WEST MIDLANDS PERINATAL INSTITUTE

PEER Report: Maternal Age Distribution 2009/10

This is the first of a planned series of themed reports based on the regional maternity data collection on the new Perinatal Episode Electronic Record (PEER), as part of the WM Investing for Health Perinatal & Infant Mortality Programme. It includes data collected between April 2009 and March 2010 (Total N=51,243) describes the associations between a number of variables and how they vary in teenage mothers (defined here as <20 as well as <18 years) and older mothers (>35 and >40 years).

Variables from the WM dataset www.pi.nhs.uk/rpnm/WM_Maternity_Dataset_v1.8.pdf are analysed in turn according to maternal age at delivery. Where appropriate, standard maternal age categories are compared with a reference group, marked *, which is based on the largest maternal age group (25-29). Statistical comparisons are expressed as odds ratios (OR) with 95% Confidence Intervals (CI).

These preliminary analyses are descriptive, and are currently being followed up with modelling of the interactions of the various risk factors, to be reported later.

Summary of Main Findings

- There is substantial **variation between PCTs** in the rate of teenage (<18) pregnancies, from 1.1% to 3.2%. Similarly, pregnancies in older mothers (40+) range widely, from 2.2% to 5.3%. (NB – Rates are also available by local authority, GP practice and ward.)

- There is also wide **variation between ethnic groups**. Teenage pregnancies are most frequent in African-Caribbean and British European mothers, and African Caribbean and African mothers are more likely to be over 40.

- **Teenage mothers** are more likely to live in deprived areas, be unemployed and without a partner, and are at increased risk of domestic violence. They are more likely to book late, smoke during pregnancy and take non-prescription drugs, and are less likely to breastfeed. There is also a (non-significant) trend towards higher rates of pregnancy induced hypertension/pre-eclampsia and admissions to the neonatal unit. Teenage pregnancies are more likely to deliver prematurely, and have increased rate of infant mortality - mostly due to an excess of immaturity related deaths and SUDIs.

- **Older mothers** are less likely to have social problems, but have increased rates of pre-existing hypertension and diabetes, as well as gestational diabetes and pregnancy-induced hypertension. They also have an increased risk of premature delivery, and are more likely to be delivered by Caesarean section. Their babies have a higher rate of low Apgar scores, and a trend towards increased neonatal unit admissions. Older mothers have an increased risk of stillbirth associated with an excess of deaths due to congenital anomaly and fetal growth restriction.

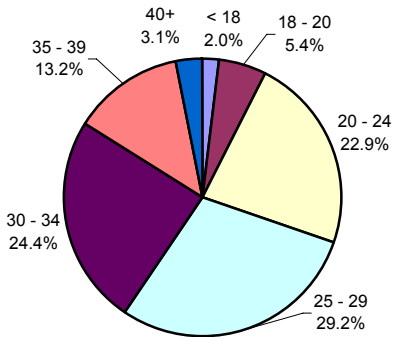
A. Maternal age distribution in the West Midlands

The average age of mothers at delivery is 28.1.

7.4% are <20, including 2.0% <18.

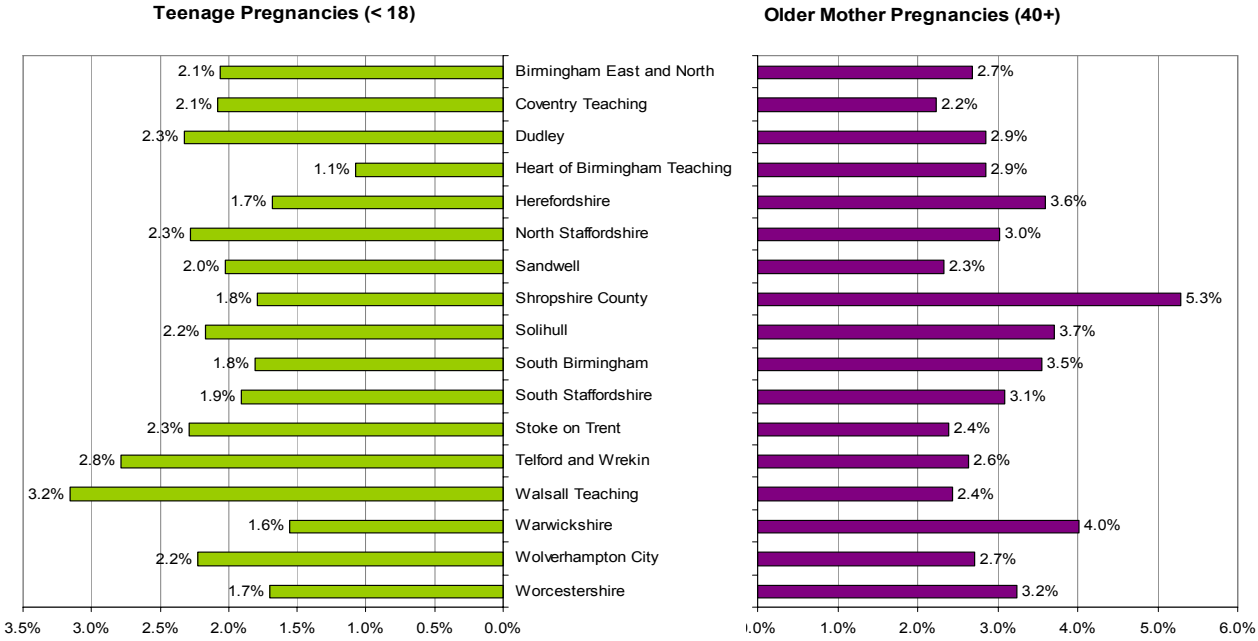
16.2% are 35 or over, including 3.1% >40

Fig 1: Maternal age distribution, West Midlands 2009/10



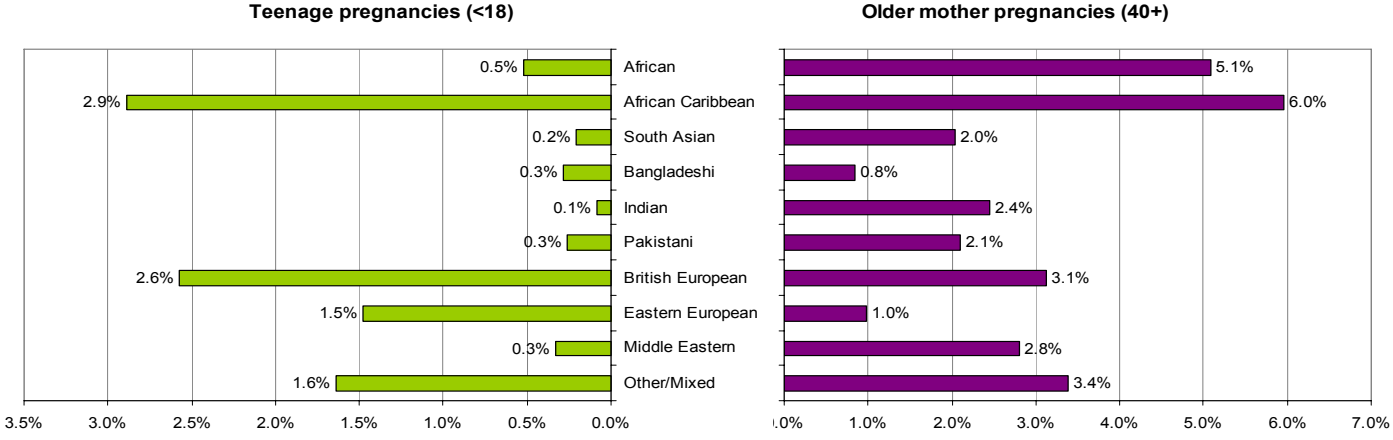
The graph below shows the rates of pregnancies by teenagers and older mothers in West Midlands PCTs. There is considerable variation, with Walsall PCT having the highest number of teenagers (<18: 3.2%) and Shropshire PCT having the highest proportion of older mothers (40+: 5.3%)

Fig 2. West Midlands PCTs - rates of pregnancies in teenagers and older mothers 2009/10



The proportion of younger as well as older mothers varies with ethnicity, as shown. African-Caribbean and British European have the highest rates of teenage pregnancy (<18) (2.9% and 2.6% respectively). African-Caribbean (5.1%) and African (6.0%) ethnicity have the highest percentage of women aged 40+

Fig 3. ETHNICITY - rates of pregnancies in teenagers and older mothers - West Midlands 2009/10

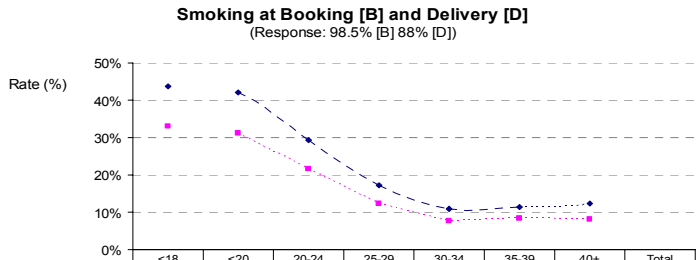


B Smoking, alcohol and social factors

Figs 4 & 5: Teenagers are more likely to take drugs and smoke during pregnancy, and are less likely to stop smoking. Older mothers are more likely to drink alcohol in pregnancy

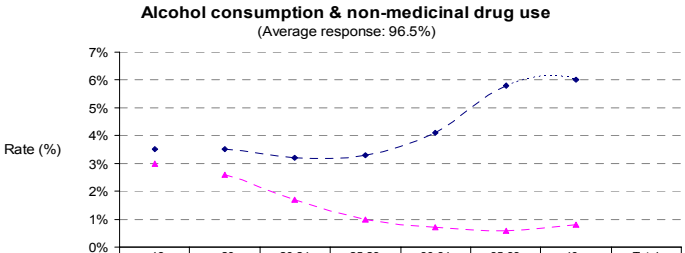
Figs 6-9: Younger mothers are more likely to be unemployed, live without a partner, report domestic abuse, and live in the most deprived areas.

Fig 4: Smoking (any) during pregnancy, as recorded at booking and at end of pregnancy ('delivery')



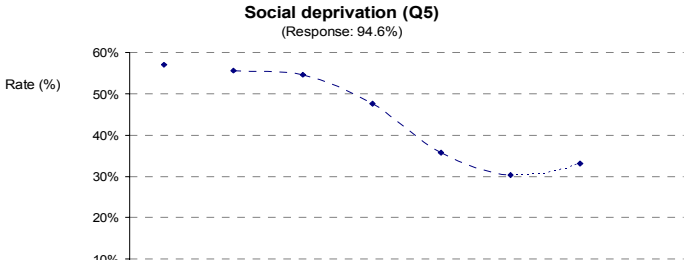
	<18	<20	20-24	25-29	30-34	35-39	40+	Total
Smoking (B)	43.7%	42.1%	29.2%	17.1%	11.0%	11.4%	12.3%	19.3%
OR (CI)	3.77 (3.3-4.3)	3.52 (3.3-3.8)	2.00 (1.9-2.1)	1.0 (0.9-1.1)	0.60 (0.56-0.64)	0.62 (0.6-0.7)	0.68 (0.6-0.8)	
Smoking (D)	33.1%	31.1%	21.5%	12.3%	7.7%	8.4%	8.2%	14.0%
OR (CI)	3.53 (3.0-4.1)	3.23 (3.0-3.5)	1.96 (1.8-2.1)	1.0 (0.9-1.1)	0.60 (0.6-0.7)	0.65 (0.6-0.7)	0.64 (0.5-0.8)	

Fig 5: Alcohol consumption (any) and non-medicinal drug use during pregnancy



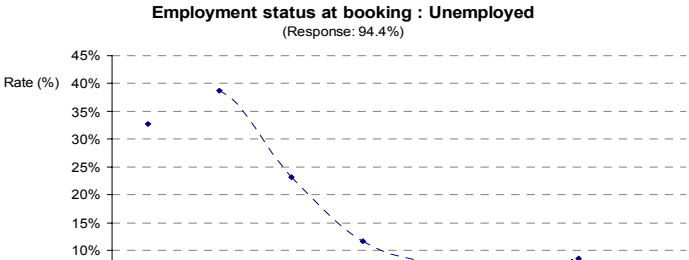
	<18	<20	20-24	25-29	30-34	35-39	40+	Total
Alcohol	3.5%	3.5%	3.2%	3.3%	4.1%	5.8%	6.0%	4.2%
OR (CI)	1.04 (0.7-1.5)	1.05 (0.8-1.3)	0.95 (0.8-1.1)	1.0 (0.9-1.2)	1.22 (0.1-1.4)	1.79 (1.5-2.1)	1.84 (1.4-2.4)	
Drug Use	3.0%	2.6%	1.7%	1.0%	0.7%	0.6%	0.8%	1.1%
OR (CI)	3.14 (2.0-4.9)	2.69 (2.0-3.6)	1.74 (1.4-2.2)	1.0 (0.8-1.3)	0.75 (0.6-1.01)	0.63 (0.4-0.9)	0.84 (0.4-1.6)	

Fig 6 Social Deprivation - lowest quintile (Q5) of index of multiple deprivation (2007)



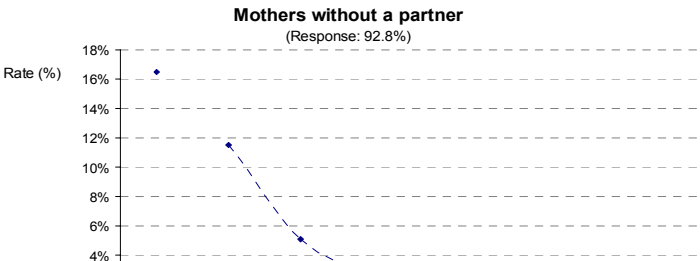
	<18	<20	20-24	25-29*	30-34	35-39	40+	Total
Deprivation (Q5)	56.9%	55.6%	54.5%	47.6%	35.7%	30.4%	33.2%	44.2%
OR (CI)	1.45 (1.3-1.7)	1.38 (1.3-1.5)	1.32 (1.3-1.4)	1.0 (1.0-1.1)	0.61 (0.58-0.64)	0.48 (0.45-0.51)	0.55 (0.5-0.6)	

Fig 7 Employment status at booking: unemployed



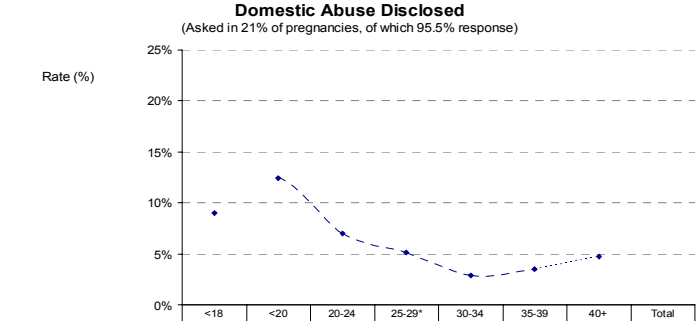
	<18	<20	20-24	25-29*	30-34	35-39	40+	Total
Unemployed	32.7%	38.7%	23.1%	11.7%	7.6%	6.3%	8.5%	14.4%
OR (CI)	3.67 (3.1-4.3)	4.76 (4.3-5.2)	2.26 (2.1-2.4)	1.0 (0.9-1.1)	0.62 (0.6-0.7)	0.51 (0.5-0.6)	0.70 (0.6-0.9)	

Fig 8: Mothers without a partner



	< 18	< 20	20-24	25-29*	30-34	35-39	40+	
No Partner	16.5%	11.5%	5.1%	2.8%	2.1%	2.0%	2.8%	
OR (CI)	6.95 (5.5-8.7)	4.58 (3.9-5.4)	1.88 (1.6-2.2)	1.0 (0.9-1.2)	0.74 (0.6-0.9)	0.73 (0.6-0.9)	1.01 (0.7-1.5)	

Fig 9: Domestic abuse disclosed (within the 21% of pregnancies where routine enquiry was undertaken)

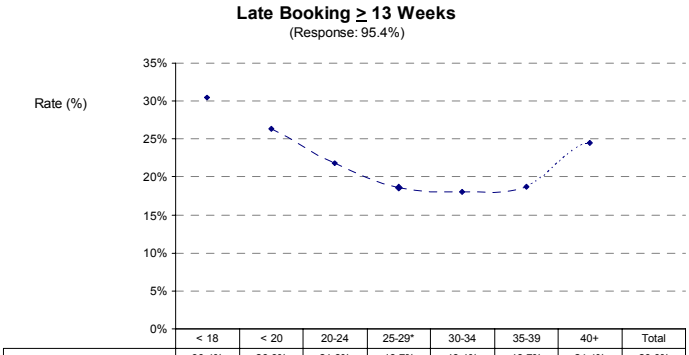


	<18	<20	20-24	25-29*	30-34	35-39	40+	Total
Domestic Abuse Disclosed	9.0%	12.4%	7.0%	5.1%	2.9%	3.5%	4.7%	5.3%
OR (CI)	1.83 (1.1-3.2)	2.61 (1.9-3.5)	1.39 (1.1-1.8)	1.0 (0.8-1.3)	0.55 (0.4-0.8)	0.67 (0.5-0.97)	0.91 (0.5-1.7)	

C. Pregnancy characteristics and complications

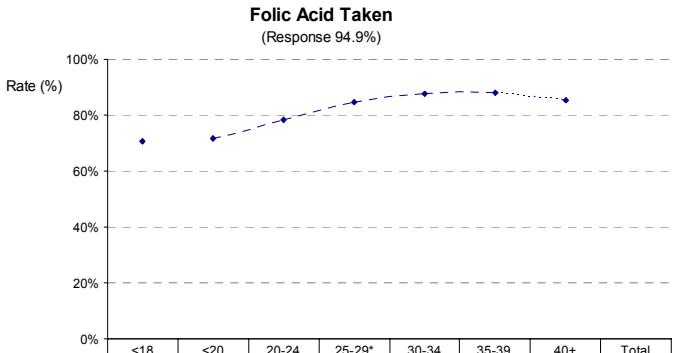
Fig 10: Booking: young mothers as well as mothers over 40 are more likely to book late
Fig 11: Folate: teenagers are less likely to take folate at the beginning of pregnancy
Fig 12: Mental health: more older mothers reported a past history of mental health problems
Fig 13: Antepartum Haemorrhage - risk is increased at both age extremes
Fig 14: Hypertension: older mothers have an increased rate of pre-existing as well as gestational hypertension, while teenagers also have an increased risk of pregnancy induced hypertension and pre-eclampsia
15: Diabetes – risk for pre-existing as well as gestational diabetes increases with maternal age

Fig 10: Late booking: date of completed health and social care assessment at 13 weeks or later.



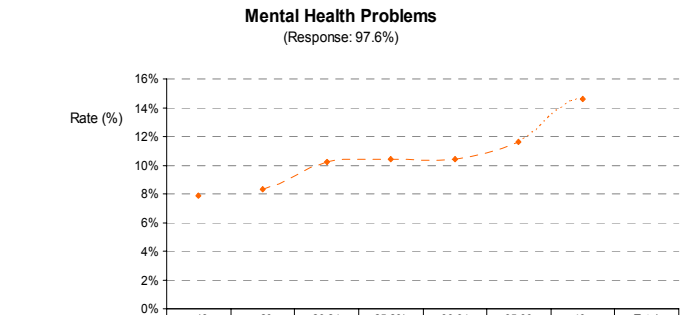
	< 18	< 20	20-24	25-29*	30-34	35-39	40+	Total
- Late Booking > 13 Weeks	30.4%	26.3%	21.8%	18.7%	18.1%	18.7%	24.4%	20.0%
OR (CI)	1.91 (1.7-2.2)	1.56 (1.4-1.7)	1.22 (1.1-1.3)	1.0 (0.9-1.1)	0.96 (0.9-1.1)	1.0 (0.9-1.1)	1.41 (1.3-1.6)	

Fig 11: Folic Acid taken (at any time in pregnancy)



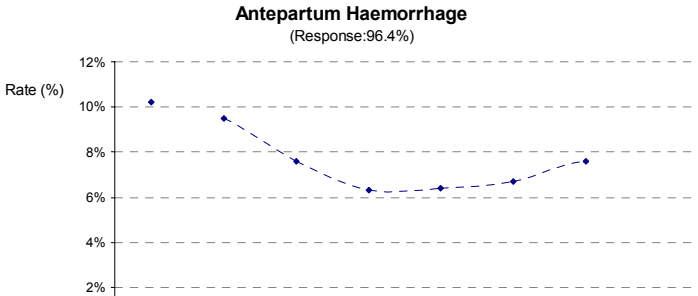
	<18	<20	20-24	25-29*	30-34	35-39	40+	Total
- Folic Acid Taken	70.8%	71.8%	78.5%	84.7%	87.6%	87.9%	85.5%	83.5%
OR (CI)	0.44 (0.4-0.5)	0.46 (0.4-0.5)	0.66 (0.6-0.7)	1.0 (0.9-1.1)	1.28 (1.2-1.4)	1.32 (1.2-1.5)	1.26 (1.2-1.4)	

Fig 12: Mental health problems (past history).



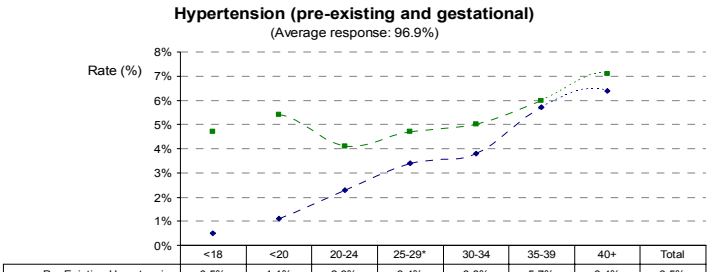
	<18	<20	20-24	25-29*	30-34	35-39	40+	Total
- Mental Health Problems	7.9%	8.3%	10.2%	10.4%	10.4%	11.6%	14.6%	10.5%
OR (CI)	0.74 (0.6-0.96)	0.78 (0.7-0.9)	0.97 (0.9-1.1)	1.0 (0.9-1.1)	1.0 (0.9-1.1)	1.13 (1.02-1.3)	1.48 (1.3-1.8)	

Fig 13: Antepartum Haemorrhage



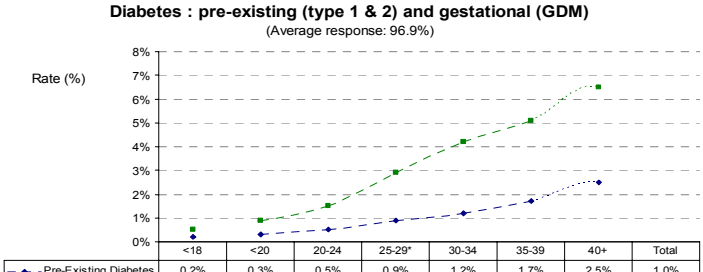
	<18	<20	20-24	25-29	30-34	35-39	40+	Total
- APH	10.2%	9.5%	7.6%	6.3%	6.4%	6.7%	7.6%	6.9%
OR (CI)	0.69 (1.3-2.1)	1.55 (1.3-1.8)	1.21 (1.1-1.3)	1.0 (0.9-1.1)	1.0 (0.9-1.1)	1.05 (0.9-1.2)	1.21 (1.0-1.5)	

Fig 14: Hypertension: Pre-existing and gestational, incl. pregnancy induced hypertension (PIH) and pre-eclamsia (PET)



	<18	<20	20-24	25-29*	30-34	35-39	40+	Total
- Pre-Existing Hypertension	0.5%	1.1%	2.3%	3.4%	3.8%	5.7%	6.4%	3.5%
OR (CI)	0.14 (0.1-0.4)	0.31 (0.2-0.4)	0.65 (0.5-0.8)	1.0 (0.9-1.1)	1.11 (1.0-1.3)	1.70 (1.5-2.0)	1.91 (1.5-2.4)	
- PIH/PET	4.7%	5.4%	4.1%	4.7%	5.0%	6.0%	7.1%	4.9%
OR (CI)	0.99 (0.7-1.4)	1.15 (1.0-1.4)	0.87 (0.8-1.0)	1.0 (0.9-1.1)	1.06 (0.9-1.2)	1.28 (1.1-1.5)	1.53 (1.2-1.9)	

Fig 15: Diabetes: Pre-existing (Type 1 & 2) and Gestational (GDM)

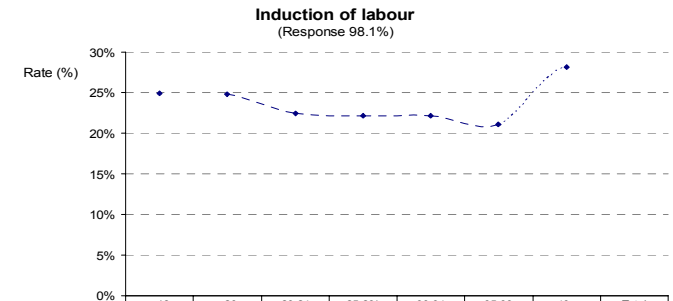


	<18	<20	20-24	25-29*	30-34	35-39	40+	Total
- Pre-Existing Diabetes	0.2%	0.3%	0.5%	0.9%	1.2%	1.7%	2.5%	1.0%
OR (CI)	0.27 (0.1-1.1)	0.33 (0.2-0.7)	0.54 (0.4-0.8)	1.0 (0.8-1.3)	1.39 (1.1-1.8)	1.86 (1.4-2.5)	2.81 (1.9-4.2)	
- GDM	0.5%	0.9%	1.5%	2.9%	4.2%	5.1%	6.5%	3.1%
OR (CI)	0.17 (0.1-0.4)	0.31 (0.2-0.5)	0.50 (0.4-0.6)	1.0 (0.9-1.2)	1.45 (1.3-1.7)	1.81 (1.5-2.1)	2.33 (1.8-3.0)	

D. Delivery and Postnatal

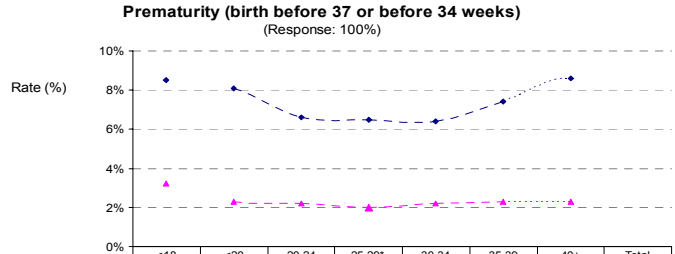
Fig 16: Inductions of labour are increased at both ends of the maternal age spectrum.
Fig 17: Prematurity (<34 weeks) is higher in pregnancies of younger as well as older mothers.
Figs 18 & 19: Both elective and emergency caesarean sections increase with age regardless of parity.
Fig 20: Intrauterine growth restrction has a bimodal distribution and is increased in mothers over 40.
Fig 21: Breast Feeding initiation rate increases with maternal age and is significantly less in teenagers.

Fig 16: Induction of labour



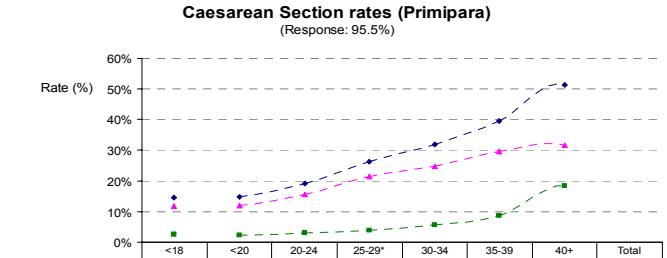
	<18	<20	20-24	25-29*	30-34	35-39	40+	Total
Labour Induced	24.9%	24.8%	22.5%	22.2%	22.2%	21.1%	28.1%	22.5%
OR (CI)	1.17 (1.0-1.4)	1.16 (1.1-1.3)	1.02 (1.0-1.1)	1.0 (0.9-1.1)	1.0 (0.9-1.1)	0.94 (0.9-1.0)	1.37 (1.2-1.6)	

Fig 17: Prematurity (birth before 34 or before 37 weeks)



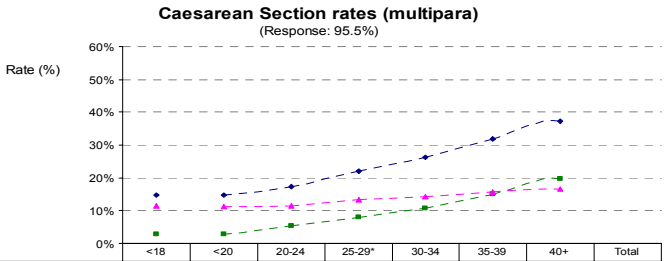
	<18	<20	20-24	25-29*	30-34	35-39	40+	Total
Prematurity < 37 Wks	8.5%	8.1%	6.6%	6.5%	6.4%	7.4%	8.6%	6.8%
OR (CI)	1.35 (1.1-1.7)	1.27 (1.1-1.5)	1.02 (0.9-1.1)	1.0 (0.9-1.1)	0.98 (0.9-1.1)	1.15 (1.0-1.3)	1.36 (1.1-1.6)	
Prematurity < 34 Wks	3.2%	2.3%	2.2%	2.0%	2.2%	2.3%	2.3%	2.2%
OR (CI)	1.60 (1.1-2.3)	1.12 (0.9-1.4)	1.10 (0.9-1.3)	1.0 (0.9-1.2)	1.07 (0.9-1.3)	1.14 (0.9-1.4)	1.14 (0.8-1.6)	

Fig 18: Caesarean section (CS) rates - elective and non-elective in **primipara**



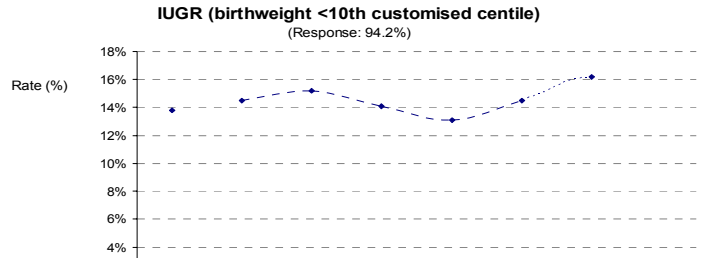
	<18	<20	20-24	25-29*	30-34	35-39	40+	Total
Caesarean Section	14.6%	14.8%	19.1%	26.3%	31.9%	39.7%	51.4%	24.8%
OR (CI)	0.48 (0.4-0.6)	0.49 (0.4-0.6)	0.66 (0.6-0.7)	1.0 (0.9-1.1)	1.32 (1.2-1.4)	1.85 (1.6-2.1)	2.97 (2.3-3.8)	
Elective CS	2.7%	2.3%	3.0%	3.9%	5.6%	8.6%	18.4%	4.2%
OR (CI)	0.68 (0.5-1.03)	0.58 (0.5-0.8)	0.75 (0.6-0.9)	1.0 (0.8-1.2)	1.48 (1.2-1.8)	2.32 (1.9-2.9)	5.59 (4.0-7.8)	
Non-Elective CS	11.7%	11.9%	15.5%	21.3%	24.8%	29.7%	31.6%	19.6%
OR (CI)	0.49 (0.4-0.6)	0.50 (0.4-0.6)	0.68 (0.6-0.7)	1.0 (0.9-1.1)	1.22 (1.1-1.3)	1.56 (1.4-1.8)	1.70 (1.3-2.2)	

Fig 19: Caesarean section (CS) rates - elective and non-elective in **multipara**



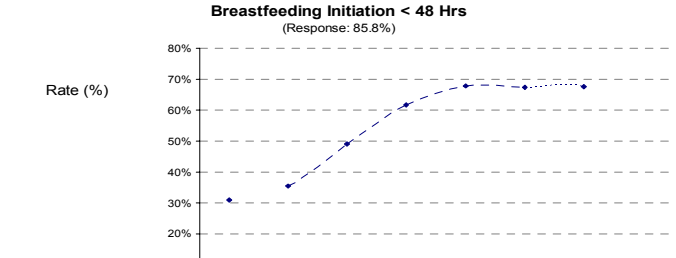
	<18	<20	20-24	25-29*	30-34	35-39	40+	Total
Caesarean Section	14.7%	14.7%	17.4%	22.0%	26.2%	31.9%	37.3%	23.2%
OR (CI)	0.61 (0.5-0.7)	0.61 (0.6-0.7)	0.75 (0.7-0.8)	1.0 (0.95-1.1)	1.26 (1.2-1.3)	1.66 (1.6-1.8)	2.12 (1.9-2.4)	
Elective CS	2.8%	2.8%	5.4%	7.9%	10.9%	15.1%	19.7%	9.0%
OR (CI)	0.34 (0.2-0.5)	0.33 (0.3-0.4)	0.67 (0.6-0.7)	1.0 (0.9-1.1)	1.42 (1.3-1.5)	2.06 (1.9-2.3)	2.85 (2.5-3.3)	
Non-Elective CS	11.5%	11.3%	11.5%	13.3%	14.3%	15.8%	16.6%	13.4%
OR (CI)	0.85 (0.7-1.03)	0.83 (0.7-0.9)	0.85 (0.8-0.9)	1.0 (0.9-1.1)	1.09 (1.02-1.2)	1.22 (1.1-1.3)	1.30 (1.1-1.5)	

Fig 20: Intrauterine growth restriction (IUGR), according to birthweight (<10th customised centile)



	<18	<20	20-24	25-29*	30-34	35-39	40+	Total
IUGR < 10th CC	13.8%	14.5%	15.2%	14.1%	13.1%	14.5%	16.2%	14.2%
OR (CI)	0.98 (0.8-1.2)	1.04 (0.9-1.2)	1.09 (1.02-1.2)	1.0 (0.9-1.1)	0.92 (0.9-0.99)	1.03 (0.95-1.1)	1.18 (1.01-1.4)	

Fig 21: Breastfeeding initiation (within 48 hours of birth)

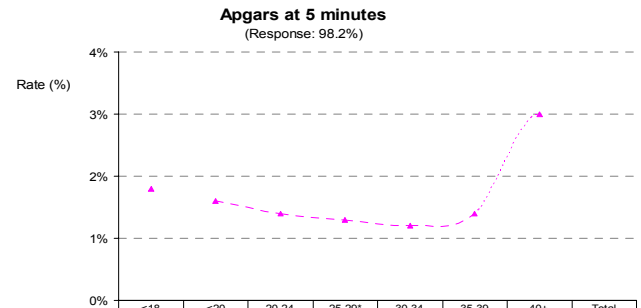


	<18	<20	20-24	25-29*	30-34	35-39	40+	Total
Breastfeeding Initiation < 48 Hrs	30.9%	35.5%	49.1%	61.6%	67.8%	67.4%	67.7%	59.1%
OR (CI)	0.28 (0.2-0.3)	0.34 (0.3-0.4)	0.60 (0.57-0.63)	1.0 (0.95-1.05)	1.31 (1.2-1.4)	1.28 (1.2-1.4)	1.30 (1.2-1.5)	

E. Perinatal and Infant Outcome

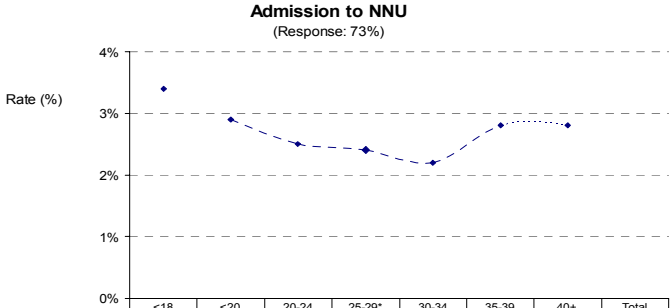
Fig 22: Low Apgar scores (<7 at 5 minutes) are higher in babies of mothers aged 40 or more.
Fig 23: Young as well as older mothers have a (non-significant) trend towards increased neonatal unit admissions.

Fig 22: Apgar score <7 at 5 minutes



	<18	<20	20-24	25-29*	30-34	35-39	40+	Total
Apgars @ 5 Mins < 7	1.8%	1.6%	1.4%	1.3%	1.2%	1.4%	3.0%	1.4%
OR (CI)	1.43 (0.8-2.4)	1.28 (0.9-1.8)	1.10 (0.9-1.4)	1.0 (0.8-1.3)	0.95 (0.8-1.2)	1.08 (0.8-1.4)	2.38 (1.7-3.4)	

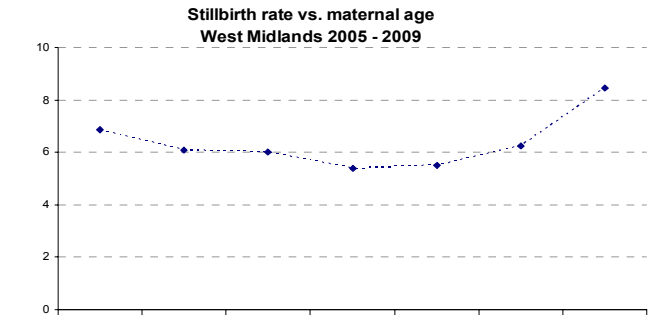
Fig 23: Admissions to the Neonatal Unit (NNU)



	<18	<20	20-24	25-29*	30-34	35-39	40+	Total
Admission to NNU	3.4%	2.9%	2.5%	2.4%	2.2%	2.8%	2.8%	2.5%
OR (CI)	1.42 (0.9-2.2)	1.21 (0.9-1.6)	1.03 (0.9-1.2)	1.0 (0.8-1.2)	0.92 (0.8-1.1)	1.18 (0.96-1.5)	1.16 (0.8-1.7)	

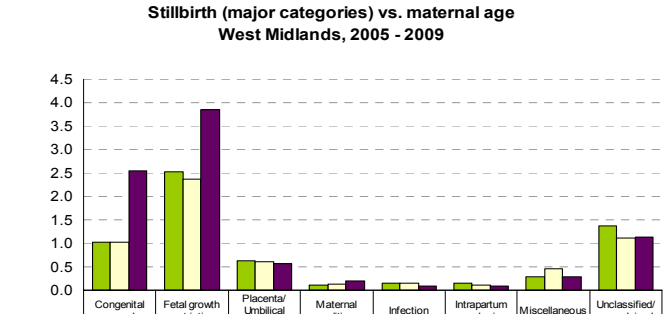
Figs 24-29 examine the maternal age distribution of stillbirths and infant deaths, based on the last 5 years of data on the WM perinatal / infant mortality survey.
Figs 24 & 25: **Stillbirth** rates are increased by 60% for women aged 40 or above. When split into the main classification groups [1], the excess in this age group is due to significantly higher congenital anomalies (OR 2.5, CI 1.7-3.7) and deaths associated with fetal growth restriction (OR 1.6, CI 1.2-2.2).

Fig 24: Stillbirth rate vs. Maternal Age (WM 2005-2009)



	<18	<20	20-24	25-29*	30-34	35-39	40+
Rate	6.8	6.1	6.0	5.4	5.5	6.2	8.5
OR CI	1.27 (0.95 - 1.7)	1.13 (0.94-1.4)	1.12 (0.99-1.3)	Ref.	1.02 (0.9-1.2)	1.16 (1.0-1.3)	1.58 (1.3-2.0)

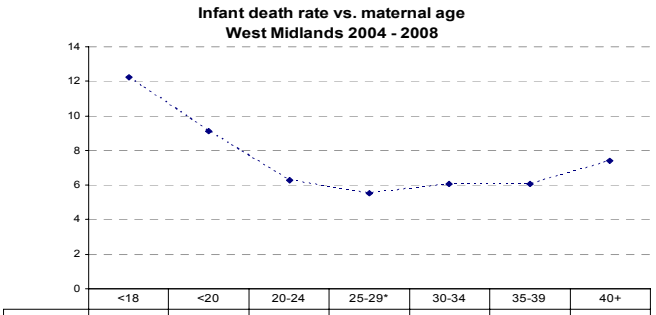
Fig 25: Stillbirths (major categories) vs maternal age (WM 2005-2009)



	Congenital anomaly	Fetal growth restriction	Placenta/ Umbilical chord	Maternal conditions	Infection	Intrapartum asphyxia	Miscellaneous	Unclassified/ unexplained
<20	10	2.5	0.6	0.1	0.2	0.2	0.3	1.4
>=20 and <40	10	2.4	0.6	0.1	0.2	0.1	0.5	1.1
40+	2.5	3.9	0.6	0.2	0.1	0.1	0.3	1.1

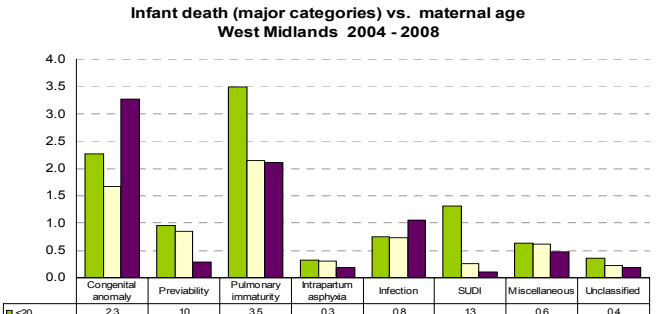
Figs 26 & 27: **Infant mortality** rates are highest for women <20, but are also increased for women aged 40 or above. Examination by the main classification groups [2], shows higher rates of deaths due to congenital anomalies in infants of older mothers (OR 2,0, CI 1.4-2.8) as well younger mothers (OR 1.4, CI 1.0-1.8). Infants of young mothers also have an increased risk of deaths due to immaturity (OR 1.6, CI 1.3-2.0) and SUDI (OR 5.1, CI 3.4-7.6).

Fig 26: Infant deaths vs Maternal Age (WM 2004-2008)



	<18	<20	20-24	25-29*	30-34	35-39	40+
Rate	12.2	9.1	6.3	5.5	6.0	6.1	7.4
OR CI	2.2 (1.8 - 2.8)	1.7 (1.4 - 1.9)	1.1 (1.0 - 1.3)	Ref.	1.1 (0.97 - 1.2)	1.1 (0.95 - 1.3)	1.3 (1.1 - 1.7)

Fig 27: Infant deaths (major categories) vs maternal age (WM 2004-2008)



	Congenital anomaly	Previability	Pulmonary immaturity	Intrapartum asphyxia	Infection	SUDI	Miscellaneous	Unclassified
<20	2.3	1.0	3.5	0.3	0.8	1.3	0.6	0.4
>=20 and <40	1.7	0.8	2.1	0.3	0.7	0.3	0.6	0.2
40+	3.3	0.3	2.1	0.2	1.1	0.1	0.5	0.2

[1] Main groups based on ReCoDe Classification, BMJ 2005 12:331 1113-7 [2] Main Groups based on Fetal & Neonatal Classification, BJOG 1986 93:12 1213–1223