2.1 INCIDENCE, CAUSES AND OUTCOMES OF SEVERE MATERNAL SEPSIS MORBIDITY IN THE UK

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Background The incidence of severe genital-tract sepsis has increased in the UK and is now the leading cause of direct maternal death. Underlying this trend is a larger number of severe morbidity cases. The aim of this study was to describe, on a national level, the incidence, causes and outcomes of severe maternal sepsis morbidity in the UK.

Methods A national population-based study was undertaken using the UK Obstetric Surveillance System (UKOSS) between June 2011 and May 2012.

Results 378 women with severe sepsis were identified; an estimated incidence of 5.0 per 10,000 maternities (95%CI 4.6–5.7). Septic shock was diagnosed in 17.5% (N = 66) of women. Sources of infection were: intrauterine (N = 109; 39.9%), urinary-tract (N = 72; 26.4%), wound (N = 35; 12.8%), and respiratory-tract infection (N = 20; 7.3%). Laboratory-confirmed causative organisms were *E. coli* (31.3%), group A streptococcus (13.9%), group B streptococcus (13.4%), *Staphylococcus aureus* (10.4%) and polymicrobial growth (9.6%). Causative organisms differed significantly according to diagnosis of septic shock and mode of delivery (P = 0.002; P < 0.001); group A streptococcus was predominant amongst women with septic shock (30.8%) and spontaneous vaginal deliveries (33.3%), while *E. coli* was predominant amongst women without septic shock (32.6%), operative vaginal deliveries (36.0%) and caesarean sections (37.1%). Of all severely septic women, 73.0% (N = 276) required critical care and five women died.

Conclusions For every death from maternal sepsis, there are more than 75 women with severe sepsis morbidity. The pattern of infective organisms appears different amongst women who suffer septic shock. Further work is needed to investigate the risk factors associated with sepsis.

2.2 PLASMA PLACENTAL GROWTH FACTOR (PLGF) IN THE DIAGNOSIS OF WOMEN WITH PRE-ECLAMPSIA REQUIRING DELIVERY WITHIN 14 DAYS: THE PELICAN STUDY

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Introduction Evidence exists to suggest that the symptoms of pre-eclampsia are mediated by an imbalance of circulating angiogenic factors of placental origin; reduced concentrations of placental growth factor (PlGF) have been correlated with disease severity.

Methods A prospective, observational, cohort study was undertaken in seven UK maternity units. Women presenting 20 + 0 to 40 + 6 weeks gestation with suspected pre-eclampsia had serum PlGF measurement. ISSHP definitions of hypertensive disease were assigned, blinded to PlGF values. Analysis of the enrolment sample was conducted to evaluate diagnostic accuracy for pre-eclampsia requiring delivery within 14 days for very low PlGF (<12 pg/ml) and low PlGF (>12 pg/ml < 5th centile) using PlGF high (>5th centile) as referent.

Results Diagnosis of pre-eclampsia requiring delivery within 14 days using 5th centile as threshold.

Conclusion In women presenting <35 weeks' gestation with suspected pre-eclampsia, low PlGF level rules in women requiring delivery within 14 days and high PlGF rules out preterm delivery. Test performance falls off in women presenting over 35 weeks' gestational. PlGF can assist diagnosis and identify women requiring increased care.

Abstract 2.2 Table

	< 35+0 N = 287	35+0 to 36+6 N = 137	≥37+0 N = 201
Sensitivity	0.95 (0.89–0.99) 79/83	0.71 (0.59–0.82) 47/66	0.59 (0.48–0.70) 49/83
Specificity	0.56 (0.49–0.63) 114/204	0.65 (0.53–0.76) 46/71	0.77 (0.69–0.84) 91/118
Positive Predictive Value	0.47 (0.39–0.55) 79/169	0.65 (0.53–0.76) 47/72	0.65 (0.53–0.75) 49/76
Negative Predictive Value	0.97 (0.92–0.99) 114/118	0.71 (0.58–0.81) 46/65	0.73 (0.64–0.80) 91/125
Positive Likelihood ratio	2.2 (1.8–2.5)	2.0 (1.4–2.9)	2.6 (1.8–3.8)
Negative Likelihood ratio	0.09 (0.03–0.23)	0.4 (0.3–0.7)	0.5 (0.4–0.7)

2.3 CIRCULATING MICROPARTICLES AND ARTERIAL STIFFNESS INDEX – A MEASURE OF VASCULAR ENDOTHELIAL DYSFUNCTION IN PREGNANCY AND SYSTEMIC LUPUS ERYTHEMATOSUS

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Introduction Microparticles (MPs) are circulatory vesicles with pro-thrombotic and inflammatory characteristics. Systemic lupus erythematosus (SLE) is an autoimmune condition with increased pregnancy morbidity. We investigated the role of MPs in pregnancy and SLE by longitudinal assessment, and correlated these with arterial stiffness index (SI), as a marker of vascular dysfunction.

Methods Plasma was obtained from pregnant (n = 20) and non-pregnant healthy women (n = 19), and pregnant (n = 15) and non-pregnant SLE patients (n = 30). MPs were quantified by flow cytometry. Arterial SI was measured by digital Pulse Contour Analysis (dPCA) (Micro Medical Ltd).

Results Platelet and endothelial MPs were significantly higher in non-pregnant women with SLE compared to healthy women ($p < 0.05$). In healthy pregnancy, platelet MPs declined at 12 wks gestation from non-pregnant controls ($p \leq 0.01$), but thereafter returned. This pattern was not observed in SLE pregnancy, which remained higher throughout gestation. Outside pregnancy, a positive correlation was recorded in SLE patients between SI and platelet, endothelial and total MPs ($p \leq 0.05$, $p \leq 0.05$ and $p = 0.05$; respectively). This relationship was lost in the SLE pregnant group. Placental MPs were unchanged in SLE and healthy pregnancies.

Conclusions SLE is associated with increased circulating MPs. These MPs may contribute or reflect vascular dysfunction as determined by arterial SI. A loss of this association implies alternative vascular and MP regulation in pregnancy. A lack of decline in platelet MPs in early pregnancy may predispose SLE patients to pregnancy complications, but the mechanism remains unclear.

3.1 PREDICTION OF FETAL COMPROMISE: THE USE OF FETAL DOPPLER ASSESSMENT IN NORMAL PREGNANCIES PRIOR TO LABOUR

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Introduction Up to 63% of cases of intra-partum hypoxia occur in pregnancies with no antenatal risk factors. Identification before labour of these antenatally normal fetuses at risk of intra-partum hypoxia would enable a more targeted approach to intra-partum care.

Methods Five hundred and eleven women with uncomplicated, term, singleton pregnancies, underwent a pre-labour ultrasound assessment. This included measurement of fetal biometry, Umbilical artery, Middle cerebral artery, and Umbilical venous resistance indices. Clinicians managing the labour were blinded to the ultrasound results. Following delivery, case notes were reviewed and intra-partum outcomes correlated with ultrasound findings.

Results Infants born by Caesarean section for presumed fetal compromise had the highest Umbilical artery pulsatility index ($p = 0.002$), the lowest Middle cerebral artery pulsatility index ($p < 0.001$), the lowest cerebro-umbilical ratio ($p < 0.001$), the lowest Umbilical venous flow rates ($p = 0.003$), and the highest cerebral blood flow of any mode of delivery group ($p = 0.007$). A cerebro-umbilical ratio <10th centile has a positive predictive value of 36% for Caesarean section for presumed fetal compromise. This can be improved to 61.5% by inclusion of the other Doppler parameters. A cerebro-umbilical ratio >90th centile has a 100% negative predictive value.

Conclusion Pre labour fetal Doppler assessment can identify fetuses at both high and low risk of subsequent compromise in labour. Current intra-partum monitoring has a high false positive rate, which could be improved by better risk stratification prior to labour. This technique is easily translatable into clinical practise and would allow risk stratification of normal pregnancies prior to labour, enabling a more targeted approach to intra-partum care.

3.2 WHAT ARE THE INTRAPARTUM RISKS ASSOCIATED WITH OBESITY IN HEALTHY WOMEN WITHOUT ADDITIONAL RISK FACTORS? EVIDENCE FROM THE BIRTHPLACE IN ENGLAND NATIONAL PROSPECTIVE COHORT STUDY

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Maternal obesity is a risk factor for intrapartum complications but some risks may be attributable to the higher prevalence of co-morbidities. This study evaluated the impact of maternal obesity on outcomes requiring obstetric or neonatal care in otherwise low risk births.

Methods We analysed 17,230 women without additional risk factors planning obstetric unit birth in the Birthplace cohort. We adjusted for maternal characteristics using Poisson regression. We evaluated two composite outcomes capturing need for obstetric or neonatal care.

Results The risk of requiring obstetric care (augmentation, instrumental/emergency caesarean delivery, blood transfusion, 3rd/4th degree tear, high dependency care) tended to increase with BMI, but nulliparous women of normal weight had higher absolute risks and were more likely to require obstetric care than multiparous women of BMI > 35 kg/m^2.

Abstract 3.2 Table Percentage receiving obstetric care and adjusted relative risks

	Nulliparous (n = 8795)			Multiparous (n = 7857)		
BMI (kg/m2)	**%**	**RR**	**(95%CI)**	**%**	**RR**	**(95%CI)**
<18.5	45.6	0.94	(0.82–1.09)	14.6	0.87	(0.57–1.31)
18.5–24.9	52.9	1	-	17.7	1	-
25–29.9	55.7	1.04	(0.99–1.08)	20.2	1.16	(1.02–1.32)
30–35	60.2	1.12	(1.05–1.18)	21.3	1.22	(1.05–1.42)
35+	57.1	1.08	(0.99–1.18)	21.0	1.24	(0.97–1.59)

The perinatal composite (intrapartum stillbirth, early neonatal death or neonatal unit admission) exhibited a similar pattern: absolute perinatal risks were higher in nulliparous women of normal weight vs. multiparous women with BMI > 35 kg/m^2 (3.7% vs. 2.9%).

Conclusions Otherwise healthy obese multiparous women have lower intrapartum risks than nulliparous women of normal weight. Planned birth in Alongside Midwifery Units may be safe for some multiparous women with BMI > 35 kg/m^2.

3.3 A CLUSTER RANDOMISED TRIAL TO ENHANCE ASSESSMENT AND REPAIR OF BIRTH ASSOCIATED PERINEAL TRAUMA: THE PEARLS STUDY

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Background Birth associated perineal trauma affects millions of women worldwide. The aim of the Perineal Assessment and Repair Longitudinal Study (PEARLS) was to evaluate if an enhanced, cascaded training programme improved implementation of evidence-based practise in perineal assessment and repair and reduced subsequent maternal morbidity.

Methods PEARLS was a pragmatic matched pair cluster randomised controlled trial with 22 participating UK maternity units. Within each of the 11 matched pairs one unit was randomised to receive the intervention early (cluster A) and the other late (cluster B). Women sustaining a second-degree tear or episiotomy were eligible. Outcomes included pain on activity at 10–12 days postnatal, clinically reported outcomes by women and implementation of evidence-based surgical repair. Analysis was based on summary statistics at cluster level, using paired t-tests.

Results 1470 and 2211 women were recruited in groups A and B respectively. No significant difference in mean primary outcome was noted between clusters that had received the intervention and those who had not (0.7% 95% CI (–10.1%, 11.4%), $p = 0.89$), with the overall percentage of women being 77% and 74% respectively. Improvement was seen in implementation of evidence-based perineal management. A significant reduction was noted in mean percentages of women reporting wound infections and needing suture removal in the early intervention clusters.

Conclusion PEARLS is the first RCT to assess the impact of a 'hands-on' training package on implementation of evidence-based perineal trauma management and clinical outcomes for women. Findings will support improvements in clinical practise and women's longer-term health.

4.1 AMIPROM: A PILOT RCT ON SERIAL TRANSABDOMINAL AMNIOINFUSION VERSUS EXPECTANT MANAGEMENT IN VERY EARLY PROM (ISRCTN 8192589)

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Objective a randomised controlled multicentre pilot study to assess:

- the feasibility of recruitment and the retention through to long term follow up of participants with very early rupture of membranes.
- short- and long-term outcomes and data to inform a larger, definitive clinical trial.

Participants Women with singleton pregnancies and confirmed preterm prelabour rupture of membranes between 16^{+0} and 24^{+0} weeks gestation.