

West Midlands Perinatal Mortality

Update - March 2006

We present West Midlands perinatal mortality statistics, including data for 2004 as an update of West Midlands Key Health Data 1998-2003 [1]. The analysis includes stillbirths and the three categories of infant deaths (early, late and post neonatal). Data are derived from ONS (VSI) as well as the Perinatal Death Notifications (PDN; formerly RRF - Rapid Report Forms). PDNs tend to show higher rates than ONS because of more complete ascertainment. Regional figures are referenced to national data published in CEMACH' latest report [2].

Table I. Perinatal and infant mortality in West Midlands (WM) and England, Wales & N Ireland (E,W&NI).
Source: PDN. All rates are per 1000 births

		2002		2003		2004	
		Rate	95% CI	Rate	95% CI	Rate	95% CI
Stillbirth	WM	6.35	5.72 - 6.98	6.15	5.54 - 6.75	5.79	5.22 - 6.37
	E,W&NI	5.71	5.52 - 5.89	5.77	5.58 - 5.95	5.69	5.51 - 5.87
Early Neonatal	WM	3.83	3.34 - 4.32	4.21	3.71 - 4.71	3.87	3.40 - 4.34
	E,W&NI	2.78	2.65 - 2.91	2.85	2.72 - 2.98	2.68	2.55 - 2.80
Late Neonatal	WM	0.98	0.73 - 1.23	0.96	0.72 - 1.20	0.87	0.64 - 1.09
	E,W&NI	0.81	0.74 - 0.88	0.80	0.73 - 0.87	0.73	0.67 - 0.80
Post Neonatal	WM	1.85	1.51 - 2.19	2.31	1.94 - 2.68	**	
	E,W&NI	1.69	1.59 - 1.79	*		*	
Perinatal^a	WM	10.16	9.37 - 10.95	10.33	9.55 - 11.11	9.64	8.90 - 10.39
	E,W&NI	8.47	8.24 - 8.70	8.60	8.38 - 8.83	8.35	8.13 - 8.57
Neonatal^b	WM	4.82	4.27 - 5.37	5.17	4.61 - 5.72	4.73	4.21 - 5.26
	E,W&NI	3.59	3.44 - 3.74	3.66	3.51 - 3.80	3.41	3.27 - 3.55
Infant^c	WM	6.67	6.02 - 7.31	7.47	6.81 - 8.14	**	
	E,W&NI	5.28	5.10 - 5.46	*		*	
Total births	WM	61,417		64,079		66,263	
	E,W&NI	620,841		646,629		665,830	

- a. Perinatal = Stillbirth and Early Neonatal Deaths
 b. Neonatal = Early and Late Neonatal Deaths
 c. Infant = Early, Late and Post Neonatal Deaths

* Post Neonatal Deaths not collected by CEMACH since 2003
 ** Notifications of WM PNDs for 2004 not yet complete

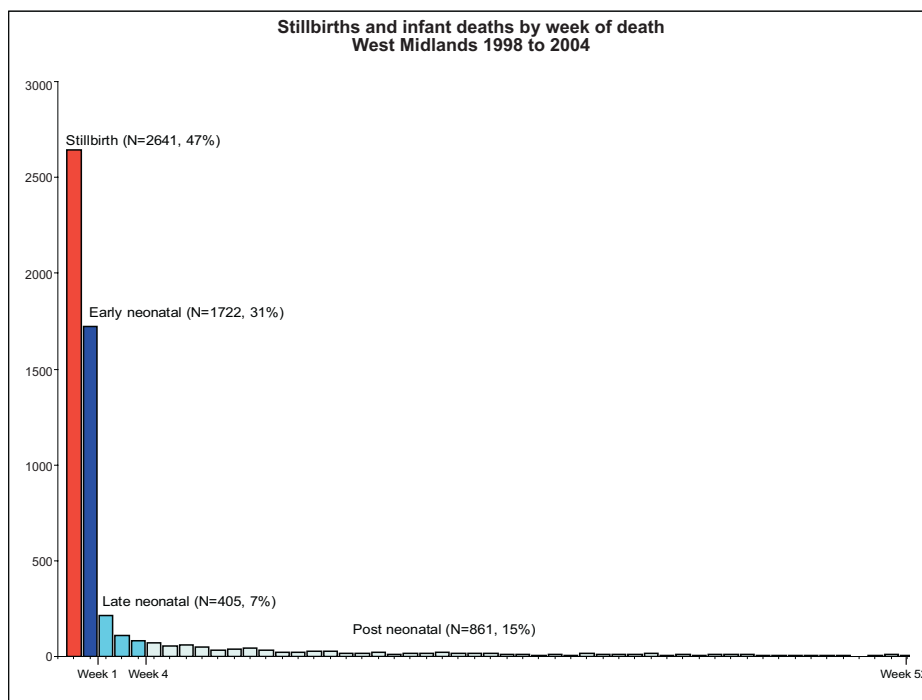


Fig. 1
Frequency plot of number of deaths in the perinatal / infant period, West Midlands.

Stillbirths and early neonatal deaths (=perinatal deaths) account for over 75% of all deaths over this period and are the main focus of this report.

1. West Midlands Key Health Data 2004. Chapter 5: Perinatal Mortality and Social Deprivation. University of Birmingham, 2005. www.perinatal.nhs.uk/pnm
 2. Confidential Enquiry into Maternal and Child Health: Perinatal mortality surveillance 2004, England Wales and Northern Ireland. London: CEMACH; 2006

Stillbirths

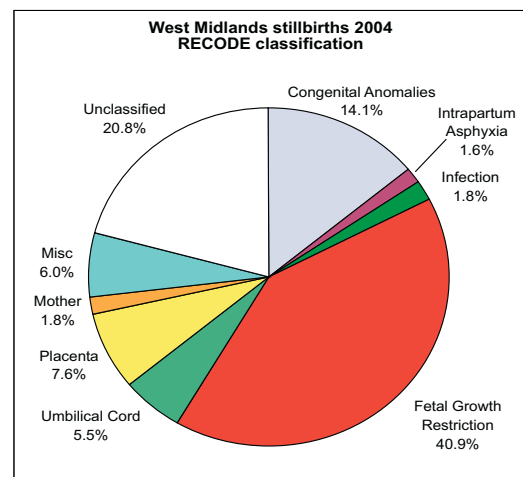
Fig. 2 - Stillbirths 2002-4



As Fig. 2 shows, stillbirths in the WM have been dropping against the national trend. However there continues to be substantial variation throughout the region, which is the subject of our ongoing analysis and reporting back to individual units.

According to the Wigglesworth classification, 74.5% of WM stillbirths are 'unexplained'. Fig. 3 presents the results according to the ReCoDe classification [1], showing that the largest category (40.9 %) is fetal growth restriction.

Fig. 3 - Classification by main ReCoDe categories



Early neonatal deaths (END; birth to 7 days)

Fig. 4 - Early neonatal deaths 2002-4

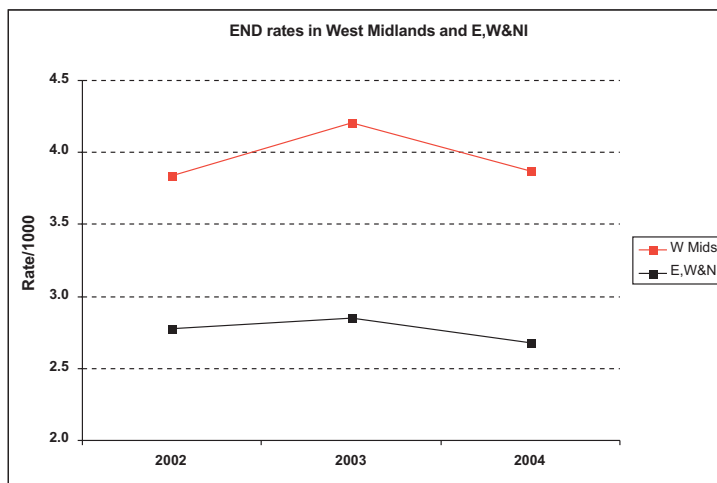
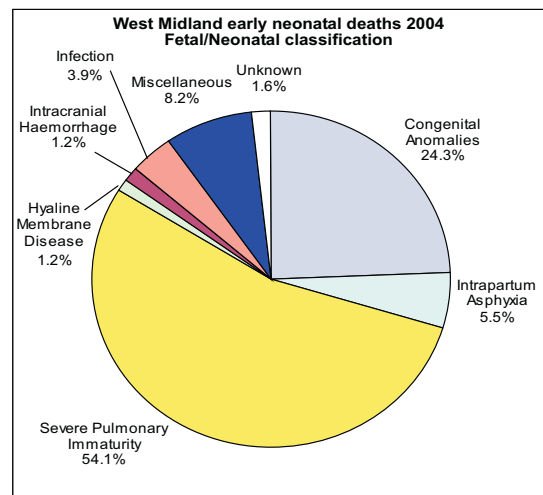


Fig. 5 - ENDs by Fetal/Neonatal Classification



West Midlands early neonatal death rates continue to be substantially higher than the national rate, and are the highest of any CEMACH region. Fig 5 shows the distribution of deaths by the Fetal and Neonatal Classification, with the largest category continuing to be deaths associated with severe pulmonary immaturity.

Pre-viable neonatal deaths

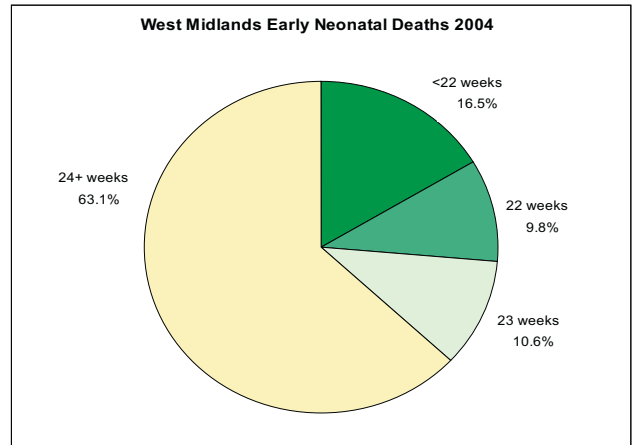
Further analysis reveals that a large proportion of the notified early neonatal deaths were at very early gestations, where the fetus was unlikely to have been viable. The current criterion for classifying a death as early neonatal (as opposed to a late miscarriage or late fetal death) is that any 'signs of life' have been observed at birth.

Fig. 6 shows the proportion of 2004 early neonatal deaths in the West Midlands which were born at <22, 22, 23 and 24+ weeks, respectively. Only 63.1% of END were 24+ weeks, and as many as 26.3% of reports were of deaths before 23 weeks, a gestational age which is generally accepted as pre-viable.

We are currently investigating possible causes for this finding, as there appears to be wide regional variation in these rates. We also sought comparative national data from CEMACH. The proportion of ENDs born at gestations <23 weeks is higher in the West Midlands than the national average, and is in fact the highest of all CEMACH regions in England, Wales & Northern Ireland.

Adjustment for this excess of deaths at very early gestations would reduce the difference between regional and national rates, but END rates in the West Midlands would still be higher than the national average. The Perinatal Institute will be seeking to discuss with stakeholders regionally and nationally the need to standardise the reporting of ENDs.

Fig. 6 - Gestational age distribution of early neonatal deaths



Late Neonatal Deaths (LND; >7 days to 28 days)

Fig. 7 shows the 3 year trend in late neonatal death rates, as detailed in Table 1. The main categories are congenital anomalies, immaturity and infection (Fig. 8).

Fig. 7 - Late neonatal deaths 2002-4

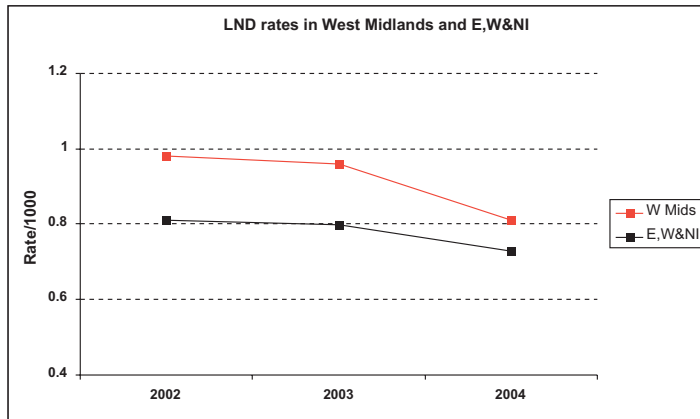
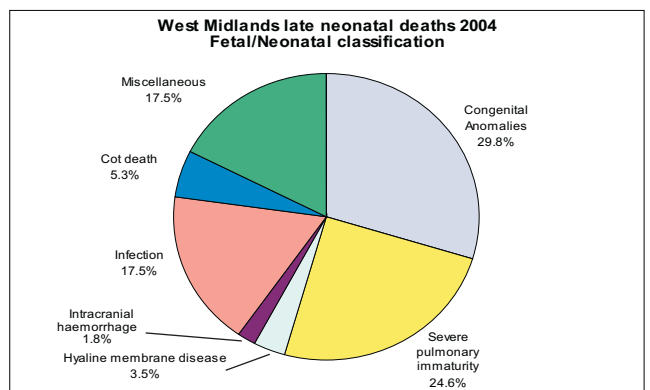


Fig. 8 - Late neonatal deaths by Fetal/Neonatal Classification



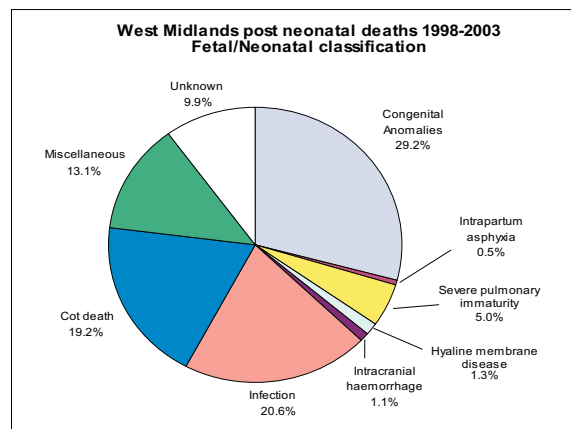
Post Neonatal Deaths (PND; >28 days to 12 months)

As post neonatal data for 2004 are not yet complete, the causes of death are summarised for 1998-2003 (Fig 9). The main categories were congenital anomaly, infection and cot death. Table 2 shows the number of cot deaths as a proportion of all deaths during this period.

Table 2. Cot deaths in West Midlands, 1998-2003

	1998	1999	2000	2001	2002	2003	All years
Postnatal deaths	120	143	112	121	113	147	756
Cot deaths	21	36	24	20	17	27	145
Cot deaths (%)	17.5	25.2	21.4	16.5	15.0	18.4	19.2

Fig. 9 - Post neonatal deaths by Fetal/Neonatal Classification



Social Deprivation

We undertook an analysis of perinatal and infant mortality and social deprivation, as defined by the Index of Multiple Deprivation (IMD 2004, now defined according to 'super-output areas').

Table 3. Perinatal mortality rates 2004 according to quintiles of IMD.

The table shows a strong association between mortality rates and social deprivation, and a large gap in PNM rates between the most deprived wards and the rest of the West Midlands population.

Least deprived
 ↑
 ↓
 Most deprived

IMD Quintile	PNM
1	6.98
2	5.45
3	6.82
4	11.50
5	13.35
West Midlands	9.6

Fig. 10 - Perinatal mortality trend by deprivation

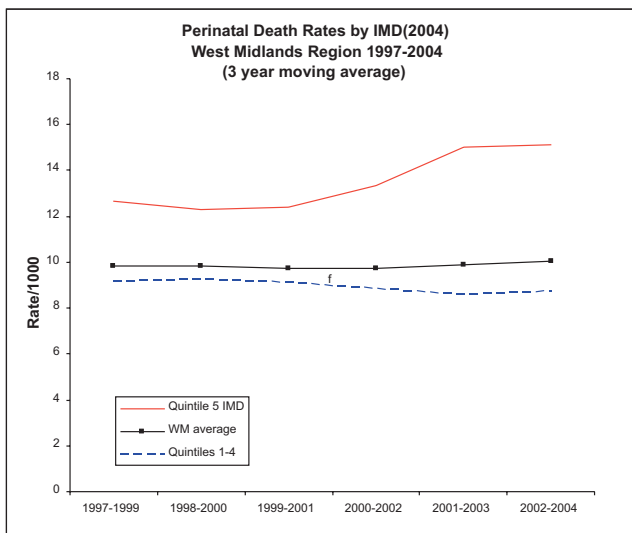
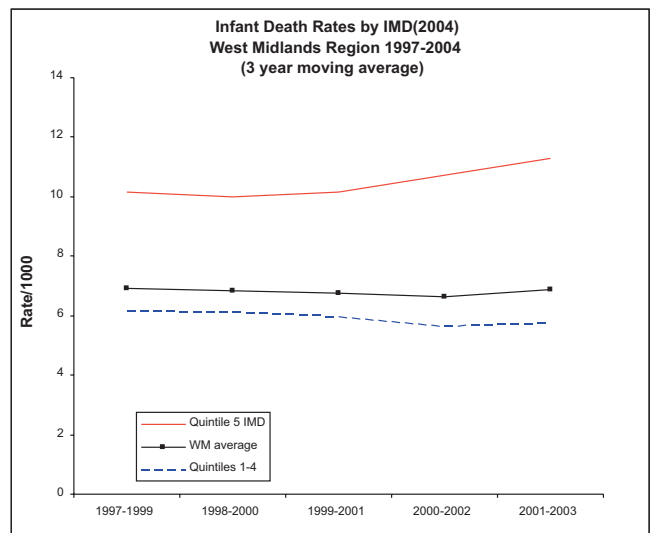


Fig. 11 - Infant mortality trend by deprivation



Figs. 10 and 11 show three year moving-average trends, comparing mortality amongst the 20% of births from the most deprived areas (Quintile 5; equivalent to 12th percentile IMD in the West Midlands), with all other births.

Although overlapping, the data are presented for the perinatal as well as the infant period, as the latter is used in the Public Service Agreement targets on reducing inequalities. Contrary to the PSA targets, both trends show no decrease in the gap, but in fact a statistically significant increase ($p < 0.01$).

Maternal obesity

Maternal height and weight are being collected on WM Perinatal Death Notifications since 2004, but the fields are not always completed and detailed figures are not yet available. However, preliminary analysis suggests that 33% of perinatal deaths occurred in pregnancies where the mother's BMI was > 30 . The elevated rate was observed for stillbirths (31%) as well as early neonatal deaths (36%).

Maternal Age

Average maternal age has been increasing over recent years. Fig. 12 shows the proportion of all pregnancies in the West Midlands where maternal age is less than 20 and 35 or over, respectively. While teenage pregnancies appear to be gradually falling, the proportion of elderly mothers has seen a steady rise.

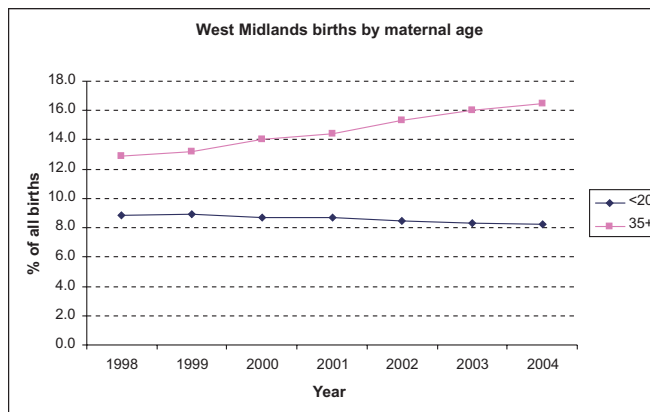


Fig. 12 - WM births by maternal age, 1998-2004

Figs. 13-16 provide an analysis of the effect of low and high maternal age on stillbirths and early, late and post neonatal deaths in the West Midlands, 1998-2004.

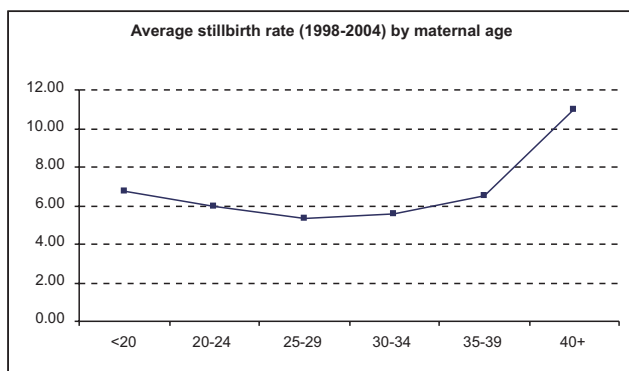


Fig. 13 - Maternal age and stillbirth rates

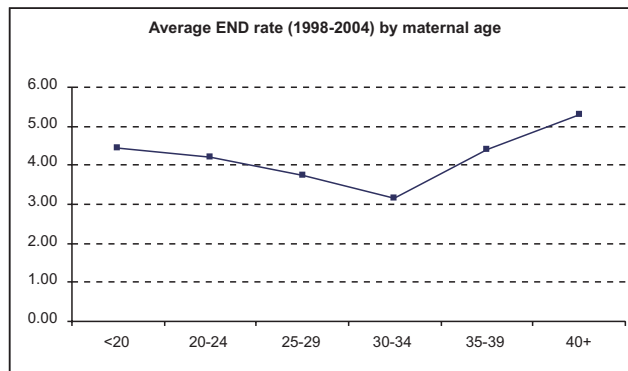


Fig. 14 - Maternal age and early neonatal death rates

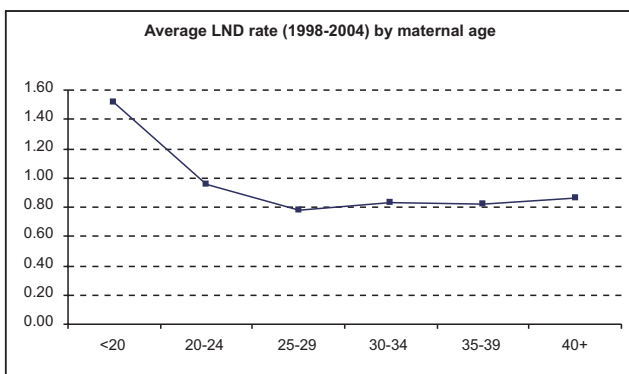


Fig. 15 - Maternal age and late neonatal death rates

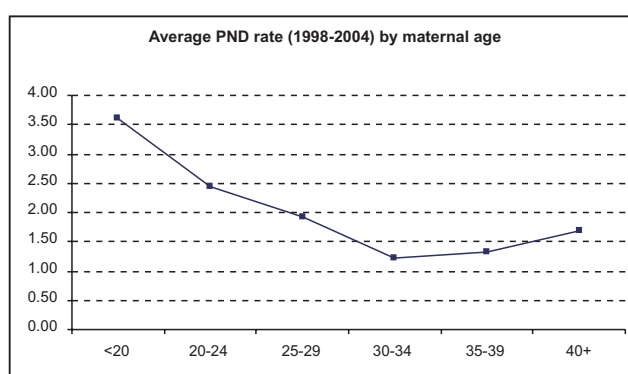


Fig. 16 - Maternal age and post neonatal death rates

For stillbirths, the risk rises steeply for mothers who are 40 years or older, while for late and post neonatal deaths, the increased risk is mainly for mothers below age 20. Early neonatal deaths show an intermediate picture, suggesting increased risk at both ends of the maternal age spectrum.

Perinatal Mortality by Ethnic Origin

The analysis of ethnic origin and its relationship with perinatal mortality is hampered by a lack of denominator data, i.e. information about all maternities and births. We therefore used as reference the latest (2001) WM population census data of the ethnic group distribution of women between 15 and 44 years of age. We looked at stillbirths and neonatal deaths as well as the subcategories associated with lethal congenital anomalies.

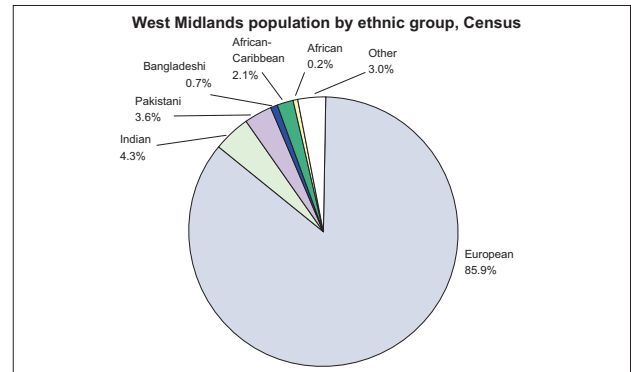


Fig. 17 - Ethnic distribution of WM women aged 15-44

Table 4: Ethnic origin distribution of West Midlands stillbirths and early neonatal deaths, 1998-2004 (% of total).

	European	Indian	Pakistani	Bangladeshi	African - Caribbean	African	Other	Total
Total WM Population	88.7	3.4	2.9	0.6	1.6	0.2	2.5	100 %
Stillbirths with congenital anomaly	68.5	6.0	14.3	1.8	4.5	2.0	3.0	100 %
Early Neonatal Deaths with congenital anomaly	65.7	5.4	15.3	0.9	5.6	1.7	5.5	100 %
	56.4	6.2	26.7	1.7	2.4	1.4	5.2	100 %

The table shows that both stillbirths and early neonatal deaths are disproportionately higher in some ethnic groups. This is further illustrated in Figs. 18 and 20. The discrepancy is particularly large for congenital anomalies, both for stillbirths (Fig 19) and early neonatal deaths (Fig 21).

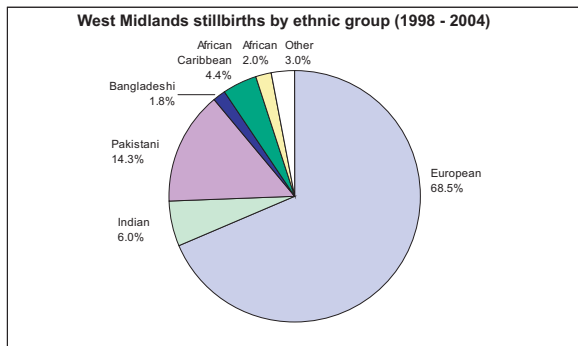


Fig. 18 - Ethnic origin distribution of WM stillbirths, 1998-2004

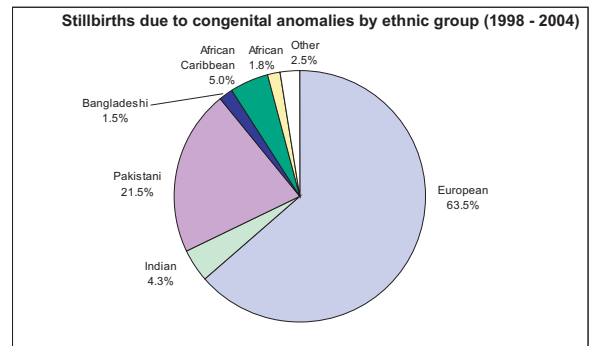


Fig. 19 - Ethnic origin distribution of WM stillbirths 1998-2004, associated with congenital anomalies

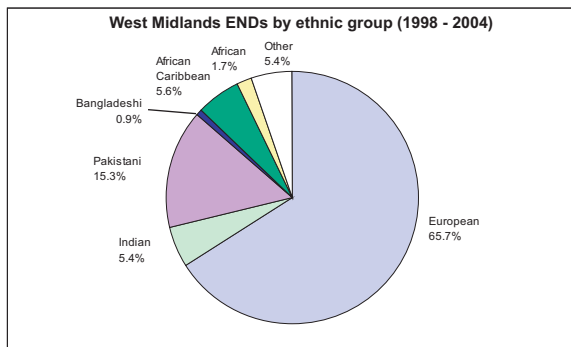


Fig. 20 - Ethnic origin distribution of WM early neonatal deaths, 1998-2004

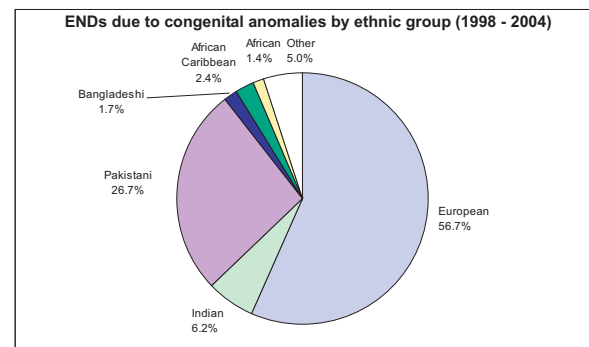


Fig. 21 - Ethnic origin distribution of WM ENDS 1998-2004, associated with congenital anomalies

Postmortems

Table 5. Proportion of deaths with postmortem

	1998	1999	2000	2001	2002	2003	2004
Stillbirth	58.4	49.9	41.7	41.7	39.0	38.3	42.7
END	39.4	37.3	26.7	20.9	15.8	16.0	16.9
PND	21.3	27.6	28.8	20.4	26.7	26.2	*
LND	39.2	49.0	51.8	44.6	48.7	44.9	*

* Data not yet complete

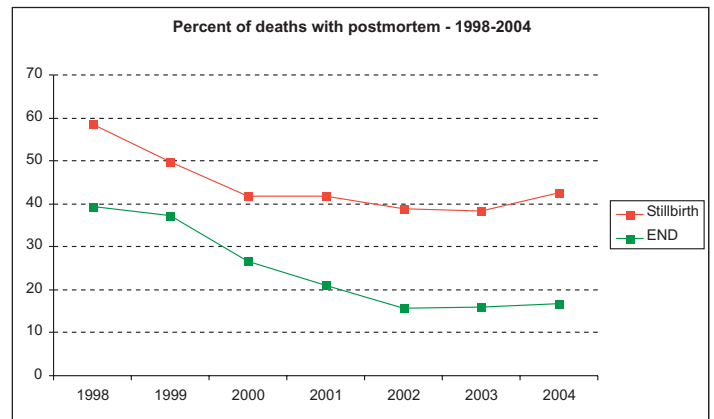


Fig. 22 - Postmortem rates in West Midlands 1998-2004

Fig 22 demonstrates the year-on-year trend, showing a drop in the proportion of stillbirths and early neonatal deaths which had a postmortem. However there is a suggestion that this decline has bottomed out in recent years.

Figures 23 -26 compare the postmortem rates for stillbirths and early, late and post neonatal deaths, respectively, in the main ethnic groups. The graphs demonstrate a wide ethnic origin - associated variation in take-up rates.

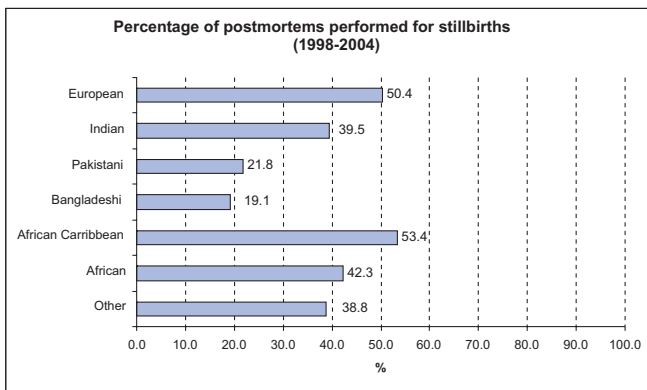


Fig. 23 - Postmortems after stillbirths

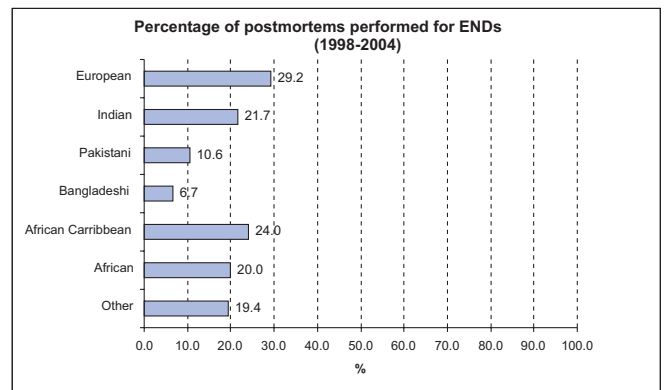


Fig. 24 - Postmortems after early neonatal deaths

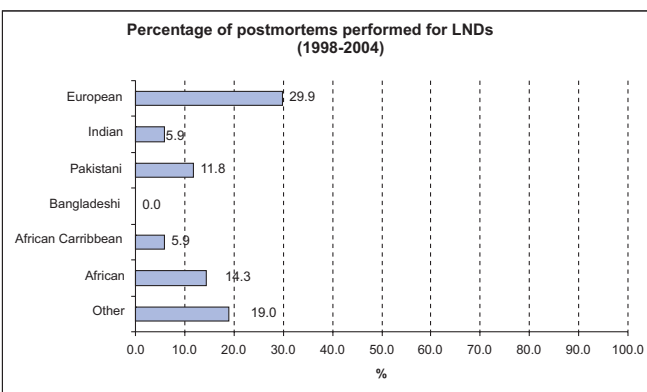


Fig. 25 - Postmortems after late neonatal deaths

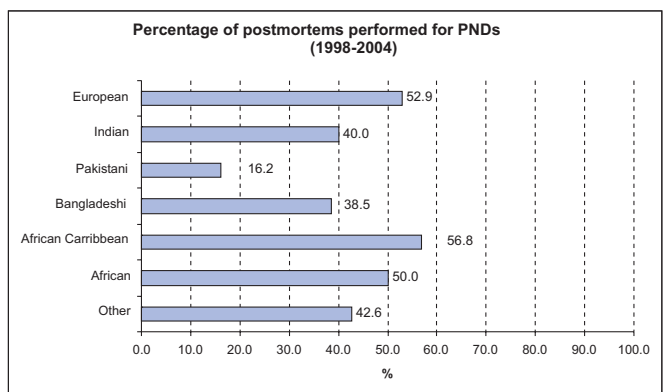


Fig. 26 - Postmortems after post neonatal deaths

Comment

This report provides an update on West Midlands trends in perinatal and infant deaths [1] and flags up issues requiring ongoing work and further investigation. The Perinatal Institute is continuing in its efforts to understand the causes of perinatal mortality and to work towards the reduction of avoidable loss, in partnership with SHAs, PCTs, WM Government Office, Hospital Trusts as well as various professional and user groups.

1. Stillbirths: While the apparent drop in stillbirth rates (Fig 2) is encouraging, there continues to be a large amount of variation within the region. We are assisting efforts by RCOG, CEMACH and SANDS to improve the current national classifications, which still show the majority of stillbirths as being 'unexplained'. The West Midlands classification system [2] substantially reduces the number of unexplained cases and shows that fetal growth restriction is the single largest contributor (Fig 3)

2. Fetal growth surveillance. The Institute's team of specialist midwives are continuing a rolling regional programme of training in standardised fundal height measurement and use of customised growth charts. The Regional Ultrasound Group has developed protocols for referral and investigation. An audit at Birmingham City Hospital has demonstrated increased antenatal detection of growth problems and reduced referrals for unnecessary investigations (www.perinatal.nhs.uk/growth). Another 50+ maternity units in England and Wales, and even units in Auckland and Sydney, have already implemented customised fetal growth assessment.

3. Early Neonatal Deaths. Rates continue to be substantially higher than the national average (Fig 4), and the reasons for this will be the subject of further investigation. The MANNERS neonatal regional report is due for completion in May 2006 and is expected to provide further information. We are also seeking to initiate discussions on standardising gestational age cut-offs for reporting death rates at pre-viable gestations.

4. Children's deaths. West Midlands will be one of the pilot regions for national confidential enquiries into deaths in children. The Perinatal Institute is working with CEMACH and WM child health professionals to implement protocols for data collection and panel assessments.

5. Inequalities. This report highlights the links between adverse outcome and social deprivation. Further mapping will be undertaken during 2006, and we have been working with Government Office on a report on inequalities in the West Midlands and how these affect perinatal outcome. There will also be further examination of the disproportionate contributions according to ethnic origin, as highlighted in this report. In March 2006 the Institute will be publishing an Urdu translation of the WM Pregnancy Notes.

6. Smoking. Smoking in pregnancy is strongly linked with growth restriction and preterm birth, two principal causes of perinatal mortality. The Institute has recently started to convene a regional network of smoking cessation in pregnancy (SCIP) co-ordinators and supports a programme of standardised data collection, audit and training to enhance the effectiveness of this service.

7. The Reducing Perinatal Mortality Project. Birmingham and the Black Country continue to have a high perinatal mortality rate (11.15 /1000 in 2004). A large, BBC-wide project involving all PCTs will aim to address this through mother and baby oriented enhancements of maternity services. The three key process indicators are 1. early booking, 2. continuity of care, and 3. detection of intrauterine growth restriction. The Perinatal Institute is assisting through the collection and analysis of a core maternity dataset, confidential enquiry panels and a maternal experience survey.

8. Local initiatives include specific assessments of adverse outcome to aid strategies for improving maternity services in line with the NSF. We have recently undertaken work with Stoke and Sandwell PCTs, and have started an in-depth analysis for Heart of Birmingham PCT.

9. Data requests. We are receiving an increasing number of specific requests for data from SHAs, PCTs and Hospital Trusts. Over 100 such requests were logged in 2005, and most of these were responded to within a week. Details about the procedure and the relevant data request forms can be downloaded from www.perinatal.nhs.uk/data.

1. West Midlands Key Health Data 2004. Chapter 5: Perinatal Mortality and Social Deprivation. University of Birmingham, 2005. www.perinatal.nhs.uk/pnm

2. Gardosi J, Kady SM, McGeown P, Francis A, Tonks A. Classification of stillbirth by relevant condition at death (ReCoDe): population based cohort study. *Br Med J* 2005;331:1113-1117.

Additional copies of this report are available from www.perinatal.nhs.uk/pnm
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