnancy outcome (fetal or neonatal loss and/or major congenital anomaly; n = 33).

Results: In comparison with women with type 1 diabetes, women with type 2 diabetes in WM are older (median age 33 years), multiparous (78%), predominantly of Asian ethnicity (43%) and living in areas of greatest social deprivation (73%). The perinatal mortality was 52.6/1000, which compares with 10.2/1000 for the general maternity population in 2002. Mothers with type 2 diabetes with poor pregnancy outcomes had diabetes from an earlier age (mean 2.2 years) and were more likely to be using insulin pre-pregnancy (49% versus 28%, p = 0.04). Glycaemic control, as assessed by serial haemoglobin A1c (HbA1c) tended to be worse

(range 10–33 days, mean 19 days, $p > 0.05$). The rate at which the side-lying group achieved three, four or five feeds per day was, however, more rapid than the rate seen in the semi-upright group.

Side-lying was well accepted by both parents and nursing staff. This pilot study will inform the design of further necessary research to examine the potential benefits of this approach to an important and common problem.

PN.02 A DEVELOPMENT IN SCOTTISH QUALIFICATION AND CREDIT FRAMEWORK LEVEL 10 NEONATAL NURSING EDUCATION IN SCOTLAND: INNOVATION AND COLLABORATION

¹C Greig, ²SL Alexander, ¹M Lobban. ¹Napier University, Edinburgh, UK; ²Glasgow Caledonian University, Glasgow, UK

Two reports recommended a structured career pathway for neonatal nurses with appropriate educational provision in Scotland.^{1,2} An identified deficit in the provision of intermediate neonatal nursing education (SCQF level 10) was addressed by the NHS Education Board for Scotland tendering a project. Napier University and Glasgow Caledonian University in conjunction with Robert Gordon University, NHS Lothian, NHS Greater Glasgow and Clyde and NHS Grampian were awarded the tender to deliver a suite of three modules.

These modules are: (1) A double integrated theory and practice module (40 level 10 credits)—Higher Level Knowledge and Skills for Neonatal Nursing. The module content focusses on the theoretical basis of specific systems, neonatal problems and conditions with opportunities to develop related practice in the neonatal intensive care setting. (2) A single module (20 level 10 credits)—Specialised Aspects of Neonatal Care, offering generic theory on subjects such as legal and ethical principles, leadership, research, working with parents and multidisciplinary team working. (3) A single module (20 level 10 credits)—Neonatal Resuscitation, Stabilisation and Transport will bring together standardised, neonatal-specific Continuing Professional Development education already available from local providers.

The ultimate aim of these modules would be to enable existing experienced neonatal nurses to achieve a Graduate Certificate in Neonatal Nursing Practice (60 level credits), which is a unique award in Scotland. These three modules are delivered across two sites at Napier University and Glasgow Caledonian University on a rotational programme.

1. **Scottish Neonatal Nurses Group (SNNG).** Report on Neonatal Nurse Staffing and Career Pathways. Unpublished. 2004.
2. **Scottish Neonatal Nurses Group (SNNG).** The Competency Framework and Core Clinical Skills for Neonatal Nurses. Unpublished. 2005.

PN.03 KANGAROO MOTHER CARE AND ITS EFFECTS ON PARENTING STRESS AND MATERNAL POSTNATAL ATTACHMENT IN CASES OF PREMATURE BIRTH

¹L Genesoni, ¹RL Curran, ³A Huertas-Ceballos, ^{1,2}MA Tallandini. ¹University College London Psychology Department, London, UK; ²University of Trieste Psychology Department, Trieste, Italy; ³Elizabeth Garrett Anderson Obstetric Hospital, UCLH, London, UK

This study investigates the impact of the kangaroo mother care (KMC) intervention for premature infants on mother–infant bonding.

Participants: 44 premature infants and their mothers were examined: 21 dyads in KMC and 23 in traditional care (TC).

Procedure: The KMC infants received daily skin-to-skin contact for a minimum of 1 h a day, for 14 days after birth. Maternal psychological data were collected twice: after delivery (time 1) and 2 weeks after the infant's discharge (time 2). Tests administered

were: Maternal Postnatal Attachment Questionnaire (MPAQ), Neonatal Perception Inventory (NPI), Parental Stress Index Short Form (PSI-SF), Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI) and Gordon-Personal Profile Inventory (GPP-I) (time 1 only).

Results: At time 1, some baseline characteristics between the intervention and the control group were significantly different with regard to gestational age at birth (more preterm in the KMC group), days in intensive care (more days in the KMC group) and mothers' BDI score (higher in the TC group). All of these were considered as covariates in the statistical analysis. At time 2, KMC mothers were less rejective (MPAQ) towards their infants ($F(1, 42) 9.56$; $p = 0.004$) and less preoccupied (NPI) in caring for their infants ($F(1, 42) 5.06$; $p = 0.031$) than TC mothers. The parenting stress level changed between times 1 and 2: TC mothers only experienced a significant increase from time 1 (mean 42.77) to time 2 (49.27) ($F(1, 22) 7.570$; $p < 0.01$).

BMFMS: Pregnancy Outcome

PPO.01 STILLBIRTHS: HAVE THINGS CHANGED OVER A DECADE?

A Tang, M Whitworth, D Roberts. Liverpool Women's NHS Foundation Trust, Liverpool, UK

The stillbirth rate has remained stable nationally at 5/1000 births since the 1990s. We aimed to investigate in detail the causes and associations of stillbirths in two cohorts, 10 years apart to determine whether there has been any reduction in the prevalence of potentially preventable stillbirths.

Methods: Information on stillbirths occurring in Liverpool Women's NHS Foundation Trust between 1995–7 and 2004–6 was collected from perinatal mortality reports, birth registers and an electronic database (Meditech). ReCoDe, placental histology and birthweight centiles were used to examine further the unexplained groups. Results were analyzed using Stats Direct.

Results: We investigated 269 stillbirths. Maternal age and proportion of primiparous women were similar in both cohorts. More than 50% of stillbirths in both groups are classified as unexplained by CEMACH. There is no significant change in the prevalence of fetal growth restriction babies in the unexplained groups over these years (see table).

Conclusions: Despite progression in obstetric services, there is no change in all causes of stillbirths. 41% of unexplained stillbirths may have been prevented if we identified methods to diagnose fetal growth restriction and predict which of these babies are at risk of stillbirth. This could impact on decreasing stillbirth rates in the next decade.

Abstract PPO.01

Causes of stillbirths	1995–7	2004–6	p Value
	N = 117 (%) SB rate 6.6	N = 152 (%) SB rate 6.3	
Abruption	19 (16.2)	20 (13.2)	0.2945
Fetal abnormality	21 (17.9)	34 (22.4)	0.2307
Infection	4 (3.4)	2 (1.3)	0.2285
Maternal disorder	2 (1.7)	5 (3.3)	0.3440
Other specific causes	5 (4.3)	6 (3.9)	0.5646
Unexplained <2500 g	44 (37.6)	46 (30.3)	0.1282
FGR	19 (43.2)	28 (60.9)	0.0708
Unexplained >2500 g	22 (18.8)	39 (25.7)	0.1178
FGR	7 (31.8)	7 (17.9)	0.1783

FGR, fetal growth restriction; SB, stillbirth.

PPO.02 EARLY DETECTION OF ADVERSE TRENDS IN HEALTHCARE: A PROSPECTIVE PILOT STUDY EVALUATING THE UTILITY OF THE CUSUM CHART METHOD IN MONITORING QUALITY IN MATERNITY

T Sibanda, T Draycott. North Bristol NHS Trust, Bristol, UK

The need for robust systems for monitoring the quality and performance of maternity services has been highlighted.¹ The Cumulative SUM (CUSUM) chart method, proved as an effective tool for the early detection of faulty systems in industry,² could play a role. We conducted a prospective pilot study evaluating the applicability and value of the CUSUM in monitoring outcomes in maternity. Rates of low Apgar scores (5 minute Apgar score <7) in term, cephalic singletons (excluding elective Caesarean sections), delivered at Southmead Hospital were monitored over a 12-month period (2006). With the reference standard set at 0.44%,³ we regarded doubling of this rate as undesirable and set 0.66% as the rate at which a signal was to be raised by the monitoring system.

Results: We detected a significant rise in the rate of low Apgar scores during August 2006. Root cause analysis identified specific training needs that were corrected by an educational intervention. Subsequent monitoring showed a return to the baseline reference rate (0.44%), which was maintained during the rest of the year. The overall rate for the whole of 2006 was eventually 0.53%.

Discussion: Prospective monitoring of clinical outcomes using the CUSUM chart method is both feasible and effective. Early detection of adverse trends provides an opportunity for prompt remedial action and hence prevention of further harm. Wider application of this tool, monitoring key outcomes and quality indicators in maternity, has the potential of leading to overall improvements in the quality and performance of maternity units.

1. **Royal Colleges.** Safer childbirth: minimum standards for service provision and care in labour. 2006.
2. **Hawkins DM,** Olwell DH. Cumulative sum charts and charting for quality improvement. New York, London: Springer, 1998.
3. **Draycott T,** Sibanda T, Owen L, *et al.* Does training in obstetric emergencies improve neonatal outcome? *Br J Obstet Gynaecol* 2006;**113**:177–82.

PPO.03 IS IT WORTH REPEATING FETAL FIBRONECTIN TESTING IN ASYMPTOMATIC WOMEN AT RISK OF SPONTANEOUS PRETERM LABOUR?

M Chandiramani, P Seed, A Briley, L Poston, AH Shennan. King's College, London, UK

Introduction: Fetal fibronectin (fFN) is a good predictor of spontaneous preterm birth (SPTB). The benefit of repeat testing in high-risk asymptomatic women is unclear.

Objective: To determine the value of repeat fibronectin testing performed at 24 and 27 weeks' gestation in high-risk asymptomatic women for prediction of SPTB at <34 and <37 weeks' gestation.

Study Design: We conducted a secondary analysis of a multicentre trial of 900 pregnancies, which underwent fFN testing at 24 and 27 weeks' gestation. Included pregnancies had at least one previous risk factor for SPTB (mid-trimester loss/preterm delivery, uterine anomaly, cervical surgery or cerclage) and received placebo following positive testing. Those delivering by pre-labour Caesarean sections were excluded. Predictive values of repeat tests for SPTB at <34 and <37 weeks' gestation were assessed.

Results: 625 women were analyzed for preterm delivery at <34 and <37 weeks' gestation. The table shows the test performance when both tests are combined.

Conclusions: A second fFN test gives additional information in this population. The highest risk is associated with repeated positive tests. Although numbers are small, repeat testing in asymptomatic women improves predictive ability and may allow improved clinical management, highlighting the need for further research in this area.

Abstract PPO.03 Test performance of repeat fFN testing

fFN (24 weeks)	fFN (27 weeks)	SPTB <34 weeks (%)	SPTB <37 weeks (%)
		n = 625 (95% CI)	n = 611 (95% CI)
-	-	18/586 (3.1) (1.8 to 4.8)	82/572 (14.3) (11.6 to 17.5)
-	+	3/19 (15.8) (3.4 to 39.6)*	5/19 (26.3) (9.1 to 51.2)
+	-	1/8 (12.5) (3.2 to 52.7)	1/8 (12.5) (3.2 to 52.7)
+	+	4/12 (33.3) (9.9 to 65.1)*	7/12 (58.3) (27.6 to 84.8)*

fFN, fetal fibronectin; SPTB, spontaneous preterm birth.

*p<0.001 when compared with -/-.

PPO.04 CLINICAL ASSOCIATIONS OF PLACENTAL DELAYED VILLOUS MATURATION

^{1,2}MF Higgins, ²EE Mooney, ^{1,2}FM McAuliffe. ¹University College Dublin, Dublin, Ireland; ²National Maternity Hospital, Dublin, Ireland

Aim: Delayed villous maturation (DVM) is a spectrum of disease with reduced vasculosyncytial membrane formation, decreased tertiary villous formation and increased large bullous villi in the more severe grades. There are few data on its significance, but in some series it is associated with an increased risk of stillbirth in the late third trimester. The aim of this study was to assess perinatal factors associated with, and the clinical significance of, the finding of DVM on placental histology.

Methods: A retrospective study investigating all pregnancies with DVM diagnosed on placental histology in a tertiary level unit from December 2000 to August 2006. Over 6 years 2915 placentas were triaged for histopathological assessment, representing 6.1% of all 48 054 deliveries in this time period. 190 (6.3%) of these selected cases showed DVM. Fifteen placentas <34 completed weeks' gestation were excluded, leaving 175 for further analysis.

Results: When compared with controls matched for gestation and delivering within the same time period (n = 175), DVM was significantly associated with pre-gestational diabetes (8% versus 2.8%, p<0.05; relative risk (RR) 2.8, 95% CI 1.03 to 7.6), gestational diabetes (8.6% versus 3.4%, p<0.05; RR 2.5, 95% CI 0.99 to 6.3) and antenatal or intrapartum intrauterine death (8.6% versus 0%, p<0.05).

Conclusions: DVM is associated with diabetes mellitus and perinatal death. The association with diabetes may be mediated by hyperglycaemia. The relationship between diabetes and delayed villous maturation is being further investigated as part of an ongoing prospective study.

PPO.05 CHARACTERISTICS OF PREGNANCIES OF WOMEN WITH DIABETES MELLITUS THAT RESULTED IN A BABY WITH CONGENITAL HEART DISEASE IN ENGLAND, WALES AND NORTHERN IRELAND

¹BN Ofoegbu, ¹A Subbarayan, ²AM Weindling. ¹Wythenshawe Hospital, Manchester, UK; ²University of Liverpool, Liverpool, UK

Aim: To characterise the pregnancies of women with pre-existing diabetes mellitus (DM) that resulted in a baby with congenital heart disease (CHD).

Methods: For a cohort of 3733 women (3808 pregnancies) with pre-conceptual diabetes who booked or delivered between 1 March 2002 and 28 February 2003, maternity units (n = 231) provided information on care of women and outcome of the pregnancy to

the Confidential Enquiry into Maternal and Child Health (CEMACH) between March 2002 and February 2003.

Results: 54 babies were born with CHD. Information was available for 49 babies born to women with type 1 (n = 40) and type 2 (n = 9) diabetes, respectively. Irrespective of diabetes type, women did not apparently plan adequately for becoming pregnant: there was low folic acid use, high BMI and preconceptional haemoglobin A1C (HbA1C). Median (interquartile range) HbA1C remained high in the first 10 weeks of conception in women with type 1 and type 2 diabetes: 8.7 (5.3–13.8) versus 7.95 (7.2–10.7), respectively. All women had an 18–22-week anomaly scan. 18 women with apparently normal anomaly scan went on to have babies with varying severities of CHD. Three other women with normal anomaly scans had CHD identified in their babies when routinely referred for specialised cardiac scanning. The pre-termination prevalence rate of CHD was seven per 1000 pregnancies compared with a post-termination prevalence of five per 1000.

Conclusions: Glycaemic control (rather than type of diabetes) appeared to be a major factor in the aetiology of CHD. All women with diabetes should be referred for specialised antenatal cardiac scanning.

PPO.06 MATERNAL SMOKING IN EARLY AND LATE PREGNANCY AND THE RISK OF FETAL GROWTH RESTRICTION

A Williams, M Sahota, J Gardosi. *Perinatal Institute, Birmingham, UK*

Background: Smoking is known to be associated with fetal growth restriction, but little is known about the relative effects of smoking cessation during pregnancy and how that affects fetal growth.

Methods: Routine collection of maternity data was recently established in Birmingham and the Black Country maternity units. The data are extracted from the standard hand-held pregnancy notes and recorded electronically. The information includes smoking status at the beginning and end of pregnancy. Maternal height, weight, parity and ethnic origin were used to adjust for constitutional variation and calculate a customised birthweight centile. Growth restriction was defined as a birthweight below the tenth customised centile.

Results: The database included details of 9074 pregnancies, from a total of 9421 births delivered during 2007. The overall rate of smoking at booking was 18% and 15.8% still smoked at the end of pregnancy. The rate of fetal growth restriction was 16.5% in pregnancies when the mother did not smoke at any stage. Mothers who smoked throughout pregnancy had a significantly increased risk of having a growth restricted baby (29.3%, odds ratio (OR) 2.1, CI 1.8 to 2.4). In contrast, mothers who smoked in early pregnancy but subsequently stopped had a slightly elevated risk of a growth restricted baby that was not significantly different from non-smokers (19.2%, OR 1.2, CI 0.8 to 1.8).

Conclusions: Cessation of smoking during pregnancy appears to reduce the risk of fetal growth restriction. Larger databases will allow further analysis to assess confounders and interactions with other variables.

PPO.07 INTRAUTERINE GROWTH RESTRICTION AS A RISK FACTOR FOR INFANT MORTALITY

N Beamish, A Francis, J Gardosi. *Perinatal Institute, Birmingham, UK*

Background: Reduction of infant mortality is a key public health target, but government strategies have to date paid little attention to antecedent factors. We wanted to investigate the association between intrauterine growth restriction (IUGR) and subsequent infant death, in a 10-year database from Birmingham and the Black Country (B&BC).

Methods: The cohort consisted of all infant deaths notified from B&BC maternity units during 1997–2006. A classification system was devised that included neonatal categories as well as relevant

antenatal conditions using ReCoDe,¹ including IUGR defined as <10th customised birthweight centile.

Results: There was a total of 2385 infant deaths over the 10-year period. Antenatal contributing conditions included infection, abruption and intrapartum asphyxia, but most frequently IUGR, which, after excluding congenital anomalies, was present in 42.3% of babies who subsequently died in infancy. Compared with surviving infants, those who died were overall more likely to have been born with IUGR (odds ratio (OR) 3.3, CI 2.9 to 3.7). This association was strongest for preterm births but present also for babies born at mature gestations. It applied in most infant death categories except infection and injury and was highest for extreme prematurity (OR 9.2, CI 7.2 to 11.6), gastrointestinal (4.8, 3.0 to 7.5), respiratory (3.0, 2.5 to 3.6) and neurological (2.7, 1.9 to 3.9) conditions as well as sudden unexpected death in infancy (2.8, 1.9 to 4.0).

Conclusions: IUGR is a frequent antecedent of infant death and may be an important factor contributing to the demise. A low weight at birth suggesting IUGR is a warning sign of an increased risk of death in infancy.

1. **Gardosi J**, Kady S, McGeown, *et al.* Classification of stillbirth by relevant condition at death (ReCoDe): population based cohort study. *BMJ* 2005;**335**:1113–17.

PPO.08 WITHDRAWN

PPO.09 INTRAUTERINE GROWTH RESTRICTION ASSOCIATED WITH MATERNAL SMOKING IN PREGNANCY: WHAT IS THE OPTIMAL TIMING OF SONOGRAPHY FOR FETAL GROWTH?

¹CM Lynch, ¹R O'Kelly, ¹B Stuart, ²R Conroy, ¹CL Regan. ¹*Coombe Women's and Infants' University Hospital, Dublin, Ireland;* ²*Royal College of Surgeons in Ireland, Dublin, Ireland*

Objectives: Smoking in pregnancy is a risk factor for fetal growth restriction. The optimal gestational age to detect this growth restriction by ultrasound examination of the fetus is uncertain.

Methods: A prospective study recruited women who were smoking (n = 71) and not smoking (n = 72) in pregnancy. Caucasian women with ultrasonographic determination of gestational age ≤ 14 weeks' gestation were eligible. Exclusion criteria were recreational drug use, multiple pregnancy, insulin-dependent diabetes, development of gestational diabetes, maternal age <18 or >40 years. Serial ultrasounds for fetal growth were performed at 28, 32, and 36 weeks' gestation. Smoking status was confirmed by immunoassay of the nicotine metabolite cotinine.

Results: The median cotinine level was 4208.0 ng/ml in the smoking group and 10.0 ng/ml in the non-smokers. The mean neonatal birthweight was lower in the smokers compared with the non-smokers, 3174 \pm 490 g versus 3581 \pm 486 g (p<0.05). The mean customised birthweight centile in the smokers was 23.0 versus 61.0. This significant difference in birthweight was identified by ultrasound biometry of abdominal circumference and estimated fetal weight at 32 and 36 weeks. The mean abdominal circumference in smokers at 32 weeks' gestation was 27.85 \pm 1.76 cm versus 28.94 \pm 1.61 cm (p<0.05) in non-smokers. The estimated fetal weight at 32 weeks' gestation was 1940.5 \pm 326.9 g in the smokers compared with 2065.7 \pm 287.4 g (p<0.05). This was not identified at 28 weeks. There was no significant difference in the amniotic fluid index or umbilical Doppler studies. Eight (13%) of the neonates born to the smoking group required admission to the neonatal unit compared with two (3.0%) in the non-smokers.

Conclusions: Smoking is associated with late-onset intrauterine growth restriction, which can be accurately detected by ultrasound at 32 weeks' gestation.

PPO.10 PREGNANCY OUTCOME IN WOMEN ON BUPRENORPHINE MAINTENANCE THERAPY: A COHORT STUDY OF 27 CASES

S Mwenechanya, A Walker, A Whincup, L Miall, J Porter, A Wright, J Shillito, JJ Walker. *Leeds University Teaching Hospitals, Leeds, UK*

Background: There is a paucity in the literature of robust data regarding maternal and neonatal outcomes in babies born to drug-using mothers who are maintained on buprenorphine (as opposed to methadone) through pregnancy.

Aims: To evaluate pregnancy outcome in opioid-dependent women who were maintained on buprenorphine through their pregnancy and to compare their outcome with matched women maintained on methadone.

Setting: Leeds University Teaching Hospitals, West Yorkshire, UK.
Methods: From March 2003 data for all pregnant women on buprenorphine maintenance therapy were collected prospectively. Pregnancy outcome of these women was compared with that of consecutive women with singleton pregnancies on methadone maintenance therapy over the same period.

Results: There were 34 women on buprenorphine maintenance therapy, seven women were co-using heroin or cocaine at the time of delivery and therefore were excluded from analysis. Preterm delivery rate was 7.7% in the buprenorphine group compared with 13% in the methadone group. Length of neonatal stay: 52% of the buprenorphine group were discharged after one week compared with 32% in the methadone group. 37% of the neonates in the methadone group were admitted for three or more weeks compared with only 16% in the buprenorphine group. Six of the 27 (22%) babies in the buprenorphine group needed treatment for neonatal abstinence syndrome compared with 22 of the 54 (44.7%) babies in the methadone group.

Conclusions: This cohort study has shown that babies born to women maintained on buprenorphine in pregnancy have less morbidity, compared with babies born to women on methadone maintenance therapy.

PPO.11 CONFIDENTIAL ENQUIRY INTO STILLBIRTHS WITH FETAL GROWTH RESTRICTION

A Williams, J Gardosi. *Perinatal Institute, Birmingham, UK*

Background: Stillbirths are the main contributor to perinatal mortality and fetal growth restriction is the single largest category of conditions relevant to stillbirth.¹ This enquiry was part of an initiative including all Primary Care Trusts in Birmingham and the Black Country (B&BC), with the aim of improving our understanding of the underlying causes and associated factors.

Methods: Anonymised case notes of 28 consecutively notified stillbirths of 30+ weeks' gestation with evidence of fetal growth restriction (diagnosed either during pregnancy, by postmortem, or by birthweight <10th customised percentile) were investigated for suboptimal care factors. Each panel included two obstetricians and two midwives from outside the area. Care was discussed and graded according to traditional CESDI criteria. After interim analysis, the project board determined that the enquiry should be terminated to allow urgent feedback of the results.

Results: 28 cases were assessed by seven panels of clinicians from outside the B&BC. In 24 cases (86%), panels considered that the death was potentially avoidable (grade 2, n = 16; or grade 3, n = 8). The main suboptimal care factors were: lack of appropriate risk assessment and management planning; long gaps between ultrasound scans in high-risk cases; incorrect use of customised growth charts and plotting of fundal height; mistakes that were likely to have resulted from work overload. Bereavement care varied considerably and was often substandard.

Conclusions: This focussed confidential enquiry suggests that most stillbirths with growth restriction are potentially avoidable. It

was able to identify several key action points that are currently being implemented.

1. **Gardosi J, Kady S, McGeown, et al.** Classification of stillbirth by relevant condition at death (ReCoDe): population based cohort study. *BMJ* 2005;**335**:1113–17.

PPO.12 SEVERE PROTEINURIA AND OUTCOME OF PREGNANCY

P Akhter, S Afridi, O Nimbe, P McKenna. *The Rotunda Hospital, Dublin, Ireland*

Introduction: Severe proteinuria is traditionally considered a hallmark for adverse perinatal outcome. Recent evidence is conflicting.

Objective: To determine perinatal outcome of pregnancy with severe proteinuria. To ascertain whether other factors such as amount or gestation of severe proteinuria, pre-eclampsia, or medical diseases were predictors of pregnancy outcome.

Study Design: A retrospective study on pregnancy with severe proteinuria (>3 g/day) attending Rotunda Hospital, January 2000 to December 2004, was performed. SPSS version 15 was used for statistical analysis.

Results: 1304 women had significant proteinuria (>0.3 g/day). Of them 130 (10%) had severe proteinuria. 29 (22.3%) women had pre-existing medical diseases. 120 (92.3%) developed pre-eclampsia, 9.23% haemolysis-elevated liver enzymes-low platelets, 0.77% eclampsia, 0.77% massive postpartum haemorrhage and 1.54% abruptio placenta. There were 70 (54%) preterm births, 39 (29%) intrauterine growth restriction (IUGR) and five perinatal deaths (PND). All PND were related to prematurity. Gestation at first diagnosis of proteinuria (GDXP) had the strongest influence on gestation at delivery and birthweight (p<0.05). Pre-eclampsia and the amount of proteinuria were significant (p<0.05) but less strongly predicted delivery gestation. Proteinuria due to medical diseases had a significant (p<0.05) influence on birthweight, not on delivery gestation. GDXP and amount of proteinuria reliably predicted IUGR (omnibus $\chi^2 = 22.698$, p<0.05). GDXP was associated with a decrease in the odds of IUGR levels by a score of 0.971 (95% CI 0.900 to 1.047). None of the predictors reliably predicted PND.

Conclusions: Preterm birth rate was high (54%). Prematurity rather than severe proteinuria was the cause of PND. Our study emphasised the need for careful evaluation of each case to prevent preterm birth.

PPO.13 MATERNAL TYPE 2 DIABETES IN PREGNANCY: IDENTIFYING RISK FACTORS FOR ADVERSE OUTCOME

N Shah, P Brydon, J Gardosi. *West Midlands Perinatal Institute, Birmingham, UK*

Aims: To document the characteristics of mothers with type 2 diabetes in the West Midlands (WM), identify risk factors for poor pregnancy outcome and assess glycaemic control before and throughout pregnancy.

Methods: Data from pregnancies with type 2 diabetes were collected as part of the UK CEMACH national enquiry programme 2002–3 and analyzed in two groups: (1) good pregnancy outcome (neonate alive at 28 days, no congenital anomaly; n = 116) and (2) poor pregnancy outcome (fetal or neonatal loss and/or major congenital anomaly; n = 33).

Results: In comparison with women with type 1 diabetes, women with type 2 diabetes in WM are older (median age 33 years), multiparous (78%), predominantly of Asian ethnicity (43%) and living in areas of greatest social deprivation (73%). The perinatal mortality was 52.6/1000, which compares with 10.2/1000 for the general maternity population in 2002. Mothers with type 2 diabetes with poor pregnancy outcomes had diabetes from an earlier age (mean 2.2 years) and were more likely to be using insulin pre-pregnancy (49% versus 28%, p = 0.04). Glycaemic control, as assessed by serial haemoglobin A1c (HbA1c) tended to be worse

in the poor outcome group before and throughout pregnancy. This difference reached significance in the first trimester, with median HbA1c of 7.5% in the poor outcome and 6.5% in the good outcome group ($p = 0.02$).

Conclusions: Mothers with type 2 diabetes in WM have a fivefold higher perinatal mortality rate compared with the regional general maternity population. Identification of risk factors and improved glycaemic control should assist efforts to improve perinatal outcomes in this group.

PPO.14 TRENDS IN FETAL AND MATERNAL MEDICAL RESEARCH

C Ruprai, R Koutsouridou, J Freitas, S Lindow. *Hull and East Yorkshire Hospitals, Hull, UK*

Background: Never before have opportunities for research in reproductive sciences been so great. The challenge in obstetrics and gynaecology is to increase research output as they form an integral part of good medicine. It has been suggested that the amount of original obstetric medical research in the United Kingdom is declining.

Methods: The British Maternal and Fetal Medicine Society holds an annual congress with publication of all abstracts in the *Journal of Obstetrics and Gynaecology*. This study reviewed the abstracts from 1997 to 2007 to categorise the research methodology, serving as a reasonable proxy for the type of research being done in this speciality.

Results: 1299 poster abstracts were reviewed and categorised. Reports of original research studies requiring ethical approval dropped from 35.2% (1998) to 16.7% (2007) of the total. Reports of other studies that would not require ethics approval went from 21.6% (1999) to 45.4% (2007). Observational studies were the most common abstract and they remained constant at 30–40% most years.

Conclusions: There is a decrease in the output of research that requires ethics approval in our speciality over the past decade if expressed as a percentage of total output. The reasons for this will be debated.

1. **Setting Standards to improve women's health.** RCOG response to Cooksey Review of UK health resources.
2. **Obstacles to conducting epidemiological research in the UK general population.** *BMJ* 2004;**329**:277–9.
3. **Bureaucracy of ethics applications.** *BMJ* 2004;**329**:280–4.

PPO.15 VILLOUS DYSMATURITY: CAN IT BE PREDICTED ANTENATALLY AND IS IT RELEVANT TO OBSTETRIC OUTCOME?

SM Cooley, J Donnelly, T Walsh, A O' Malley, J Gillan, MP Geary. *Rotunda Hospital, Dublin, Ireland*

Objective: Villous dysmaturity is a condition of terminal chorionic villi in which an increased amount of stromal connective tissue is observed with a corresponding reduction in capillary calibre. It has been linked to gestational diabetes and its prevalence increases with poor glycaemic control. Recent information shows that this condition is associated with impaired fetal perfusion and non-diabetic patients with placental villous dysmaturity have an established increased risk of idiopathic intrauterine fetal distress. We aimed to determine the incidence and impact of placental villous dysmaturity in the low-risk primigravid population. We also aimed to determine a predictive pathognomic ultrasonographic feature for the condition.

Methods: Caucasian women with a singleton pregnancy, booking at less than 20 weeks' gestation were recruited. They were between 18 and 40 years old and had no chronic medical conditions. Fetal growth, uterine and umbilical Dopplers and placental architecture were reviewed ultrasonographically at 24 and 36 weeks' gestation. Maternal and neonatal outcome was

recorded at delivery. Systematic placental histology was performed and villous dysmaturity was graded based on the percentage of stroma present.

Results: 1011 primips were recruited. Detailed placental histology was performed. Villous dysmaturity was present in 31.6%. It was associated with a higher rate of induction of labour, higher rates of obstetric intervention and a fivefold increase in the incidence of postpartum haemorrhage when compared with the control population.

Conclusions: We conclude that villous dysmaturity is highly prevalent and impacts negatively on maternal outcome.

PPO.16 EXTERNAL CEPHALIC VERSION FOR BREECH PRESENTATION AT TERM: IS IT WORTHWHILE?

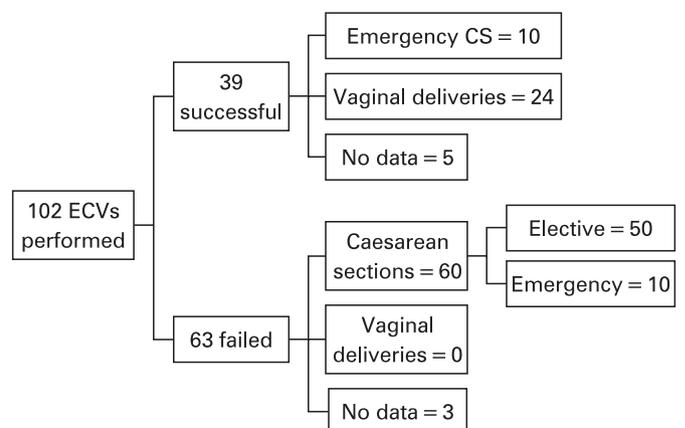
¹M Gidiri, ²OA Jibodu. ¹Women and Children's Hospital, Department of Obstetrics and Gynaecology, Hull Royal Infirmary, Kingston upon Hull, UK; ²York District Hospital, York, UK

Background: Breech presentation has a risk of neonatal morbidity of 19.4% irrespective of mode of delivery. Vaginal breech delivery is associated with greater harm according to the Term Breech Trial. External cephalic version (ECV) and Caesarean section (CS) reduce vaginal breech deliveries and associated risks. We aimed to determine the success rate and pregnancy outcome after ECV.

Methods: We audited ECV performed at York Hospital from January 2002 to December 2005. All patients had nifedipine for tocolysis. Procedure details were recorded contemporaneously and delivery data were obtained retrospectively by case notes review.

Results: We performed ECV in 102 patients. ECV was successful in 38.2%. For all ECV, the CS rate was 74.4% with 53.2% elective and 21.3% emergency CS. Only 25.5% delivered vaginally. Of 20 emergency CS, 10 were breech presentation in early labour, 10 (25.5%) were intrapartum. The commonest indication was failure to progress (50%) then fetal distress (30%); cord prolapse (11%) and antepartum haemorrhage (10%) (see fig).

Conclusions: ECV is a safe procedure but not without risk. The only significant risk in our series was fetal distress (0.9%) requiring emergency delivery. Success rate rarely exceeds 40% in most series. Several studies suggest significant intrapartum CS rates of >17%. With such poor success rates, high intrapartum CS rates and inherent risk of neonatal morbidity, we would like to question the clinical advantages of offering ECV to patients. Are we trading elective for emergency Caesarean sections?



Abstract PPO.16
CS, Caesarean section; ECV, external cephalic version.

PPO.17 IS STILLBIRTH PRECEDED BY BEING SMALL FOR GESTATIONAL AGE?

R Horgan, A Gaolebale, JR Higgins, LC Kenny. *Department of Obstetrics and Gynaecology, University College Cork, Cork, Ireland*

Stillbirths are the largest component of perinatal mortality. Current classification systems consistently report at least half of stillbirths as unexplained.¹ A new classification system (ReCoDe) can identify relevant conditions at the time of fetal death in 85% of cases² and has found that fetal growth restriction is the single largest category of conditions associated with stillbirth and is found in the majority of the cases previously considered unexplained. Our objective was to investigate the association between fetal growth restriction and stillbirths in our unit.

We performed a retrospective chart review of all stillbirths over 6 years (2000–5) occurring in the Unified Maternity Services, Cork. Fetal growth restriction was defined as an individual birthweight ratio (IBR) <10th centile.

There were 30 675 deliveries and 156 singleton stillbirths during the 6-year period, giving an overall stillbirth rate of 5.2/1000. 142 charts were available for review. Of the 142 charts, 44 had insufficient data to calculate the IBR.

Stillbirths occurring in babies with congenital abnormalities (n = 20) were excluded. 56% (44/78) of stillbirths occurred in infants with IBR <10th centile, 51% (40/78) of stillbirths occurred in infants with IBR <5th and 50% (39/78) of stillbirths occurred in infants with IBR <3rd centile.

The use of customised centiles for weight allows quantification of the overall strength of association between stillbirth and pathological smallness. Fetal growth restriction is a common antecedent of previously unexplained stillbirth in our population.

- Confidential Enquiry into Maternal and Child Health.** Perinatal Mortality Surveillance, 2004: England, Wales and Northern Ireland. London: CEMACH, 2006.
- Gardosi J,** Kady SM, McGeown P, *et al.* Classification of stillbirths by relevant condition at death (ReCoDe): population based cohort study. *BMJ* 2005;**331**:1113–17.

PPO.18 NEONATAL OUTCOMES OF SPONTANEOUS POST-TERM DELIVERIES IN A TERTIARY OBSTETRIC UNIT IN THE UNITED KINGDOM BETWEEN 1999 AND 2005

SAC De Silva, L Baker, A Kerrigan, S Quenby, J Topping. *Liverpool Womens NHS Foundation Trust, Liverpool, UK*

Introduction: Current RCOG–UK guidelines recommend women with uncomplicated pregnancies should be offered induction of labour (IOL) beyond 41 weeks (287 days). If declined, for increased antenatal surveillance including twice weekly cardiotocograph and amniotic fluid measurement beyond 42 weeks (294 days). Our current unit protocol offers IOL at 290 days (T+10).

Methods: Retrospective cohort audit of 15 845 uncomplicated post dates pregnancies of which 2157 had normal T+10 antenatal surveillance at Liverpool Women’s Hospital. All had spontaneous onset of labour between 1 January 1999 and 31 December 2005. The hospital electronic database Meditech was used for data collection.

Results: Neonatal outcome measurements included need for advanced resuscitation, Apgar scores of <5 at 1 and 5 minutes, presence of thick meconium, cord pH <7.0 and stillbirths. Results were analyzed in groups according to gestation in days (see table).

Conclusions: Our results show an increased incidence of thick meconium beyond T+10 (p<0.001) and a requirement for advanced resuscitation for neonates delivering T+14 or greater (p<0.001). However, the incidence of cord pH <7.0 was actually decreased in all cohorts beyond T+10 (p<0.003) with normal postdates monitoring.

PPO.19 OUT-OF-HOSPITAL DELIVERY STUDY

R Horgan, S Gupta, R Sarkar, LC Kenny, JR Higgins. *Department of Obstetrics and Gynaecology, University College Cork, Cork, Ireland*

Born-before-arrival or out-of-hospital deliveries are reported to be associated with an increased perinatal mortality rate. Prematurity is the main contributing factor. However, there are few recent studies. Our aims were to determine the neonatal outcomes of out-of-hospital deliveries and to explore the obstetric characteristics of these women.

This was a 10-year retrospective review (1997–2006 inclusive) of all births that occurred before arrival at two Cork maternity hospitals.

There were 50 789 deliveries during the study period. There were 468 perinatal deaths (overall perinatal mortality rate 9.2). 152 women delivered 155 babies out-of-hospital (prevalence 0.3%) during the study period. 130 cases (133 babies) were available for review.

The perinatal mortality rate was higher for babies born-before-arrival (45.1/1000). Prematurity was the main contributing factor (all four early neonatal deaths were born less than 28 weeks’ gestation).

111 (87%) of the women were multiparous. 16 (13%) cases were unbooked and these women were more likely to be young and unmarried. 50% of the babies were delivered between midnight and 08:00 hours. 53 (42%) of women delivering before arrival lived more than 50 km from the hospital.

Cork is the largest county in Ireland and much of the population live some distance from the maternity units. Parity and residing at a remote distance from the hospital appear to be the major risk factors for out-of-hospital deliveries.

Improving training of district hospital staff and emergency medical technicians in the immediate management of the preterm infant may reduce the morbidity and mortality associated with out-of-hospital delivery.

Abstract PPO.18

	280–290	291 (T+11)	292 (T+12)	293 (T+13)	294 (T+14)	>294
Gestation in days	n = 13 688	n = 798	n = 555	n = 359	n = 183	n = 262
Advanced resuscitation %	0.9	0.3	0.7	0.8	2.7	2.7
Apgar <5 at 1 minute %	7.6	9	10	8.9	15.3	15.3
Apgar <5 at 5 minutes %	0.8	0.5	0.2	1.1	1.1	0.8
Thick meconium %	8.2	12.1	12.1	11.2	12.6	9.6
Cord ph <7.0%	12.4	8.8	11.4	8.9	8.2	8.8
Stillbirths %	0.1	0.1	0	0	0	0

PPO.20 PREGNANCY OUTCOME AFTER A STILLBIRTHL Shanmugasundaram. *Dorset County Hospital Foundation Trust, Dorchester, UK*

Introduction: Stillbirths are often a result of a complex chain of events. The CEMACH report in 2005 showed a stillbirth rate of 5.5% for England and Wales. Several different classifications are in use for stillbirths. There is a high level of anxiety for the woman and care providers during the pregnancy subsequent to the stillbirth. This study helps to assess the outcome in pregnancy after a stillbirth.

Aim of the Study: To get a live birth rate subsequent to a stillbirth pregnancy.

Study Method: A retrospective case series analysis between 2000 and 2005.

Setting: Leeds Teaching Hospitals—St James's University Hospital and Leeds General Infirmary.

Outcome: At the Leeds Teaching Hospitals there were 26 000 births in 2000–4. The number of stillbirths in this period was 300; this included eight sets of twin pregnancies. In the period 2000–5, 139 women who have had a stillbirth were booked for a subsequent pregnancy. There were 173 deliveries. Among these there were 12 stillbirths. The recurrence rate for stillbirths is 6.9%. Most of the pregnancies subsequent to the stillbirth occurred within a short time interval.

Conclusions: At Leeds Teaching Hospitals among women who attended for delivery after having a stillbirth in a previous pregnancy, 93.1% had a live birth. There are several contributing factors for the stillbirths and their recurrence and this study provides an overview.

PPO.21 THE CHARACTERISTICS OF PREGNANCIES WITH UNRECORDED BEST ESTIMATE OF GESTATIONAL AGE AT BIRTH

¹I Balchin, ²JC Whittaker, ³RF Lamont, ³PJ Steer. ¹University College London, London, UK; ²London School of Hygiene and Tropical Medicine, London, UK; ³Imperial College, London, UK

Objective: To identify the factors associated with pregnancies with unrecorded best estimate of gestational age at birth, hereafter called the study group and to investigate if the exclusion of such cases in epidemiological studies would alter the true perinatal outcome.

Methods: A prospective study of 497 105 cases in 15 maternity units in North West Thames from 1988 to 1998. We recalculated the best estimate of gestational age at birth, using the infant's actual date of birth and the estimated date of delivery. Factors associated with the study group were identified using multiple logistic regression analysis.

Results: The study group had 53 981 (11%) cases. It was possible to compute a new best estimate of gestational age at birth in 80% of cases. Of these, 27% were miscarriages and the preterm birth rate was 42.0% (95% CI 41.5 to 42.6). Excluding miscarriages, the associating factors were change of place of birth (OR 66.4, 95% CI 17.9 to 245.8) and uncertain last menstrual date (OR 5.2, 95% CI 1.7 to 16.0).

Conclusions: The corrected, overall preterm birth rate in North West Thames was 9.8% (95% CI 9.7 to 9.9). This was significantly higher than our previously reported rate of 7.6% (95% CI 7.5 to 7.7) for cases with recorded gestational age over the same period. Human omission was the main contributing factor, possibly because in high-risk cases, the midwives were too busy to complete the computer data entry. Researchers should be aware that excluding pregnancies with unrecorded gestational age would lead to a study of an unrepresentative sample.

PPO.22 ARE THERE DIFFERENCES IN ATTITUDES TO AND MANAGEMENT OF EXTREME PRETERM BIRTH AMONG PERINATAL HEALTH PROFESSIONALS?

¹E Jones, ²L Miall. ¹University of Leeds, Leeds, UK; ²Leeds Teaching Hospitals NHS Trust, Leeds, UK

Objectives: To describe the attitudes of perinatal health professionals, to issues surrounding antenatal counselling and resuscitation of extremely preterm infants.

Methods: A questionnaire-based survey conducted in three tertiary perinatal centres, delivered anonymously to all senior neonatologists and neonatal nurses, delivery suite midwives and obstetricians. Information was gathered regarding parental counselling, delivery and resuscitation of infants 22⁺⁰–26⁺⁶ weeks' gestation. Outcome data were analyzed using the χ^2 test.

Results: 144 of 319 questionnaires were returned. 23 neonatologists, 52 neonatal nurses, 19 obstetricians and 50 midwives responded. At 23⁺⁰⁻⁶ weeks 36/42 (86%) doctors considered parents were involved in decision making versus 67/102 (66%) nurses, $p < 0.05$. At 23⁺⁰⁻⁶ weeks neonatal staff were more likely than obstetric staff to request fetal monitoring, 59/75 (79%) versus 23/69 (33%) $p < 0.01$ and antenatal steroids 38/75 (51%) versus 22/69 (32%) $p < 0.05$. At 25⁺⁰⁻⁶ weeks 7/19 (37%) obstetricians would perform a Caesarean section for fetal distress versus 94/125 (75%) of others, $p < 0.01$. At 23⁺⁰⁻⁶ weeks, 15/23 (65%) senior neonatologists wanted to attend delivery; this was felt necessary by 45/121 (37%) of others, $p < 0.05$. At 24⁺⁰⁻⁶ weeks, 8/19 (42%) obstetricians thought a baby should be actively resuscitated versus 95/125 (76%) of others, $p < 0.01$.

Conclusions: We found significant differences of opinion between different groups of health professionals. More work is needed for care to be standardised, best practice delineated and communication between perinatal professionals improved.

PPO.23 DOSE REVERSED TYPE 3 FEMALE GENITAL MUTILATION STILL INCREASE THE POSSIBILITY OF OBSTETRIC COMPLICATIONS?

S Raouf, T Ball, A Hughes, S Papaioannou. *Heart of England Hospital, Birmingham, UK*

Objective: To assess whether reversal of type 3 female genital mutilation (FGM) will affect the obstetric and neonatal outcome.

Setting: Birmingham Teaching Hospital.

Design: Retrospective observational study.

Methods: Retrospective analyses of the first 250 cases of type 3 FGM from the FGM clinic data; both obstetric and neonatal outcome were obtained from case notes review.

Results: 97% of the patients were Somalian origin, the reversal was offered to 92% of type 3 FGM in the antenatal period by a trained skilled midwife. A total of 230 women with type 3 FGM were reversed, the majority in the antenatal period and in the first stage of labour. 184 (80%) of them achieved normal vaginal delivery, 64 (35%) of them had an intact perineum with an estimated blood loss average of 300 ml and the Caesarean section rate was 20%, which is less than the local Caesarean section rate. 214 (93%) had good neonatal Apgar scores. The 20 (8%) non-reversed patients had a 50% Caesarean section rate; of those who had a normal vaginal delivery, 50% had second degree perineal tear and 50% required large episiotomy, the estimated blood loss average was 500 ml.

Conclusions: The obstetrics outcome of the reversed type 3 FGM is not different from the general population. Although the number is not sufficient nevertheless the comparison between the reversed and non-reversed group verifies that the initial operation has obstetric significance. Larger studies are required to establish the clinical value of reversal of type 3 FGM.

PPO.24 NEONATAL ENCEPHALOPATHY: IS THERE A RECURRING INTRAPARTUM CAUSE?

F Siddiqui, D Mathews, A Simm, L Kean. *Nottingham University NHS Trust (City Campus), Nottingham, UK*

Background: Despite improvements in antenatal and intrapartum care the incidence of neonatal encephalopathy remains static.

Methods: This prospective study reviews cases of neonatal encephalopathy in a tertiary centre (with 5700 deliveries per annum) between January 2004 and December 2007. Infants delivered after 34 weeks with arterial cord pH <7.1 and Apgar scores of <7 at 5 minutes were included.

Results: 42 infants were included; 14 had grade 3, 12 had grade 2 and 15 had grade 1 encephalopathy, with one neonatal death. Six cases had an identifiable antenatal trigger before admission (four presenting with reduced fetal movements). Six cases were inpatients. In 16 cases an intrapartum cause was identified. 13 had cardiotocography abnormalities, which were not detected in six cases. In five, the decision-to-incision interval was longer than 30 minutes; four of these five had a BMI >35. The neonatal resuscitation was delayed or inadequate in eight cases. Six of the intrapartum causes were compounded with delayed neonatal resuscitation. No cause was found in one case.

Discussion: The approach to reduce the incidence of hypoxic ischaemic encephalopathy should be multidisciplinary with good communication between the obstetric, neonatal and anaesthetic staff. The category of Caesarean should be reviewed if the clinical condition changes. Patients with BMI >35 have a longer decision-to-delivery time and pose both an anaesthetic and surgical challenge when labour is complicated by a pathological cardiotocograph. Furthermore, the need for better education in the primary care setting to report reduced fetal movements and arrange appropriate fetal assessment was highlighted.

PPO.25 TERM LOW BIRTHWEIGHT BABIES: ARE THEY UNDER-DIAGNOSED ANTENATALLY?

M Rajagopalan, M Nandar, D Rich, A Sajitha Parveen. *Gwent Healthcare NHS Trust, Nevill Hall Hospital, Abergavenny, UK*

Aim: To identify whether low birthweight babies are predicted antenatally in the setting of a district general hospital. We also analyzed the methods of diagnosis, prevalence of risk factors and neonatal outcome.

Methodology: Retrospective study of 54 cases of term babies (>37 weeks) with birthweight <10th centile (2500 g) delivered over a period of one year. All women who met the above criteria were included in the study.

Results: (31/54) 57.4% were primigravida and (10/54) 18.5% had BMI <20. (29/54) 53.4% had at least one or two risk factors for low birthweight and (7/54) 13% had three or more risk factors. Smoking and depression were prevalent in 57% and 20% of the study population, respectively. 39/54 (72%) were predicted antenatally. 15 (38.5%) of these were picked up by symphysis fundal height (SFH) measurement using customised growth charts and 24 (61.5%) by ultrasound. 15/54 (28%) were not detected with SFH measurements and were diagnosed post-delivery. Four cases had abnormal liquor and/or Doppler. Good neonatal outcome was obtained in all of the patients studied.

Conclusions: 28% of small for gestational age (SGA) babies were not detected clinically despite using customised growth charts. Of these, 47% had at least one risk factor with 7% having two risk factors or more. Ultrasound has a higher positive predictive value at detecting SGA babies than SFH.

PPO.26 STUDY ON ACCURACY OF SONOGRAPHIC ESTIMATION OF FETAL WEIGHT IN LOW BIRTHWEIGHT BABIES

M Rajagopalan, M Nandar, D Rich, A Sajitha Parveen. *Gwent Healthcare NHS Trust, Nevill Hall Hospital, Abergavenny, UK*

Aim: To study the accuracy of expected birthweight calculated by ultrasound in low birthweight babies in a district general hospital.

Methodology: Retrospective study in which 54 term low birthweight (birthweight <10th centile at 37 completed weeks) cases were selected. Seventeen of these were not scanned and hence were excluded. The remaining 37 cases were analyzed and expected birthweight was calculated from the last scan using the Hadlock chart. Expected birthweight at delivery was calculated by adding 30 g/day for normal growth and 20 g/day for abdominal circumference less than 10th centile (Gallivan *et al*).

Results: Discrepancy between actual birthweight and calculated expected birthweight was <10% in only 38% (14/37) and >10% in 62% (23/37). In 91% of cases, actual birthweight was less than sonographic calculated expected birthweight. In only 9% of cases, the actual birthweight was more than the calculated birthweight. The mean average time between last scan and time of delivery was 13 days.

Conclusions: The study shows that the use of ultrasound biometry for prediction of estimated birthweight, especially in low birthweight babies, is less accurate and is more a case of overestimation of fetal weight. Some variation in discrepancy in this study might be due to bias from added predicted weight gain and from operator bias.

PPO.27 CERVICAL CERCLAGE AND PREGNANCY OUTCOME

¹S Sawant, ¹P Hoo, ^{1,2}W Lo, ^{1,2}R Rai, ^{1,2}L Regan. ¹Hillingdon Hospital, London, UK; ²St Mary's Hospital, London, UK; ³Imperial College, London, UK

Aim: Assess the efficacy of modified Shirodkar's high cervical cerclage with respect to take-home baby rate, complications such as bleeding and infection.

Materials/Methods: Retrospective case note review, for women attending the recurrent miscarriage clinic at St Mary's Hospital, London, who underwent a modified Shirodkars stitch for history of cervical incompetence. The cohort was based on a history of cervical incompetence. Co-factors such as primary antiphospholipids syndrome and thromboelastogram were investigated and treated. The suture was placed high up on the cervix after reflecting the bladder and the knot was buried anteriorly under the vaginal skin. Electively the cerclage was removed after 36 weeks.

Results: Total cohort, n = 75. 62 women had elective modified Shirodkars cerclage at 12+ to 17 weeks' gestation and 13 women had emergency rescue cerclage between 16 and 24 weeks. The take-home baby rate was 94.3% (58/62) in the elective group and 92.3% with rescue cerclage (12/13). The perioperative complication rate was 5%. Only 1/75 patients had difficulty in removing the cerclage. 78% of women had additional co-factors such as primary antiphospholipids syndrome and thromboelastogram. The take-home baby rate in this subgroup was 91.5%.

Conclusions: High placement of the knot and its burial reduces the risk of infection and early delivery. Investigation and treatment of co-factors improves the outcome of the pregnancy.

PPO.28 WITHDRAWN**PPO.29 TIME TO TARGET BIRTHWEIGHT DEFICIT IN SOUTH ASIAN BABIES IN THE UNITED KINGDOM**

R Parikh, E Archery, S Sinha. *Manor Hospital, Walsall, UK*

Introduction: Historically south Asian babies are of low birthweight and are lighter than their European counterparts. Low

birthweight in babies predisposes to type 2 diabetes, essential hypertension, coronary artery and renal disease in later life.

Aims: To determine the secular trend over a 20-year period for the mean birthweight of south Asian babies born in Walsall versus their European counterparts. To determine whether ethnicity or any maternal factor has a significant effect on birthweight.

Methods: A prospective research study of the birthweight of five subgroups of south Asian babies and European babies over a 1-year period. We recorded maternal and baby details from maternal antenatal and postnatal notes.

Results: 402 babies were studied. 268 were European and 134 babies were of south Asian origin. Our findings showed that the mean birthweight of babies born to all subgroups of south Asian mothers has not increased in the past two decades. The mean birthweight was highest in the European babies (3.32 kg) and lowest in two subgroups, namely Hindus and Muslim Gujarati babies (3.04 kg). Analysis showed that when maternal factors were taken into account, ethnic group was no longer a significant predictor of birthweight. The significant predictors were BMI ($p < 0.001$), cigarette smoking and parity.

Conclusions: Persistence of low birthweight in the south Asian population means that the risk of the associated morbidities will also remain constant. Strategic health measures need to be implemented to target this population subgroup especially as there is an associated rise in the birth rate in this ethnic group.

PPO.30 BODY MASS INDEX AND MATERNAL AGE IN HIGH-RISK ANTENATAL PATIENTS

Y Diab, M To, K Harding, K Langford. *Guys and St Thomas' NHS Foundation Trust, London, UK*

There is substantial evidence that obesity in pregnancy contributes to increased morbidity and mortality for both mother and baby.¹ It is also widely held clinically that advanced maternal age is associated with poor reproductive outcome and is independently associated with specific adverse pregnancy outcomes.²

We assessed the prevalence of obesity and advanced maternal age in women who attended a specialised high-risk antenatal clinic for a 4-week period at St Thomas's Hospital (mean age 31.7 ± 0.71 CI, mean BMI 25.2 ± 1.11 CI) and in patients who were admitted to the antenatal ward during the same period (mean age 30 ± 1.20 CI, mean BMI 24.5 ± 1.06 CI) compared with all births during the same period (mean age 30.3 ± 0.62 CI, mean BMI 24.1 ± 0.62 CI). We also audited the level of compliance with regard to the documentation of BMI of the above groups.

Up to 26% of BMI were not recorded on maternity healthware.

Despite the well documented risks of increased BMI and advanced maternal age we were unable to show any difference in BMI and age between all deliveries and those women requiring admission or attending high-risk antenatal clinics. This might be due to inaccurate data or a small sample size of a high-risk population.

We conclude that neither increased BMI nor advanced maternal age increase the risk of antenatal admission or referral to specialised high-risk antenatal clinic in our sample population.

1. **CEMACH report.** 2005.
2. **Luke B,** Brown MB. Elevated risks of pregnancy complications and adverse outcomes with increasing maternal age. *Hum Reprod* 2007;**22**(5).

PPO.31 ADMISSIONS TO AN OBSTETRIC HIGH DEPENDENCY UNIT

HJ Scholefield, C Fitzpatrick, P Coffey, R Stanton. *Liverpool Women's NHS Foundation Trust, Liverpool, UK*

There are no recent data about the rate of admission to a high dependency unit (HDU). In England, the Critical Care Minimum Data Set (CCMDS) is now being used to assess critical care activity. This uses the number of organs supported to define level of care.

One organ is level 2 (high dependency), two or more level 3 (intensive care). It is unclear whether the definitions used are transferable to obstetrics. We looked at our admissions over a 7-month period to determine rates of admissions and level of care as defined by the CCMDS.

4608 women were delivered and 239 (5.18%) were admitted to the HDU. Average length of stay was 1.97 days. 137 (57%) were CCMDS level 2 and 52 (22%) level 3.

50 (21%) women admitted did not meet the organ support criteria of CCMDS, but did meet the intensive care society criteria for critical care. Their average length of stay was 2 days.

An admission rate of 1–2% quoted in the literature. This predates the publication of the MAGPIE study. Magnesium sulphate treatment constitutes a significant proportion of our HDU admissions, which may account for this increase.

A surprisingly high number of women were CCMDS level 3. It has previously been noted that obstetric patients score high on intensive care unit scoring systems such as APACHE II, but have lower mortality. This has not been reported previously for CCMDS. A significant minority requiring HDU care did not fit the CCMDS definitions. Further work is needed to refine CCMDS for obstetric purposes.

PPO.32 NEONATAL MORBIDITY AND PERINATAL MORTALITY IN PREGNANCIES WITH ABSENT OR REVERSED END-DIASTOLIC FLOW ON UMBILICAL ARTERY DOPPLER

¹LB Duthie, ¹SJE Stock, ²J Urquhart, ¹ES Cooper. *¹Edinburgh University, Edinburgh, UK; ²New Royal Infirmary of Edinburgh, Edinburgh, UK*

Objective: To analyze outcomes of pregnancies with absent or reversed end-diastolic flow on umbilical artery Doppler managed at the Simpson Centre for Reproductive Health, a tertiary referral unit with approximately 6000 deliveries a year and a health board perinatal mortality rate of 10.1 per 1000 deliveries.

Methods: We retrospectively reviewed cases between 1996 and 2007. Obstetric and delivery details were obtained from maternity database and case note review. Neonatal morbidity data were obtained from the Badger data management system (2000 onwards). Statistical analysis was performed using SPSS.

Findings: 148 cases of absent/reversed end-diastolic were flow identified. The usual indication for umbilical Doppler assessment was abdominal circumference <5th centile on ultrasound. 17 were twin pregnancies and three cases were associated with fetal anomaly or chromosomal abnormality; these were excluded from analysis. Median gestation at diagnosis was 31 weeks (range 23–40) and median interval to delivery was 1 day (range 0–37). Perinatal mortality rate was 11.7%, with 93% (14/15) of deaths occurring at gestations <32 weeks and weights <1000 g. 90% of live births were admitted to the neonatal unit with median stay of 40 days (range 1–137). 26.9% had one or more of the following morbidities: bronchopulmonary dysplasia, intracerebral haemorrhage, necrotising enterocolitis or retinopathy of prematurity. Adverse perinatal outcomes related to gestational age and birthweight. Intact survival to discharge improved dramatically after 28 weeks' gestation consistently exceeding 60%. Neonatal morbidity was more common when mothers were smokers or aged ≥ 35 years ($p < 0.05$).

PPO.33 PRETERM PREMATURE RUPTURE OF MEMBRANES: A 4-YEAR RETROSPECTIVE REVIEW

M Manoharan, A Karthikeyan, KJ Erskine. *Homerton University Hospital NHS Foundation Trust, London, UK*

Preterm premature rupture of the membranes (PPROM) is a major cause of preterm births. It is typically thought to be associated with brief latency between rupture of the membranes and delivery, risk of perinatal infection and significant morbidity and mortality.

The aim of this review is to evaluate the outcome of patients with PPRM at a tertiary referral centre over 4 years (2003–7).

64 patients with confirmed PPRM were identified. They were admitted for a week; conservative management was advocated unless there was evidence of chorioamnionitis. Our hospital did not routinely use antibiotics in 2003–5. We looked at gestation, neonatal outcome and antibiotic usage.

33% of rupture of the membranes occurred at 35–36+6 weeks; 11% at 23–24+6 weeks. 28% of women had had an early termination of pregnancy, 5% late miscarriage and 11% had previous PPRM/preterm delivery. 36% of women received erythromycin. 45% of women delivered within 7 days; 16% at 8–14 days and 39% delivered at >2 weeks. 26% of women who had antibiotics compared with 56% of women who did not deliver within 7 days.

In women whose babies were admitted, the white blood cell count was raised in 60%, neutrophil count in 81% and C-reactive protein level in 63%. Only 18% of babies over 35 weeks required admission.

In conclusion, only 45% of women delivered within 7 days of rupture of the membranes despite many not receiving antibiotics. Use of antibiotics resulted in prolongation of pregnancy. The impact on outcome of white blood cell count and C-reactive protein level is difficult to evaluate. Our hospital policy has now changed so that all women with PPRM are induced at 35 weeks.

PPO.34 THE LINK CLINIC AUDIT, LIVERPOOL WOMEN'S HOSPITAL: FAVOURABLE OBSTETRIC OUTCOMES OF 1540 WOMEN FROM ETHNIC MINORITY GROUPS WHEN THE FIRST LANGUAGE IS NOT ENGLISH

K Thorncroft, N Deole, J Topping. *Liverpool Women's Hospital, Liverpool, UK*

The Link Clinic provides specialist obstetric care to women whose first language is not English. It is widely appreciated that this heterogeneous population has distinct psychological needs and poorer outcomes. It is specifically noted in the "top ten" recommendations of the latest CEMACH report. However, a Pubmed search reveals relatively little literature on obstetric outcomes in this group, particularly in the United Kingdom.

Methods: Retrospective audit. Database searches of the outcomes of 1540 women booked in the Link Clinic from 2002 to 2006 were compiled and compared with overall trust outcomes from the same period (35 644 women).

Outcomes (Link Versus Overall): Onset of labour: spontaneous 72% versus 60.5%, induction 19% versus 28%. Gestation <37/40; 4.55% (25% <34/40) versus 4.52%. Delivery mode: vaginal 72% versus 65.6%, instrumental 8% versus 10%, elective Caesarean section 6.3% versus 9.7% and emergency Caesarean section 12.9% versus 13.9%. Breech 1.7% versus 3.7%. Neonatal: Apgar <4 at 5 minutes 0.57% versus 0.42%, admission to special care baby unit (SCBU) 6.5% versus 13.4%, cord pH <7 0.44% versus 0.76%. Stillbirth 0.26% versus 0.61%. Link only: Birthweights 5.3% <2500 g, 6.3% 4000 g+, hepatitis B surface antigen 5%, HIV positive 1.3%, refugees 4%, asylum seekers 16%.

Link Clinic outcomes of spontaneous labour, vaginal delivery, admission to SCBU and stillbirth were better; there were fewer inductions of labour, Caesarean sections, breech and instrumental deliveries. This suggests that continuity of care from a dedicated multidisciplinary team, with a special interest in this area, can significantly improve outcomes in this potentially high-risk group.

PPO.35 PREGNANCY OUTCOMES WITH OPIOID SUBSTITUTION THERAPY

P Munjuluri, J Kirk, R Gosakan. *Bradford Royal Infirmary, Bradford, UK*

Introduction: There is a growing body of evidence that treatment for opioid dependence with buprenorphine (Subutex)

Abstract PPO.35

Gestation at delivery	31–41 weeks
Mode of delivery	10 normal delivery, 3 Caesarean sections
Birthweights	1800–3840 g (mean 2990)
Apgar at 1 minute	9
Apgar at 5 minutes	9
Number admitted to neonatal unit	6
Neonatal abstinence syndrome	2 babies required morphine (15%)

is effective and safe. It was licensed for use in the United Kingdom in 1999. It is given as a once-daily sublingual tablet at an initial dose of 0.8–4 mg but experiences limited in its use in pregnancy in the United Kingdom. The recent enquiry into maternal deaths (2003–5) highlighted the contribution of substance abuse. 11% had problems with substance abuse, 60% of whom were registered addicts.

Study Objectives: To investigate obstetric and neonatal outcomes in women using Subutex (buprenorphine) in a multidisciplinary one-stop substance misuse obstetric clinic.

Setting: Large teaching hospital in West Yorkshire.

Methodology: Retrospective case series review: 1999–2007.

Results: The study group comprised 13 women. The mean age of the group was 27 years. The Subutex dose range varied between 0.4 and 8 mg. At delivery, five of them were detoxed. The table shows the outcomes.

Conclusions: The experience gained in the management of these vulnerable women has aided the design of our guidelines and helped optimise outcomes for these mothers and babies.

PPO.36 A COMPARISON OF PREGNANCY OUTCOMES IN MORBIDLY OBESE WOMEN (BMI >40) AND WOMEN WITH BMI 20–25

¹S Stone, ¹J Miller, ¹MC Jolly, ²J Girling. ¹Portsmouth Hospitals, Portsmouth, UK; ²West Middlesex University Hospital, London, UK

Maternal obesity has been associated with adverse pregnancy events.

Objective: To examine outcomes in morbidly obese women delivering in a busy district general hospital in a deprived area in the United Kingdom.

Design: Retrospective audit of 85 women with BMI >40 and a comparison with 2644 women of BMI 20–25 delivering between 1 April 2006 and 31 March 2007.

Measurements: Antenatal management, complications, intervention in labour and neonatal outcome. Data are presented as median values with Mann–Whitney U and Fisher's exact test analysis.

Results: Differences in BMI in the two groups were due to weight (median 114 kg versus 60.6 kg, $p < 0.001$) alone. There were no differences in height ($p = 0.25$), age ($p = 0.051$), previous Caesarean section (CS) ($p = 0.13$), gestation at delivery ($p = 0.63$) and induction ($p = 0.25$). Number of primiparous women was higher in the control group (28% versus 43%, $p = 0.04$). Of women with BMI >40, 41% had co-morbidities, 36% previous pregnancy-induced hypertension/pre-eclampsia; 94% had hospital care; 50% anaesthetic assessment, 84% gestational diabetes screen (4% positive), 50% had serial growth scans; 6% developed pregnancy-induced hypertension, 2% pre-eclampsia, 8% antepartum haemorrhage. Compared with women with BMI 20–25, the normal vaginal delivery rate was less ($p = 0.001$) but with no differences in operative vaginal delivery ($p = 0.67$). The emergency CS rate was 29% versus 16% ($p = 0.009$), total CS rate was 45% versus 23%, $p = 0.001$ with greatest differences in elective CS (22% versus 8%, $p = 0.001$). Meconium stained liquor was more frequent 27% versus 12%, $p = 0.001$. Women with BMI >40 had a high incidence (29%) of wound infections after CS.

Conclusions: Morbid obesity increases morbidity and complicates delivery.

PPO.37 SUBSTANCE ABUSE: CARE IN PREGNANCY AND NEONATAL OUTCOME—UDIT

L Thirumalaikumar, H Preece, P White, R Ironton. *Princess Anne Hospital, Southampton, UK*

Aim: To look into the antepartum, intrapartum and postpartum care of women with substance abuse in pregnancy. To look into the standards of care of the newborn babies born to these women.

Standards: TOG January 2000. Substance abuse in pregnancy. Team approach and DOH guidelines: drug misuse and dependence 1999.

Methodology: Retrospective study from 1 January 2001 to 31 December 2005.

Sample Size: 123 excluded cannabis only users 73 (50). Drugs used: cannabis 73, cocaine 20, opiates 3, ecstasy 3, amphetamines 6, opiate treatment 20. Some women used a combination of drugs.

Results: Mode and duration of administration not documented in >50%. 50% of them were booked at 19–22 weeks. 42% of them defaulted their appointments and there were good efforts and links with community care to ensure good follow-up. Multidisciplinary (obstetric, psychosocial, paediatric, addiction management team) input was noted in 58%. 42% of such women had regular growth scan. 100% had hepatitis B and HIV screening, but none of them had it repeated at 36 weeks. 71% had term delivery. 12% had Caesarean sections. 88% delivered in a high-risk unit. 17% of the babies had birthweight <2.5 kg. 29% of the babies were admitted to a neonatal unit. Of these babies 14% received pharmacological treatment. 67% of the babies had withdrawal observations. Only 9% of the babies were offered hepatitis B vaccination.

Recommendations: Need for local guidelines. To consider anaesthetic referral for specific conditions. Need for continuous cardiocotograph and paediatrician at delivery. Re-audit in the next 5 years.

PPO.38 AN AUDIT OF THE MANAGEMENT OF TERM BREECH PREGNANCIES

Y Mohammed, S Das, B Hammersley. *Tameside General Hospital, Manchester, UK*

Background: The incidence of breech presentation was 3–4% in term pregnancies. The Term Breech Trial significantly changed the practice of breech pregnancies by recommending Caesarean section for breech babies. Guidelines in Tameside General Hospital have encouraged a trial of external cephalic version (ECV) to reduce the number of breech presentations at term and the resultant Caesarean section rate.

Objective: The aim of the audit was to assess adherence to guidelines by assessing antenatal counselling, adherence to hospital guidelines during ECV or vaginal delivery and outcome.

Methods: Retrospective case review of 50 breech pregnancies was conducted and analyzed.

Results: Although 98% of patients were counselled by a consultant or a senior registrar, only six patients (12%) had a trial of ECV, whereas 32% opted for a Caesarean section. Nine patients (18%) with undiagnosed breech underwent emergency Caesarean section. Four patients (8%) had successful trial of vaginal delivery. Adherence to guidelines and documentation were below required standards.

Conclusions: Women who initially agreed to ECV had changed their mind on the day. They voiced concerns over the information provided in the leaflet. This was highlighted as one of the reasons for the poor uptake for ECV. The audit also showed deficiencies in documentation of the counselling. The patient leaflet has been updated to improve uptake of ECV. Creation of a checklist has also been recommended to standardise the quality of counselling in the clinic. A re-audit has been recommended after changes are introduced.

PPO.39 DOES PROVISION OF DEDICATED ANTENATAL CARE IMPROVE THE OBSTETRIC OUTCOME IN TEENAGE PREGNANCY

K Nayini, M Vachhani, J Miheso, F Hamer. *Burnley General Hospital, Burnley, UK*

Introduction: Following the Social Exclusion Unit's report on Teenage Pregnancy 1999, the Teenage Pregnancy Unit was established. The unit was established to manage implementation of the National Teenage Pregnancy Strategy. With a dedicated teenage midwife obstetric outcome has changed tremendously.

Aim: Standards set based on teenage pregnancy report 1999. Standard is that good antenatal care can improve obstetric outcome in a teenage pregnancy.

Methodology: Retrospective analysis of case notes of 62 teenagers delivered between January 2006 and March 2006 in Burnley General Hospital.

Results: 59 (95%) teenage pregnancies occurred in the white population. 42 (68.5%) had regular antenatal check-ups (primis >10 and multitis >7 visits). 12 (19%) teenagers were anaemic (haemoglobin % <11 g/dl) at booking. Seven (11%) teenagers had preterm deliveries. One (1.6%) had pre-eclampsia. Four (6%) of the babies were intrauterine growth restricted babies (<2500 g). 49 (79%) had spontaneous vaginal delivery. Only seven (11%) teenagers had Caesarean sections and four (7%) had instrumental deliveries. 21 (34%) teenagers had perineal tears during delivery. None of the babies were transferred to neonatal intensive care within one hour after delivery.

Conclusions: Anaemia and preterm labour were shown to be common. Instrumental deliveries and Caesarean section rates were low. Other complications such as pre-eclampsia were also low. This highlights that good antenatal care for teenagers with a dedicated teenage midwife improves obstetric outcome and is similar to women of other ages.

PPO.40 RETROSPECTIVE REVIEW OF OBSTETRIC ADMISSIONS TO INTENSIVE CARE UNIT

E Torbe. *Royal Hampshire County Hospital, Winchester, UK*

Objectives: Review clinical characteristics, interventions and outcomes of critically ill obstetric patients admitted to the intensive care unit (ICU) and compare with published data. Identify patients who may be appropriately managed in the high dependency unit (HDU).

Methods: Retrospective review of women, pregnant or within 28 days postpartum, admitted to ICU at Basingstoke and North Hampshire Foundation Trust, between March 2006 and February 2007. Data presented include demographics, diagnosis, interventions, length of stay, indication for ICU admission and outcome.

Results: 14 obstetric ICU admissions represented 0.53% (14/2691) of deliveries. Mean patient age was 31 years and 6 months. Mean parity was 1.8. Mean length of ICU stay was 1.7 days (43 h). 85% (12/14) of admissions were postpartum. Both antenatal admissions were with non-obstetric causes, one sepsis and one trauma. There were no maternal deaths. Fetal death rate was 20% (3/15). Neonatal death rate was 6.7% (1/15). Commonest disease processes leading to critical illness were postpartum haemorrhage (35.7%) and hypertensive disease of pregnancy (14.2%). Commonest indication for ICU admission was haemodynamic instability. 21.4% required inotropic support. 57.1% received significant blood product transfusion. Intravascular monitoring was performed in 85.7%. 64.2% were admitted, intubated and ventilated; all were extubated within 24 h. 21.4% stayed <2 days and did not receive any ICU specific interventions. These patients could potentially be managed in an HDU environment.

Conclusions: Data collected correlated well with previous studies. Therefore our current practice reflects that reported nationally and

internationally. Developing an HDU could prevent unnecessary admissions to ICU, thereby potentially reducing the psychological impact on the patient.

PPO.41 A QUESTIONNAIRE-BASED SURVEY ON THE DEFINITION OF GRAVIDITY AND PARITY

S Sivanathan, Y Gurtovaya. *Oxford University, Oxford, UK*

There is considerable conflict in the literature on the definitions and clinical applications of the terms gravidity and parity, creating confusion among the obstetric specialty regarding their use. We conducted a survey among regional obstetric and midwifery staff, evaluating the interpretations of these terms in relation to previous singleton as well as multiple pregnancies. Dorland's medical dictionary¹ defines gravidity as "the condition of being pregnant, without regard to the outcome". Parity is defined as "the number of pregnancies a woman has had that have each resulted in the birth of an infant or infants capable of survival. The legal age of viability of a fetus is 24 weeks".² 140 questionnaires were handed out to trainees, consultants and midwives in three hospitals in the Oxford deanery and 129 (92%) were returned (see table).

There is significant confusion regarding the definitions of the terms "gravidity" and "parity" among obstetricians and midwives. Standardisation of these definitions is important in clinical risk management and will help improve accuracy and uniformity in documentation.

1. **Dorland WAN.** Dorland's illustrated medical dictionary, 31st edn. Saunders, 2007.
2. **Martin E,** editor. Oxford medical dictionary, 6th edn. Oxford University Press, 2007.

Abstract PPO.41

Answers received	No (%)
Gravidity (accepted definition): total number of pregnancies irrespective of outcome	118 (91.4)
Parity (accepted definition): the "number of pregnancies that attained the gestational age of 24 completed weeks irrespective of outcome"	67 (51.9)
Defined parity as the "number of pregnancies ending in live births at 24 or more completed weeks"	49 (38.0)
Defined a twin delivery as para 1	54 (41.8)
Defined a twin delivery as para 2	72 (55.8)
Defined a twin delivery as "other than para 1 or 2"	3 (2.3)

PPO.42 TWIN PREGNANCIES MANAGED IN A SPECIALISED CLINIC HAVE SIMILAR OUTCOMES REGARDLESS OF HOW THEY ARE CONCEIVED

ED Johnstone, EL Ferriman. *Leeds Teaching Hospitals Trust, Leeds, UK*

Introduction: Current in vitro fertilisation (IVF) (and intracytoplasmic sperm injection) practice results in increased numbers of twin pregnancies. We investigated whether twins resulting from infertility treatment had different obstetric outcomes compared with those conceived spontaneously when managed in a specialised twin clinic.

Methods: A retrospective comparison study of 250 twin pregnancy deliveries after 23 weeks' gestation in a teaching hospital setting was performed from a prospectively recorded database. Outcome measures were the incidence of chorionicity, pre-eclampsia and intrauterine growth restriction (IUGR), gestation, mode of delivery, birthweight and Apgars and admission to special care. Comparisons were made using appropriate statistical tests.

Results: Of pregnancies studied 77.8% were from spontaneous conceptions; monochorionic pregnancies were commoner after spontaneous conception (23% versus 7%, $p = 0.003$). The incidence

of pre-eclampsia and IUGR was not increased in IVF pregnancies (10% versus 16%, $p = 0.082$, 7% versus 8%, $p = 0.67$). Both groups had the same median delivery gestation (spontaneous 38 weeks, IVF 37 weeks, $p = 0.1$) and similar incidences of Caesarean section (36% and 38%, $p = 0.9$). Gestation-corrected mean birthweight, abnormal second twin Apgars or admission to special care did not differ between the two groups.

Conclusions: The incidence of pre-eclampsia was not statistically different, but did show a trend towards being increased in the IVF group, which concurs with published evidence. All other comparisons did not reveal significant differences between the two groups. This conflicts with other studies of outcomes after infertility treatment in multiple pregnancy patients and suggests that with specialised twin pregnancy care near identical outcomes can be achieved.

PPO.43 PREGNANCY OUTCOMES WITH AN ANENCEPHALIC FETUS: A 10-YEAR REVIEW OF CASES IN A DISTRICT GENERAL HOSPITAL

E Ingram, EA Martindale. *Royal Blackburn Hospital, Blackburn, UK*

Anencephaly is a diagnosis usually made early in pregnancy. The condition is lethal and termination of pregnancy is offered. In many places in the United Kingdom, term pregnancies with an anencephalic fetus are not seen. The Royal Blackburn Hospital has approximately 3700 deliveries per year, with a large proportion born to ethnic minorities. Termination is not an acceptable option to many of our Muslim women and we are therefore starting to have experience of caring for and delivering these women at term and beyond.

From 1997 to 2006 there were 24 cases of anencephaly at the Royal Blackburn Hospital. Diagnosis was identified from an ultrasound department database, with the delivery and termination information gained from the Birth Register and Fetal Loss Register, respectively.

There were 14 terminations of pregnancy, with gestations ranging from 12 to 23 weeks. Seven of these women were of ethnic minority. There were five deliveries at term, one induction at 26 weeks and two spontaneous miscarriages at 17 and 22 weeks. All the term deliveries were born to Muslim women, predominantly with face presentation and were commonly overdue. Three of the infants were born alive and died within 24 h. The information regarding two women was unobtainable.

Muslim women are more likely to carry an anencephalic fetus to term. Caring for these pregnancies can be challenging, especially when considering delivery options and the risks of induction of labour. The importance of preconceptual folic acid needs to be emphasised especially within ethnic minorities.

PPO.44 TO ASSESS HBSAG POSITIVITY DURING PREGNANCY AND OUTCOME

R Wuntakal, V Thakur, O Oluwu, L Coxon, B Dawlatly, D Visvanathan. *Whipps Cross University Hospital, London, UK*

Background: Hepatitis B is the world's most common blood-borne viral infection. Perinatal transmission decreased to <5% if the mother was HBsAg positive and HBeAg negative. Often, 90% of the perinatal infection can be prevented if HBsAg-positive mothers are identified and their newborn babies are treated promptly after delivery with hepatitis B virus vaccine and hepatitis B immune globulin depending on the status of HBsAg and HBeAg positivity.

Aims: This audit was carried out to assess HBsAg positivity during pregnancy and neonatal outcome.

Materials and Methods: A retrospective study of 35 cases from January 2007 to July 2007 performed at Whipps Cross University Hospital. We collected data from antenatal cards, antenatal

hepatitis B positive register, intranet and database, labour ward register and also vaccination register for babies. We got 35 cases of HBsAg-positive patients from the total screened patients.

Results: The total number of HBsAg-positive women was 35. Out of these 29 were low risk for infectivity (ie, HBsAg positive and HBeAg negative) and six were high risk for infectivity (ie, HBsAg positive and HBeAg positive). The documentation in the antenatal record was 100%. None of the babies were admitted to the special care baby unit and the vaccination rate was 100%. It did not show any effect on haemoglobin, white blood count and platelet levels.

Conclusions: We recommend that all women should be offered antenatal screening for hepatitis B and neonates should be vaccinated if mothers are HBsAg positive.

PPO.45 THE USE OF BILE ACIDS IN THE MANAGEMENT OF OBSTETRIC CHOLESTASIS: SHOULD WE CONTINUE?

MM Reyad, MS Zanaty, S Dave, S Cray. *North Manchester General Hospital, Manchester, UK*

Obstetric cholestasis is a condition that occurs only during pregnancy. Its diagnosis can be quite difficult and is partly by the use of biochemical markers, mainly liver function tests (LFT) and bile acids.

Objectives: To evaluate the use of bile acids as a diagnostic marker for obstetric cholestasis and whether its use changes our management in such cases. To identify whether we need to continue with our current practice if the diagnostic findings bear no weight in how the patient is managed.

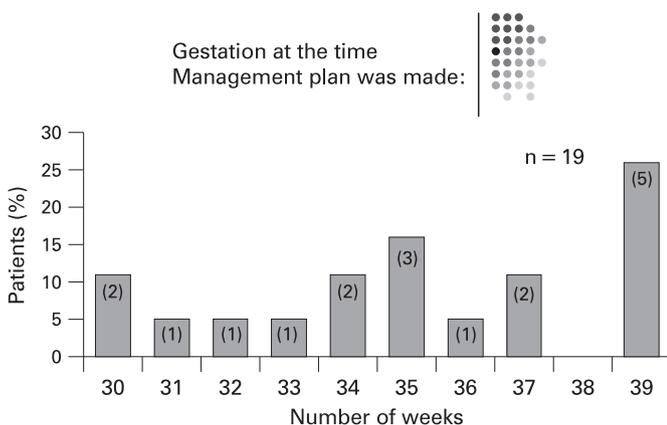
Size: 19 patients.

Methodology: A retrospective audit using a proforma.

Outcome Measures: Gestation at presentation, when LFT and bile acids were performed, when management plan was made and the time of delivery.

Results: Most of the patients presented with the symptoms of cholestasis in the latter half of pregnancy. 10 patients (53%) presented between 28 and 36 weeks, eight (42%) presented between 37 and 40 weeks and only one (5%) presented before 28 weeks. Bile acids were done in 17 patients. The mean gestation at which they were sent was 34 weeks and it took 5–14 days to get the results back. In 13 patients (72%) a management plan was made after 34 weeks, in five (28%) patients it was made between 30 and 33 weeks. 18 patients (95%) delivered between 37 and 40 weeks, only one patient (5%) delivered at 32 weeks (see fig).

Conclusions: Checking bile acids did not affect management in 13 (68%) patients, four (20%) patients were delivered on the basis of bile acid results. Two patients (10%) were awaiting bile acid results before making a decision on induction of labour but one went into spontaneous labour.



Abstract PPO.45

PPO.46 FOLIC ACID SUPPLEMENTATION IN PREGNANCY: AN AUDIT

¹S Dix, ²A Gale. ¹University of Manchester Medical School, Manchester, UK; ²Lancashire Teaching Hospitals NHS Foundation Trust, Preston, UK

Background: Current recommendations for pregnant women and those planning pregnancies are to take 400 µg folic acid daily before conception and for up to 12 weeks' gestation to reduce the risk of neural tube defects. Women in high-risk groups should take 5 mg daily.

Methods: The NICE and Department of Health guidelines were used as the gold standard. 300 pregnant women were included in the audit; women were excluded if they had not yet had an anomaly scan or if their scan was abnormal.

Results: Although 90% of women take supplementation, preconceptional uptake according to the guidance is met by only 28%; with 62% starting after conception, often too late for the prevention of defects. Women were statistically more likely to have started supplementation preconceptionally in the age range 30–40 years, having undergone subfertility investigations, or with detailed knowledge of folic acid supplementation. Knowledge that supplementation should start preconceptionally was high, with 85% of women with planned pregnancies knowing supplementation should be started before conception but only 40% actually doing so, highlighting the difference between knowledge and action.

Discussion: New measures to increase awareness further may have limited impact on supplementation uptake for women not in high-risk groups. Proposed measures to supplement flour with folic acid nationally, raising background folate levels, may be the next appropriate step. Women in high-risk groups are more likely to start supplementation preconceptionally; however, the number doing so is lower than expected and there may be room for improvement in preconceptional counselling.

PPO.47 A RARE CAUSE OF ACUTE POLYHYDRAMNIOS

B Ghosh, R Arya, L Byrd. *St Mary's Hospital, Manchester, UK*

We report a case of a 29-year-old Pakistani primiparous woman with no relevant past medical history who was booked for shared care. An anomaly scan was unremarkable. At 31 weeks' gestation she was referred by the community midwife to the hospital as she measured large for dates with a symphysiofundal height of 34 cm. The abdomen was very tense and fetal parts were difficult to palpate. An ultrasound scan showed gross polyhydramnios with an amniotic fluid index (AFI) of 42.7 cm (>95th centile), with an estimated fetal weight of 2578 g. No anomalies of the stomach, bladder, kidneys and bowel were noted. The woman was admitted for investigation. Corticosteroids were administered for fetal lung maturation in case of preterm delivery. TORCH serology revealed positive IgG and negative IgM for parvovirus, suggesting previous exposure.

A repeat scan performed 2 days later showed that the AFI had increased to 63.0 cm. Umbilical artery Doppler revealed good end-diastolic flow. The possibility of amnioreduction was discussed but it was thought that the liquor would re-accumulate with time. A further scan at 34 weeks' gestation showed an AFI of 24.2 cm (<95th centile). The woman was discharged from hospital. The AFI at 37 weeks' gestation was 17.0 cm. The woman went into labour spontaneously at 39 weeks. She was delivered with forceps due to a prolonged second stage. A liveborn female infant weighing 3630 g was delivered in good condition. The placenta was noted to have a 6 cm tumour. The histology result confirmed chorioangioma.

PPO.48 EXIGENCIES OF PRENATAL SCREENING STRATEGY FOR FETAL ANEUPLOIDY IN ROMANIA

¹E Bernad, ¹D Lungeanu, ¹C Ilie, ²F Capitan, ¹V Albulescu. ¹University of Medicine and Pharmacy, Timisoara, Timis, Romania; ²County Hospital, Timisoara, Timis, Romania

Effective prenatal screening for detecting patients at risk of numerical chromosomal abnormalities using non-invasive assays of maternal serum is in current practice. At the University ObGyn Clinic in Timisoara there were 4616 live and stillbirths in 2006–7. Of these, there were seven cases of cytogenetically confirmed Down's syndrome and 10 cases with other genetic disorders. The academic medical staff recommended to all affiliated obstetricians to measure nuchal translucency during the routine first trimester prenatal visit and to advise all pregnant patients, independently of their age, to undergo first trimester double-test (pregnancy-associated plasma protein A and free beta human chorionic gonadotrophin) and/or second trimester triple-test (α -fetoprotein, total human chorionic gonadotrophin, unconjugated estriol).

In Romania there are private biochemical companies offering such screening tests, but they are not covered by the general health insurance and the cost (approximately €25–30) is not affordable for every patient. Therefore, even for the patients who normally visit private medical offices, the uptake rate has been under 50%. Two private offices were included in our study and 222 patients undertook at least one test (combined with ultrasonography) at a laboratory that uses the software Prisca (DPC France). A calculated risk was provided, independent of each test, with a cut-off value of 1 in 250. Only two cases were detected as true positives and the false positive rate was over 11%.

Although genetic counselling is offered by the obstetrician himself, test costs are high, and specific prevalence and demographic factors for Romania unknown, a coherent national strategy for prenatal screening is needed.

PPO.49 WITHDRAWN

PPO.50 WHY ARE PATIENTS REFERRED FOR CONSULTANT-LED ANTENATAL CARE?

S Yue, RP Smith. Norfolk and Norwich University Hospital, Norwich, UK

We collected all booking referrals received from general practitioners and community midwives between 25 November and 15 December 2006 and analyzed the reason(s) for consultant referral.

We sent a questionnaire to all seven consultant obstetricians with antenatal clinics. We asked if they would arrange any further visits or investigations for some of our criteria, without any other risk factors: age 37–40 years at estimated date of delivery (EDD); subfertility/in vitro fertilisation pregnancy; short stature (below 1.52 m/5 ft); recurrent miscarriage; grand multiparity.

We received 145 requests for consultant-led antenatal care. 109 (75%) fulfilled our criteria, 22 (15%) did not and in 14 (10%) it was not clear.

All seven consultants would not arrange extra investigations or follow up women solely on the basis of short stature, subfertility or age 37–38 years at EDD (10% or 15/145). There were differences of opinion regarding grand multiparity, recurrent miscarriage or age 39 years or above at EDD.

We could reduce our booking workload by up to 25% by modification of and adherence to our guideline, allowing more time to be spent with complex cases. We aim to modify our guidelines and re-audit in one year.

PPO.51 OUTCOMES OF PREGNANCY IN WOMEN WITH BMI OF 40 AND ABOVE

A Gumma, A Sarva. University Hospital of Coventry and Warwickshire, Coventry, UK

Methods: Retrospective audit of 25 women delivered during this period with BMI 40 or above.

Results: 36% of the patients had a BMI between 45 and 50. The majority of the patients were in the age group 30–35 years. Previous medical history of deep vein thrombosis in two patients and pulmonary embolism in another. A further two patients had hypertension. Anomaly scans were recorded as “difficult due to poor views” in 21 patients and a quarter of these required more than two scans to complete the investigation. Pregnancy-induced hypertension occurred in 20% and gestational diabetes in 24%. Varying levels of additional day assessment unit monitoring were needed in 64%. Delivery was preterm in 20% due to medical complications. Fetal heart monitoring was difficult in 60%. Mode of delivery was by Caesarean section in 40%. Postpartum haemorrhage complicated 20% of deliveries. Postoperative complications were noted to be high including wound infection and pyrexia. Macrosomia and shoulder dystocia were also increased. Neonates requiring special care baby unit admission occurred in 24%.

Conclusions: Women with high BMI appear to have an increased number of complications along with higher demand on resources. They are at high risk of pregnancy-induced hypertension, gestational diabetes and deep vein thrombosis (compared with the population mean). Interestingly, it is also a risk factor for neonatal admission to the special care baby unit. It is clear that measures to “watch the weight” and steps to promote weight loss with positive lifestyle changes before pregnancy would have potential benefits for both mother and baby.

PPO.52 SOCIAL RISKS: THE ADVERSE CHILDHOOD EXPERIENCES ON OFFER IN THE HOUSEHOLDS OF OUR PATIENTS

MK Whitworth. University of Liverpool, Liverpool, UK

Health risk behaviours and disease in adulthood can be linked to exposure to childhood abuse/household dysfunction based on analysis of adverse childhood experiences (ACE). People who have four or more ACE have a four to 12-fold increased risk of substance abuse, depression or suicide attempt. Women with problems such as substance misuse and depression were overrepresented in the latest Confidential Enquiry. We looked at women referred to a midwife responsible for child protection (CPMW) to determine how many of these women were living in households that put their child at risk of an ACE.

100 women were selected at random from 321 referrals to the CPMW in 2006 and referral data were analyzed. Results are outlined in the table.

Although we were unable to comment upon the presence/absence of psychological abuse, 15% of women were living a household that was likely to put children at risk of three ACE, 8% in a household with a risk of four ACE and 5% a household with a risk of five ACE. In 40% of cases at risk of three or more ACE plans had been made for the neonate to enter foster care following discharge. This, the first study to look at the risk of ACE in the households of a pregnant population, highlights the need for careful assessment of “social” risks.

Abstract PPO.52

ACE	% of women referred to CPMW living in household where ACE is likely to occur (%)
Physical abuse	47
Sexual abuse	4
Substance abuse (household member)	55
Mental illness (parent)	41
Domestic violence	37
Criminal behaviour (parent)	40

ACE, adverse childhood experience; CPMW, child protection midwife.