

16 February 2012



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Dear Colleague

Perinatal & Infant Mortality Report - 2010

This report covers the **Birmingham and Solihull NHS Cluster** and its constituent LAs and provider units with reference to the West Midlands (WM), and includes stillbirth, perinatal and infant mortality data up to 2010.

To put mortality rates within context of the characteristics of the population served, the report includes results from the PEER regional maternity data collection, which was well established during 2010 (Section 2).

The report also examines trends within the main mortality subgroups. For the first time, we are including analysis of perinatal deaths from 30 weeks, to help us track some of the potentially avoidable deaths at gestations where immaturity plays a lesser role (Section 8). This is showing encouraging signs that the improvements in antenatal detection of intrauterine growth restriction (IUGR) associated with the enhanced training and community growth scan (CoGS) programme in Birmingham are translating into demonstrable reductions in perinatal mortality rates.

The results within each section can be summarised as follows:

Section	Main Finding
1. Birth rate	Upward trend in Cluster, following WM and national trends
2. Maternity population	Highlights high deprivation rates and variation of quality indicators and KPIs between units.
3. Stillbirths	Above WM and national average, but with a downward trend. LA stillbirth rates are within prediction interval adjusted for deprivation
4. Stillbirth categories	Largest groups: fetal growth restriction and congenital anomalies; significant reduction of stillbirths with intrauterine growth restriction
5. Early neonatal & perinatal rates	Following regional and national trend
6. Infant deaths	Above the WM rate but dropping significantly, following national downward trend; LA mortality rates are within prediction interval
7. Infant death categories	Largest group: immaturity related - downward trend; followed by congenital anomalies - no change
8. Perinatal deaths from 30+weeks	Largest groups: congenital anomalies and IUGR. Significant downward trend in IUGR deaths, with 2010 rate 46% lower than 200 baseline.

More specific comments are made within the respective sections.
As always, the team at the Institute is happy to provide supplementary information as required.

With sincere regards



Professor Jason Gardosi
Director

METHODS & DEFINITIONS

- Mortality rates are calculated for deaths based on year of delivery.
 - Mortality data are reported annually and for 3 year moving average.
 - 'Previaible' neonatal or infant deaths: <22 weeks gestation and/or <500g
 - Cases allocated to trusts/units using place of birth, and to Cluster/PCT/LA using maternal postcode at birth
 - Deliveries at home or elsewhere (e.g. born before arrival) allocated to intended place of delivery at booking
 - Death classifications: ReCoDe - *BMJ*. 2005;331:1113-7 ; Fetal & Neonatal : *BJOG* 1986;93:1213-23.
 - Fetal/Intrauterine Growth Restriction (FGR/IUGR): below 10th customised weight-for-gestation centile
-
- Deprivation scores for individual cases (births and deaths) are derived by linking maternal postcode at birth to area-based measures. Index of Multiple Deprivation (IMD 2007) is based on the ordering of deprivation scores for Lower Super Output Areas in England and Wales. Quintile 5 describes the most deprived 20% nationally.

ABBREVIATIONS

HES - Hospital Episode Statistics

ONS - Office for National Statistics

PEER - Perinatal Episode Electronic Record

SCB - Safeguarding Children's Board

DATA SOURCES

Deaths (numerator) - PI collects all fetal losses (from 20 weeks gestation including stillbirths) and infant deaths (up to 1 year of age) for the West Midlands. Cases are notified by co-ordinators from maternity and tertiary paediatric units, using perinatal death notifications (PDNs). In order to ensure high ascertainment, cases are cross-matched with ONS statutory notifications (stillbirth and death registrations), Safeguarding Children's Boards (SCB; infant deaths), pathology reports, and HES inpatient deaths.
NB Mortality rates will occasionally differ from ONS Vital Statistics because PI data are regularly updated with late ascertained cases.

Births (denominator; population-based) - ONS birth registrations are the denominators used in calculating mortality rates for Clusters, PCTs, or LAs.

Births (denominator; service-based) - PI collects annual denominator data from all West Midlands units through the Heads of Midwifery. These are used when calculating mortality rates for trusts or units.

PEER database. The Perinatal Episode Electronic Record was established under the regional Investing for Health (IfH) programme to provide standardised patient level data across the West Midlands. It uses a regularly updated regional dataset http://www.pi.nhs.uk/peer/peerdata_collection.htm which was version 1.7 during the period reported here (Jan-Dec 2010). PEER is quality assured through regular crosschecks and audits. It is used for unit, PCT and Cluster based standardised reports (www.pi.nhs.uk/peer/peerview) as well as bespoke data requests.

Key Performance Indicators (KPIs), as established and agreed under the SHA's IfH programme. Definitions are available here: http://www.pi.nhs.uk/rpnm/IfH_KPI_Evidence_Targets.pdf

AUTHORS / CITATION:

Abdel EISheikh, Asad Malik, Jason Gardosi. Perinatal and Infant Mortality Report 2010 – Birmingham & Solihull NHS Cluster. West Midlands Perinatal Institute, 2012

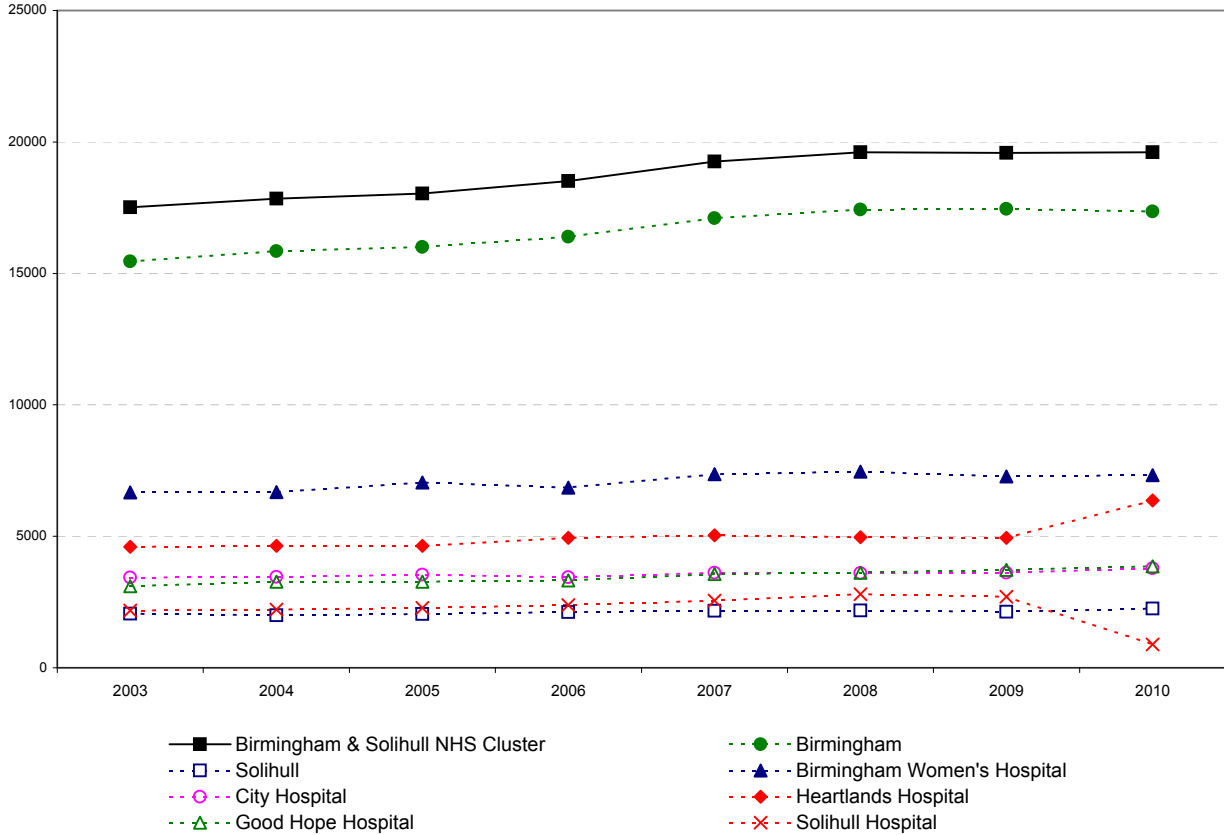
1. Births: Birmingham & Solihull NHS Cluster, West Midlands 2003-2010

Source: ONS

		2003	2004	2005	2006	2007	2008	2009	2010
England and Wales		624816	643026	649094	672966	693356	712328	709936	726879
West Midlands		64080	66300	66350	68064	70472	72126	71452	72459
Birmingham & Solihull NHS Cluster		17512	17846	18044	18507	19257	19610	19579	19607
LA/UA	Birmingham	15456	15848	16000	16390	17095	17429	17448	17356
	Solihull	2056	1998	2044	2117	2162	2181	2131	2251
Delivery Unit	Birmingham Women's Hospital	6671	6687	7046	6858	7367	7461	7283	7325
	City Hospital	3435	3458	3545	3440	3617	3607	3615	3782
	Heartlands Hospital	4603	4640	4641	4945	5039	4969	4945	6366
	Good Hope Hospital	3104	3271	3271	3328	3565	3619	3720	3858
	Solihull Hospital	2180	2220	2279	2383	2550	2800	2700	884

Total Births

Fig. 1 - Total Births 2003-2010
Birmingham & Solihull NHS Cluster



Comment:

The Table and Figure illustrate the increasing birth rate in the Region, Cluster, LAs and constituent maternity units. The 2010 changes in deliveries at Heartlands and Solihull Hospitals represent reconfiguration within Heart of England Foundation Trust.

2. Demographics & KPIs: Birmingham & Solihull NHS Cluster, 2010

	West Midlands	Birmingham & Solihull NHS Cluster	Birmingham LA	Solihull LA	Birmingham Women's Hospital	City Hospital	Heartlands Hospital	Good Hope Hospital	Solihull Hospital
Total Births:	72,459	19,607	17,356	2,251	7,325	3,782	6,366	3,858	884
Submissions:	58,718	15,848	14,337	1,511	7,106	3,621	3,536	3,391	754
% of Births	81.0%	80.8%	82.6%	67.1%	97.0%	95.7%	55.5%	87.9%	85.3%
Deprivation - IMD Quintile									
1 (least)	8.6%	4.0%	1.2%	30.6%	2.6%	0.2%	3.7%	10.6%	14.3%
2	12.7%	5.4%	3.4%	24.0%	5.4%	1.0%	5.6%	14.6%	15.3%
3	16.5%	11.4%	11.3%	11.8%	16.6%	4.4%	7.6%	16.8%	15.0%
4	21.2%	17.2%	17.9%	10.9%	22.2%	13.9%	9.8%	19.0%	15.7%
5 (most)	41.0%	62.1%	66.3%	22.6%	53.2%	80.5%	73.3%	39.0%	39.8%
Ethnic Origin									
African	3.5%	6.6%	7.2%	1.1%	4.6%	11.9%	7.1%	2.5%	3.1%
African Caribbean	2.0%	4.2%	4.6%	1.0%	3.4%	9.2%	2.2%	2.5%	1.1%
British European	67.9%	45.7%	41.9%	81.9%	51.9%	17.7%	42.3%	75.3%	66.7%
Eastern European	3.7%	2.9%	3.0%	1.8%	1.7%	5.9%	1.4%	3.7%	2.5%
Middle Eastern	1.1%	2.1%	2.3%	0.4%	3.2%	2.2%	1.1%	0.4%	0.5%
South Asian	15.6%	29.8%	32.0%	9.1%	25.2%	42.1%	41.3%	7.4%	19.9%
Bangladeshi	1.9%	4.2%	4.6%	0.3%	2.0%	9.4%	5.6%	0.6%	1.6%
Indian	5.1%	5.8%	5.9%	5.1%	6.3%	11.9%	2.9%	2.9%	5.1%
Pakistani	8.6%	19.8%	21.5%	3.7%	16.9%	20.8%	32.8%	3.9%	13.3%
Other/Mixed	6.2%	8.6%	9.0%	4.7%	10.0%	11.0%	4.7%	8.3%	6.2%
Migrants									
Non UK Born	20.6%	34.0%	36.8%	8.8%	27.7%	57.9%	37.6%	14.2%	19.3%
Maternal Age									
< 16	0.2%	0.2%	0.2%	0.0%	0.2%	0.4%	0.1%	0.2%	0.0%
< 18	1.9%	1.5%	1.5%	1.2%	1.3%	2.1%	1.4%	1.6%	0.9%
< 20	6.9%	5.7%	5.8%	4.6%	5.1%	7.3%	5.8%	6.2%	5.3%
20 - 24	22.4%	21.8%	22.2%	17.8%	19.5%	23.0%	24.4%	20.5%	21.4%
25 - 29	29.2%	30.1%	30.8%	23.3%	29.0%	33.7%	30.7%	28.2%	31.0%
30 - 34	25.4%	26.3%	25.6%	32.3%	28.7%	22.5%	23.8%	26.7%	25.9%
35 - 39	13.1%	12.9%	12.3%	18.5%	14.0%	10.1%	12.3%	14.7%	13.8%
35+	16.1%	16.2%	15.6%	22.1%	17.6%	13.5%	15.2%	18.5%	16.4%
40+	3.0%	3.3%	3.3%	3.5%	3.6%	3.5%	2.9%	3.8%	2.7%
Body Mass Index									
< 18.5	3.3%	3.1%	3.2%	1.8%	2.7%	3.8%	3.3%	3.4%	2.4%
18.5 - 24.9	48.0%	45.8%	45.2%	51.2%	45.7%	46.1%	41.8%	49.4%	52.7%
25 - 29.9	28.3%	30.4%	30.5%	29.4%	30.9%	30.0%	32.0%	26.3%	29.6%
30 - 34.9	12.7%	13.6%	13.8%	11.6%	13.5%	13.1%	15.0%	13.1%	12.1%
35 - 39.9	5.1%	5.0%	5.0%	4.5%	5.0%	4.8%	5.4%	5.3%	2.8%
30+	20.4%	20.7%	21.0%	17.6%	20.7%	20.1%	22.8%	20.8%	15.2%
35+	7.6%	7.1%	7.2%	6.0%	7.2%	7.0%	7.8%	7.8%	3.1%
40+	2.5%	2.1%	2.2%	1.5%	2.2%	2.2%	2.4%	2.5%	0.3%

contd.

	West Midlands	Birmingham & Solihull NHS Cluster	Birmingham LA	Solihull LA	Birmingham Women's Hospital	City Hospital	Heartlands Hospital	Good Hope Hospital	Solihull Hospital
Prematurity									
< 37 Weeks	6.0%	6.0%	6.2%	3.9%	7.2%	6.6%	6.8%	5.8%	1.5%
< 34 Weeks	1.8%	2.0%	2.1%	1.1%	2.8%	2.9%	2.3%	1.5%	0.0%
Onset of Labour									
Induced	22.3%	22.4%	22.5%	21.2%	27.0%	14.9%	21.8%	22.3%	18.4%
Mode of Delivery									
Forceps/Ventouse	10.6%	10.5%	10.5%	10.3%	14.7%	7.3%	6.6%	9.7%	8.4%
Caesarean Section	23.0%	21.9%	21.7%	23.9%	21.3%	23.5%	22.4%	25.8%	18.4%
Elective	9.2%	8.2%	7.8%	12.4%	8.0%	7.2%	9.2%	11.1%	8.4%
Non-Elective	13.8%	13.7%	13.9%	11.6%	13.3%	16.2%	13.2%	14.7%	10.1%
Outcome									
Apgar < 7 @ 5 Min.	1.4%	1.7%	1.7%	1.4%	1.6%	2.2%	2.1%	1.3%	1.5%
NICU Admission (37+ Wks) ^a	2.3%	2.4%	2.3%	3.4%	1.7%	3.1%	1.4%	2.9%	**
Early Booking < 13 Weeks *									
Average	83.7%	80.9%	80.6%	83.2%	88.2%	63.1%	79.4%	89.4%	84.7%
Range ^b	(63.1% - 90.7%)	(63.1% - 89.4%)							
Fetal growth restriction *									
Birthweight <10th cust. centile									
Average	13.8%	13.5%	13.6%	12.6%	13.5%	15.5%	14.8%	11.9%	10.2%
Range ^b	(10.3% - 16.4%)	(10.2% - 15.5%)							
FGR Detection									
Average	31.0%	32.6%	32.2%	36.5%	31.4%	34.5%	34.5%	29.9%	18.7%
Range ^b	(11.5% - 48.3%)	(18.7% - 34.5%)							
Detection after referral for FH									
Average	61.5%	60.5%	59.9%	64.6%	51.4%	70.5%	62.4%	68.2%	50.0%
Range ^b	(30.9% - 72.5%)	(50% - 70.5%)							
Smoking *									
At booking	18.8%	15.4%	15.2%	18.1%	14.4%	13.4%	16.6%	19.8%	17.7%
Late in pregnancy	13.6%	10.7%	10.4%	13.8%	9.4%	9.0%	11.6%	16.0%	10.2%
Ceased During Pregnancy	27.3%	29.1%	30.0%	21.4%	35.8%	34.5%	24.9%	18.1%	31.8%
Range ^b	(15.4% - 61.4%)	(18.1% - 34.5%)							
Breastfeeding Initiation *									
Average	60.5%	63.2%	63.1%	63.7%	64.2%	73.4%	55.7%	61.6%	62.1%
Range ^b	(43.1% - 78.0%)	(55.7% - 73.4%)							

Notes

* KPI - Definitions are available [here](#) ** Not presented as submissions (denominator) <1 a Collected since 10/2010 only; 12 months data to 09/2011 shown
b Range based on annual average within WM or Cluster

Comment:

This table compares the characteristics of the maternity population of the West Midlands with that of B&S Cluster, constituent LAs and associated maternity units. Of particular note is the high rate of social deprivation in Birmingham, and the wide variation between individual units. A high proportion of mothers are from ethnic minorities, and over a third are migrants.

3. Stillbirths 2003-2010

Birmingham & Solihull

Numbers

		2003	2004	2005	2006	2007	2008	2009	2010
England and Wales*		3565	3517	3473	3590	3585	3617	3688	3714
West Midlands		395	383	404	391	399	414	433	394
Birmingham & Solihull NHS Cluster		152	139	126	123	132	134	140	140
LA/UA	Birmingham	140	133	114	112	129	122	131	124
	Solihull	12	6	12	11	3	12	9	16
Delivery Unit	Birmingham Women's Hospital	47	55	42	57	49	55	57	49
	City Hospital	30	28	35	16	33	24	37	39
	Heartlands Hospital	56	52	49	57	55	48	50	51
	Good Hope Hospital	18	15	12	14	14	18	17	15
	Solihull Hospital	12	5	6	3	6	8	5	3

Rate/1,000

		2003	2004	2005	2006	2007	2008	2009	2010	2010 C.I.
England and Wales*		5.7	5.5	5.4	5.3	5.2	5.1	5.2	5.1	4.9 - 5.3
West Midlands		6.2	5.8	6.1	5.7	5.7	5.7	6.1	5.4	4.9 - 6.0
Birmingham & Solihull NHS Cluster		8.7	7.8	7.0	6.6	6.9	6.8	7.2	7.1	6.1 - 8.4
LA/UA	Birmingham	9.1	8.4	7.1	6.8	7.5	7.0	7.5	7.1	6.0 - 8.5
	Solihull	5.8	3.0	5.9	5.2	1.4	5.5	4.2	7.1	4.4 - 11.5
Delivery Unit	Birmingham Women's Hospital	7.0	8.2	6.0	8.3	6.7	7.4	7.8	6.7	5.1 - 8.8
	City Hospital	8.7	8.1	9.9	4.7	9.1	6.7	10.2	10.3	7.6 - 14.1
	Heartlands Hospital	12.2	11.2	10.6	11.5	10.9	9.7	10.1	8.0	6.1 - 10.5
	Good Hope Hospital	5.8	4.6	3.7	4.2	3.9	5.0	4.6	3.9	2.4 - 6.4
	Solihull Hospital	5.5	2.3	2.6	1.3	2.4	2.9	1.9	3.4	1.2 - 9.9

3 year moving averages

		03-05	04-06	05-07	06-08	07-09	08-10	08-10 C.I.
England and Wales		5.51	5.4	5.3	5.2	5.1	5.13	5.0 - 5.2
West Midlands		6.01	5.9	5.8	5.7	5.8	5.74	5.4 - 6.1
Birmingham & Solihull NHS Cluster		7.81	7.1	6.8	6.8	6.9	7.04	6.4 - 7.8
LA/UA	Birmingham	8.2	7.4	7.2	7.1	7.4	7.2	6.5 - 8.0
	Solihull	4.9	4.7	4.1	4.0	3.7	5.6	4.1 - 7.8
Delivery Unit	Birmingham Women's Hospital	7.1	7.5	7.0	7.4	7.3	7.3	6.3 - 8.5
	City Hospital	8.9	7.6	7.9	6.8	8.7	9.1	7.5 - 11.0
	Heartlands Hospital	11.3	11.1	11.0	10.7	10.2	9.2	7.8 - 10.7
	Good Hope Hospital	4.7	4.2	3.9	4.4	4.5	4.5	3.4 - 5.9
	Solihull Hospital	3.4	2.0	2.1	2.2	2.4	2.5	1.5 - 4.1

Comment:

The tables present year on year numbers and rates of stillbirth for Cluster, LAs and provider units.

Figure 3.1 illustrates the 3 year moving trend; the rate for the Birmingham Cluster is higher than that of the West Midlands and England & Wales. There has been a sustained drop from 7.8 /1000 in 2003-5 to 7.0/1000 in 2008-10.

Figure 3.2 shows the two LAs plotted according to deprivation score and stillbirth rate; both are within the prediction interval adjusted for social deprivation.

Fig. 3.1 - Stillbirth rates - 3 year moving average
Birmingham & Solihull NHS Cluster, 2003-2010

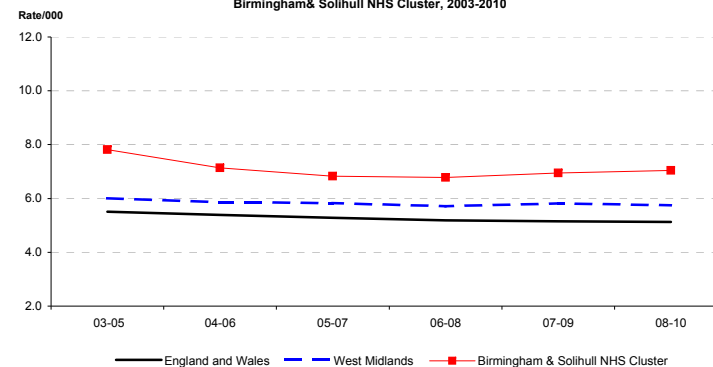


Fig 3.1 Stillbirth trend for Birmingham & Solihull NHS Cluster, West Midlands and England & Wales, 2003-10.

Fig. 3.2 - Stillbirth and Deprivation
Birmingham & Solihull NHS Cluster, 2008-2010

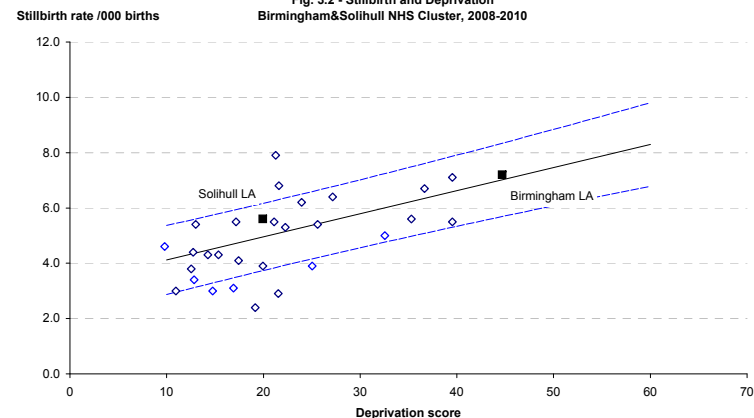


Fig 3.2 Stillbirth rates for last triennium (2008-10) for the Birmingham & Solihull NHS Cluster, plotted against each LA's deprivation score (IMD 2007). Regression lines represent 90% prediction intervals, based on WM 2003 - 2010.

4. Stillbirths in Birmingham & Solihull NHS Cluster, 2003-2010: Classification in main groups

Groups based on ReCoDe classification

Births 2008-10

	Birmingham & Solihull NHS Cluster		Birmingham Women's Hospital		City Hospital		Heartlands Hospital		Good Hope Hospital		Solihull Hospital	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Births 2008-10	58796		22069		11004		16280		11197		6384	
MAIN GROUPS - 2008-10												
Congenital anomaly	99	1.7	39	1.8	21	1.9	43	2.6	9	0.8	2	0.3
Fetal growth restriction	145	2.5	63	2.9	35	3.2	47	2.9	16	1.4	6	0.9
Placenta / Umbilical chord	37	0.6	12	0.5	10	0.9	13	0.8	9	0.8	2	0.3
Maternal conditions	13	0.2	4	0.2	5	0.5	5	0.3	0	0.0	0	0.0
Infection	13	0.2	5	0.2	2	0.2	2	0.1	1	0.1	1	0.2
Intrapartum asphyxia	3	0.1	2	0.1	1	0.1	0	0.0	0	0.0	0	0.0
Miscellaneous	27	0.5	16	0.7	7	0.6	10	0.6	1	0.1	2	0.3
Unclassified / Unexplained	77	1.3	20	0.9	19	1.7	29	1.8	14	1.3	3	0.5

Births

	2003	2004	2005	2006	2007	2008	2009	2010
Births	17512	17846	18044	18507	19257	19610	19579	19607

MAIN GROUPS Birmingham & Solihull NHS Cluster Numbers

Congenital anomaly	26	20	19	24	30	42	30	27
Fetal growth restriction	58	59	52	46	53	51	49	45
Placenta/Umbilical chord	23	21	8	17	5	7	14	16
Maternal conditions	6	1	2	1	2	3	2	8
Infection	4	3	0	4	5	4	2	7
Intrapartum asphyxia	5	1	3	1	2	2	0	1
Miscellaneous	7	11	11	5	3	9	10	8
Unclassified / Unexplained	23	23	31	25	32	16	33	28

3-year moving averages

	03-05	04-06	05-07	05-08	07-09	08-10
Congenital anomaly	1.2	1.2	1.3	1.7	1.7	1.7
Fetal growth restriction	3.2	2.9	2.7	2.6	2.6	2.5
Placenta/Umbilical chord	1.0	0.8	0.5	0.5	0.4	0.6
Maternal conditions	0.2	0.1	0.1	0.1	0.1	0.2
Infection	0.1	0.1	0.2	0.2	0.2	0.2
Intrapartum asphyxia	0.2	0.1	0.1	0.1	0.1	0.1
Miscellaneous	0.5	0.5	0.3	0.3	0.4	0.5
Unclassified / Unexplained	1.4	1.5	1.6	1.3	1.4	1.3

Fig. 4.1 - Stillbirth Rates: Main Groups Birmingham&Solihull NHS Cluster, 2008 - 2010

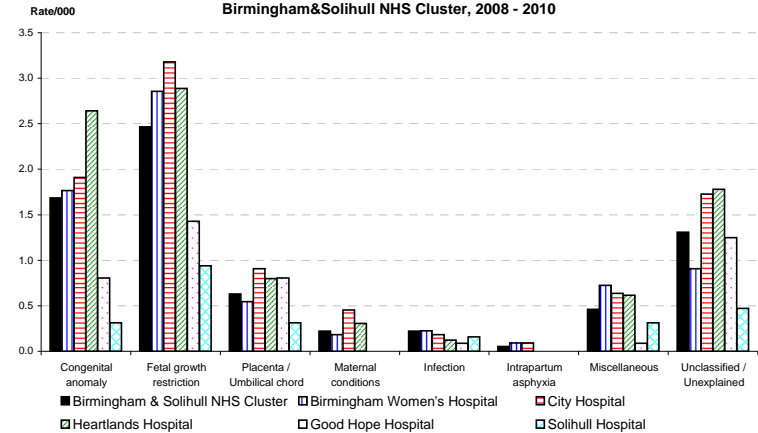
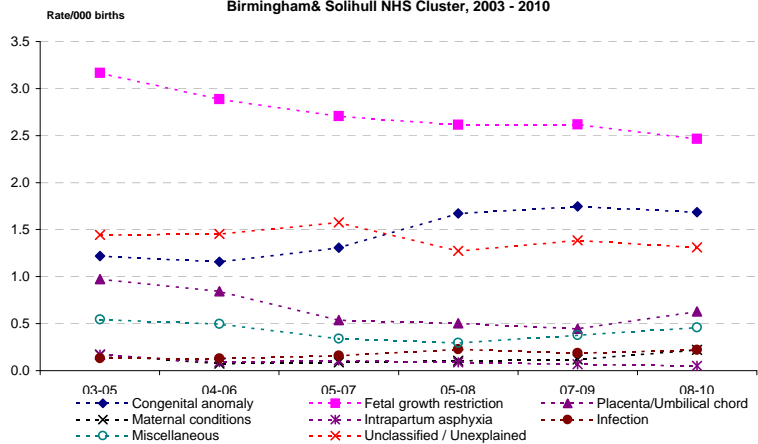


Fig. 4.2 - Stillbirth main groups, 3-year moving average Birmingham&Solihull NHS Cluster, 2003 - 2010



Comment:

Fig 4.1. shows the main categories of stillbirth within the Cluster and provider units. Although the proportions vary, the largest category is fetal growth restriction within each unit, followed by congenital anomaly. Fig 4.2. shows 3 year moving average trends analysis. There has been a gradual and sustained drop in stillbirths associated with fetal growth restriction, which is statistically significant (analysis of trend: $p=0.02$; see also Section 8). Over the same period, the rate of stillbirths with congenital anomalies has been showing a slight upward trend ($p=0.181$).

5 A. Early Neonatal Deaths 2003-2010

Birmingham & Solihull

Numbers - PDNs

	2003	2004	2005	2006	2007	2008	2009	2010
England and Wales*	1726	1714	1681	1750	1762	1763	1715	1675
West Midlands	267	255	270	246	268	260	253	229
Birmingham & Solihull NHS Cluster	102	81	95	90	92	84	83	71
LA/UA								
Birmingham	97	77	87	84	87	72	79	69
Solihull	5	4	8	6	5	12	4	2
Delivery Unit								
Birmingham Women's Hospital	47	35	64	46	53	38	49	47
City Hospital	18	21	9	19	11	14	13	9
Heartlands Hospital	42	30	33	34	37	36	37	23
Good Hope Hospital	13	8	8	13	13	12	13	4
Solihull Hospital	2	2	5	0	1	0	0	1

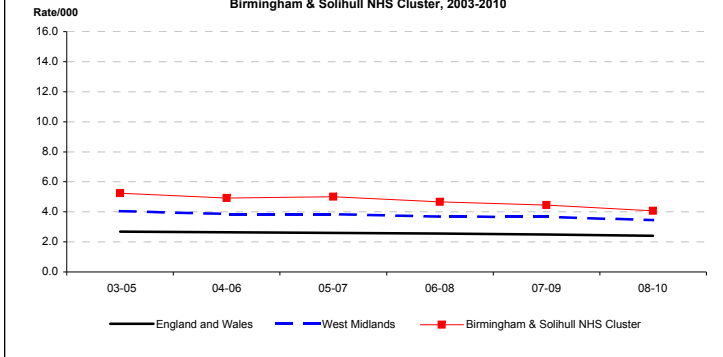
Rate/1,000

	2003	2004	2005	2006	2007	2008	2009	2010	2010 C.I.
England and Wales*	2.8	2.7	2.6	2.6	2.6	2.5	2.4	2.3	2.2 - 2.4
West Midlands	4.2	3.9	4.1	3.6	3.8	3.6	3.6	3.2	2.8 - 3.6
Birmingham & Solihull NHS Cluster	5.9	4.6	5.3	4.9	4.8	4.3	4.3	3.6	2.9 - 4.6
Birmingham	6.3	4.9	5.5	5.2	5.1	4.2	4.6	4.0	3.2 - 5.1
Solihull	2.4	2.0	3.9	2.8	2.3	5.5	1.9	0.9	0.2 - 3.3
Birmingham Women's Hospital	7.1	5.3	9.1	6.8	7.2	5.1	6.8	6.5	4.9 - 8.6
City Hospital	5.3	6.1	2.6	5.5	3.1	3.9	3.6	2.4	1.3 - 4.6
Heartlands Hospital	9.2	6.5	7.2	7.0	7.4	7.3	7.6	3.6	2.4 - 5.5
Good Hope Hospital	4.2	2.5	2.5	3.9	3.7	3.3	3.5	1.0	0.4 - 2.7
Solihull Hospital	0.9	0.9	2.2	0.0	0.4	0.0	0.0	1.1	0.2 - 6.4

3 year moving averages

	03-05	04-06	05-07	06-08	07-09	08-10	08-10 C.I.
England and Wales	2.7	2.6	2.6	2.6	2.5	2.4	2.3 - 2.5
West Midlands	4.1	3.9	3.8	3.7	3.7	3.5	3.2 - 3.7
Birmingham & Solihull NHS Cluster	5.2	4.9	5.0	4.7	4.5	4.1	3.6 - 4.6
LA/UA							
Birmingham	5.6	5.2	5.3	4.8	4.6	4.2	3.7 - 4.8
Solihull	2.8	2.9	3.0	3.6	3.3	2.8	1.7 - 4.4
Delivery Unit							
Birmingham Women's Hospital	7.2	7.1	7.7	6.4	6.4	6.1	5.2 - 7.2
City Hospital	4.6	4.7	3.7	4.2	3.5	3.3	2.4 - 4.6
Heartlands Hospital	7.6	6.9	7.2	7.2	7.4	6.0	4.9 - 7.3
Good Hope Hospital	3.0	3.0	3.4	3.6	3.5	2.6	1.8 - 3.7
Solihull Hospital	1.4	1.0	0.8	0.1	0.1	0.2	0.0 - 0.9

Fig. 5.1 - Early neonatal death rates - 3 year moving average
Birmingham & Solihull NHS Cluster, 2003-2010



5 B. Perinatal Deaths 2003-2010

Numbers - PDNs

	2003	2004	2005	2006	2007	2008	2009	2010
England and Wales*	5291	5231	5154	5340	5347	5380	5403	5389
West Midlands	662	638	674	637	667	674	666	623
Birmingham & Solihull NHS Cluster	254	220	221	213	224	218	223	211
LA/UA								
Birmingham	237	210	201	196	216	194	210	193
Solihull	17	10	20	17	8	24	13	18
Delivery Unit								
Birmingham Women's Hospital	94	90	106	103	102	93	106	96
City Hospital	48	49	44	35	44	38	50	48
Heartlands Hospital	98	82	82	91	92	84	87	74
Good Hope Hospital	31	23	20	27	27	30	30	19
Solihull Hospital	14	7	11	3	7	8	5	4

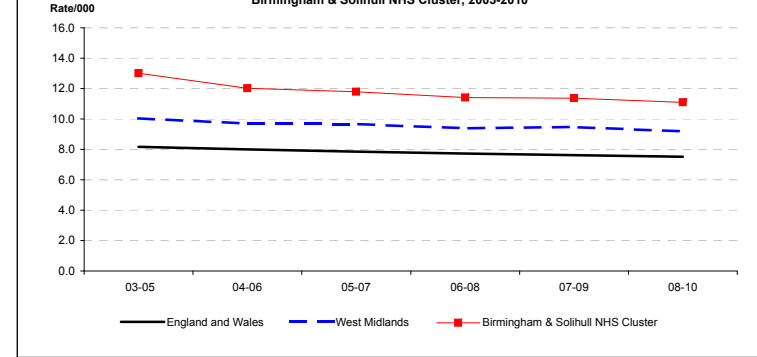
Rate/1,000

	2003	2004	2005	2006	2007	2008	2009	2010	2010 C.I.
England and Wales*	8.5	8.1	7.9	7.9	7.7	7.6	7.6	7.4	7.2 - 7.6
West Midlands	10.3	9.6	10.2	9.4	9.5	9.3	9.6	8.6	8.0 - 9.3
Birmingham & Solihull NHS Cluster	14.5	12.3	12.2	11.5	11.6	11.1	11.4	10.8	9.4 - 12.3
Birmingham	15.3	13.3	12.6	12.0	12.6	11.1	12.0	11.1	9.7 - 12.8
Solihull	8.3	5.0	9.8	8.0	3.7	11.0	6.1	8.0	5.1 - 12.6
Birmingham Women's Hospital	14.1	13.5	15.0	15.0	13.8	12.5	14.6	13.1	10.7 - 16.0
City Hospital	14.0	14.2	12.4	10.2	12.2	10.5	13.8	12.7	9.6 - 16.8
Heartlands Hospital	21.3	17.7	17.7	18.4	18.3	16.9	17.6	11.6	9.3 - 14.6
Good Hope Hospital	10.0	7.0	6.1	8.1	7.6	8.3	8.1	4.9	3.2 - 7.7
Solihull Hospital	6.4	3.2	4.8	1.3	2.7	2.9	1.9	4.5	1.8 - 11.6

3 year moving averages

	03-05	04-06	05-07	06-08	07-09	08-10	08-10 C.I.
England and Wales	8.2	8.0	7.9	7.7	7.6	7.5	7.4 - 7.6
West Midlands	10.0	9.7	9.7	9.4	9.5	9.2	8.8 - 9.6
Birmingham & Solihull NHS Cluster	13.0	12.0	11.8	11.4	11.4	11.1	10.3 - 12.0
LA/UA							
Birmingham	13.7	12.6	12.4	11.9	11.9	11.4	10.6 - 12.4
Solihull	7.7	7.6	7.1	7.6	7.0	8.4	6.4 - 10.9
Delivery Unit							
Birmingham Women's Hospital	14.2	14.5	14.6	13.7	13.6	13.4	11.9 - 15.0
City Hospital	13.5	12.3	11.6	11.0	12.2	12.4	10.5 - 14.6
Heartlands Hospital	18.9	17.9	18.1	17.9	17.6	15.0	13.3 - 17.0
Good Hope Hospital	7.7	7.1	7.3	8.0	8.0	7.1	5.7 - 8.8
Solihull Hospital	4.8	3.1	2.9	2.3	2.5	2.7	1.7 - 4.3

Fig. 5.2 - Perinatal death rates - 3 year moving average
Birmingham & Solihull NHS Cluster, 2003-2010



Comment:

The tables present annual numbers, rates and 3 year moving averages for early neonatal deaths (END; birth to day 7) and perinatal deaths (PMR; stillbirths and early neonatal deaths).

Figures 5.1 and 5.2 illustrate a gradual downward trend in both END and PMR rates, significant in both instances ($p < 0.01$), and following the national trend.

Further detail and comment about the neonatal mortality trend is available from the SWMNN Report <http://www.networks.nhs.uk/nhs-networks/southern-west-midlands-newborn-network>

6. Infant Deaths 2003-2010

Birmingham & Solihull

Numbers

	2003	2004	2005	2006	2007	2008	2009	2010
England and Wales*	3274	3234	3217	3329	3309	3369	3312	3140
West Midlands	477	419	424	407	423	459	456	406
Birmingham & Solihull NHS Cluster	181	133	144	145	136	158	146	120
LA/UA								
Birmingham	174	124	134	135	126	142	141	115
Solihull	7	9	10	10	10	16	5	5
Delivery Unit								
Birmingham Women's Hospital	81	56	89	76	69	77	88	74
City Hospital	38	30	24	33	26	31	28	23
Heartlands Hospital	68	47	47	54	55	60	58	43
Good Hope Hospital	25	16	15	21	16	19	17	10
Solihull Hospital	5	6	5	2	4	0	2	1

Rate/1,000

	2003	2004	2005	2006	2007	2008	2009	2010	2010 C.I.
England and Wales*	5.3	5.1	5.0	5.0	4.8	4.8	4.7	4.3	4.2 - 4.5
West Midlands	7.5	6.4	6.4	6.0	6.0	6.4	6.4	5.6	5.1 - 6.2
Birmingham & Solihull NHS Cluster	10.4	7.5	8.0	7.9	7.1	8.1	7.5	6.2	5.2 - 7.4
LA/UA									
Birmingham	11.4	7.9	8.4	8.3	7.4	8.2	8.1	6.7	5.6 - 8.0
Solihull	3.4	4.5	4.9	4.7	4.6	7.4	2.4	2.2	1.0 - 5.2
Delivery Unit									
Birmingham Women's Hospital	12.2	8.4	12.7	11.2	9.4	10.4	12.2	10.2	8.1 - 12.7
City Hospital	11.2	8.7	6.8	9.6	7.3	8.7	7.8	6.1	4.1 - 9.2
Heartlands Hospital	15.0	10.2	10.2	11.0	11.0	12.2	11.8	6.8	5.1 - 9.2
Good Hope Hospital	8.1	4.9	4.6	6.3	4.5	5.3	4.6	2.6	1.4 - 4.8
Solihull Hospital	2.3	2.7	2.2	0.8	1.6	0.0	0.7	1.1	0.2 - 6.4

3 year moving averages

	03-05	04-06	05-07	06-08	07-09	08-10	08-10 C.I.
England and Wales	5.1	5.0	4.9	4.8	4.7	4.6	4.5 - 4.7
West Midlands	6.8	6.3	6.2	6.2	6.3	6.2	5.8 - 6.5
Birmingham & Solihull NHS Cluster	8.6	7.8	7.7	7.7	7.6	7.3	6.6 - 8.0
LA/UA							
Birmingham	9.2	8.2	8.0	8.0	7.9	7.7	7.0 - 8.5
Solihull	4.3	4.7	4.8	5.6	4.8	4.0	2.7 - 5.8
Delivery Unit							
Birmingham Women's Hospital	11.2	10.8	11.1	10.3	10.7	10.9	9.6 - 12.4
City Hospital	8.9	8.4	7.9	8.5	7.9	7.5	6.1 - 9.3
Heartlands Hospital	11.8	10.5	10.8	11.4	11.7	10.0	8.6 - 11.6
Good Hope Hospital	5.8	5.3	5.1	5.4	4.8	4.1	3.1 - 5.5
Solihull Hospital	2.4	1.9	1.5	0.8	0.7	0.5	0.2 - 1.4

Comment:

The tables present year on year numbers and rates of infant deaths for Cluster, LAs and provider units.

Figure 6.1 illustrates the 3 year average trends; the rate for the Birmingham Cluster is higher than that of the West Midlands and England & Wales but, along with the latter, is showing a sustained and significant ($p < 0.01$) drop from 5.2 /1000 in 2003-5 to 4.6/1000 in 2008-10.

Figure 6.2 shows the two LAs plotted according to deprivation score and infant mortality rate; both are within the prediction interval adjusted for social deprivation.

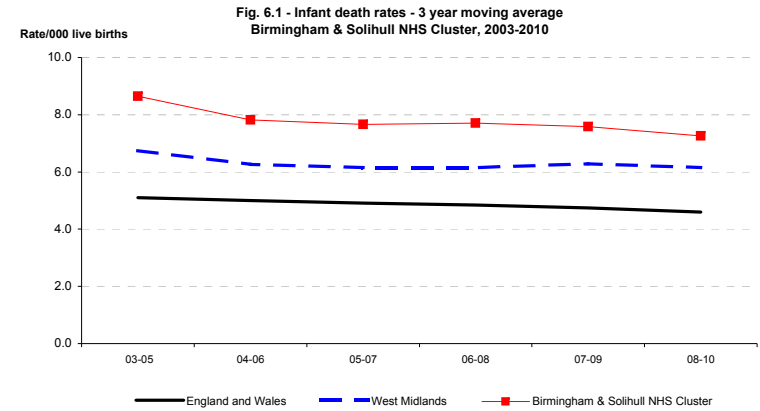


Fig 6.1 Infant death trend for Birmingham & Solihull Cluster NHS Cluster, West Midlands and England & Wales, 2003-10

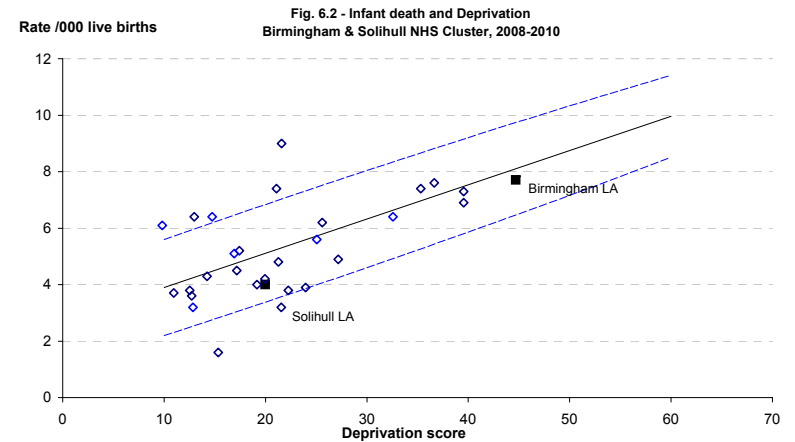


Fig 6.2 Infant death rates for last triennium (2008-10) for the Birmingham & Solihull Cluster NHS Cluster, plotted against each LA's deprivation score (IMD 2007). Regression lines represent 90% prediction intervals, based on WM 2003-10.

7. Infant Deaths in Birmingham & Solihull NHS Cluster, 2003-2010: Classification in main groups

Groups based on Fetal/Neonatal/Infant classification

	Birmingham & Solihull NHS Cluster		Birmingham Women's Hospital		City Hospital		Heartlands Hospital		Good Hope Hospital		Solihull Hospital	
Births 2008-10	58382		21908		10904		16131		11147		6368	
MAIN GROUPS - 2008-10	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Congenital anomaly	144	2.5	92	4.2	33	3.0	60	3.7	6	0.5	0	0.0
Pre-viability	67	1.1	36	1.6	9	0.8	18	1.1	10	0.9	0	0.0
Pulmonary immaturity	130	2.2	76	3.5	18	1.7	47	2.9	17	1.5	0	0.0
Intrapartum asphyxia	32	0.5	13	0.6	4	0.4	13	0.8	5	0.4	1	0.2
Infection	44	0.8	25	1.1	11	1.0	14	0.9	6	0.5	0	0.0
SUDI	8	0.1	4	0.2	2	0.2	2	0.1	2	0.2	0	0.0
Miscellaneous	24	0.4	20	0.9	7	0.6	7	0.4	3	0.3	0	0.0
Unclassified	42	0.7	9	0.4	7	0.6	18	1.1	7	0.6	2	0.3

	2003	2004	2005	2006	2007	2008	2009	2010
Live births	17360	17707	17918	18384	19125	19476	19439	19467

MAIN GROUPS Birmingham & Solihull NHS Cluster Numbers

Congenital anomaly	56	36	53	48	44	50	57	37
Pre-viability	40	27	26	28	27	21	24	22
Pulmonary immaturity	64	55	47	55	42	50	48	32
Intrapartum asphyxia	7	7	7	8	10	11	14	7
Infection	15	12	15	19	16	21	12	11
SUDI	13	6	3	1	4	6	1	1
Miscellaneous	22	17	16	9	14	11	5	8
Unclassified/Undocumented	4	0	3	5	6	9	9	24

3-year moving averages

	03-05	04-06	05-07	05-08	07-09	08-10
Congenital anomaly	2.7	2.5	2.6	2.5	2.6	2.5
Pre-viability	1.8	1.5	1.5	1.3	1.2	1.1
Pulmonary immaturity	3.1	2.9	2.6	2.6	2.4	2.2
Intrapartum asphyxia	0.4	0.4	0.5	0.5	0.6	0.5
Infection	0.8	0.9	0.9	1.0	0.8	0.8
SUDI	0.4	0.2	0.1	0.2	0.2	0.1
Miscellaneous	1.0	0.8	0.7	0.6	0.5	0.4
Unclassified	0.1	0.1	0.3	0.4	0.4	0.7

Fig. 7.1 - Infant Death Rates: Main Groups
Birmingham & Solihull NHS Cluster, 2008 - 2010

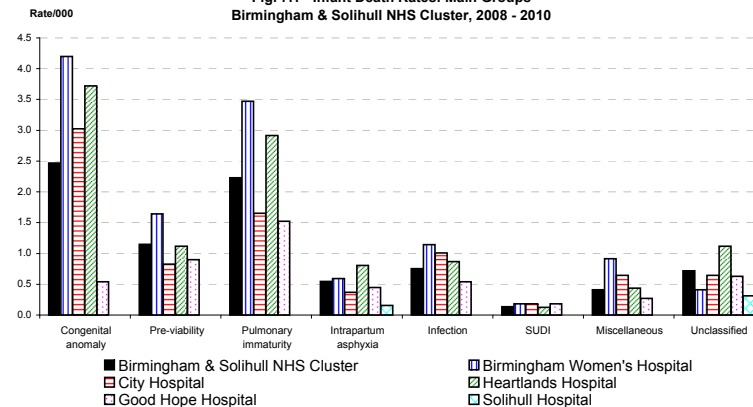
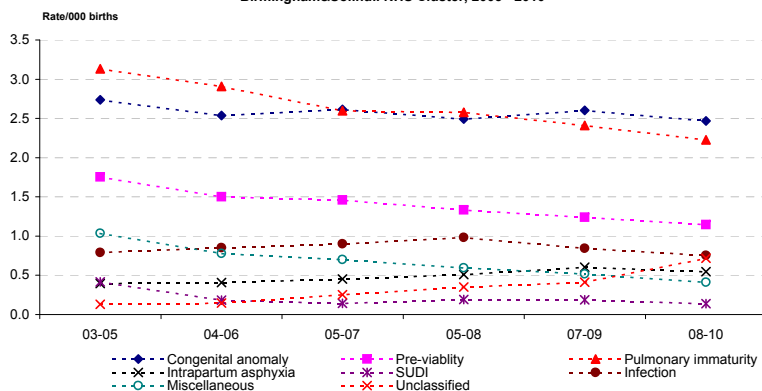


Fig. 7.2 - Infant death main groups, 3-year moving average
Birmingham&Solihull NHS Cluster, 2003 - 2010



Comment:

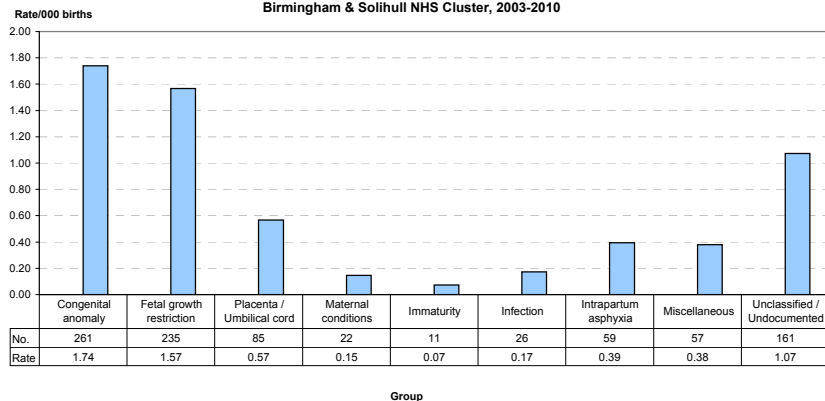
The tables and Fig 7.1. show the main categories of infant deaths within the Cluster and the respective units. Congenital anomalies represent the largest category, followed by immaturity related deaths.

Fig 7.2. shows 3 year moving average trend analysis. This shows a gradual and sustained drop in immaturity related deaths ($p < 0.01$). Over the same period, there has also been a significant drop in pre-viable deaths ($p < 0.01$) while the rate of infant deaths associated with congenital anomalies remained essentially unchanged.

8. Perinatal deaths from 30 weeks - Birmingham & Solihull NHS Cluster, 2003-2010

MAIN GROUPS

Fig 8.1 - Perinatal Death (30+ weeks) Rates: Main Groups
Birmingham & Solihull NHS Cluster, 2003-2010



TRENDS IN PERINATAL DEATHS WITH FETAL GROWTH RESTRICTION

Numbers - PDN

	2003	2004	2005	2006	2007	2008	2009	2010	p
Rest of West Midlands									
Perinatal	56	71	77	68	70	63	81	74	0.776
Stillbirth	50	60	65	62	61	62	73	68	
Early Neonatal	6	11	12	6	9	1	8	6	
Birmingham & Solihull									0.006
Perinatal	42	37	40	28	35	40	27	26	
Stillbirth	36	31	36	26	28	34	24	24	
Early Neonatal	6	6	4	2	7	6	3	2	

Rate/1,000

	2003	2004	2005	2006	2007	2008	2009	2010	2010 C.I.
Rest of West Midlands									
Perinatal	1.2	1.5	1.6	1.4	1.4	1.2	1.6	1.4	1.1 - 1.8
Stillbirth	1.1	1.2	1.3	1.3	1.2	1.2	1.4	1.3	1.0 - 1.6
Early Neonatal	0.1	0.2	0.2	0.1	0.2	0.0	0.2	0.1	0.1 - 0.2
Birmingham & Solihull									
Perinatal	2.4	2.1	2.2	1.5	1.8	2.0	1.4	1.3	0.9 - 1.9
Stillbirth	2.1	1.7	2.0	1.4	1.5	1.7	1.2	1.2	0.8 - 1.8
Early Neonatal	0.3	0.3	0.2	0.1	0.4	0.3	0.2	0.1	0.0 - 0.4

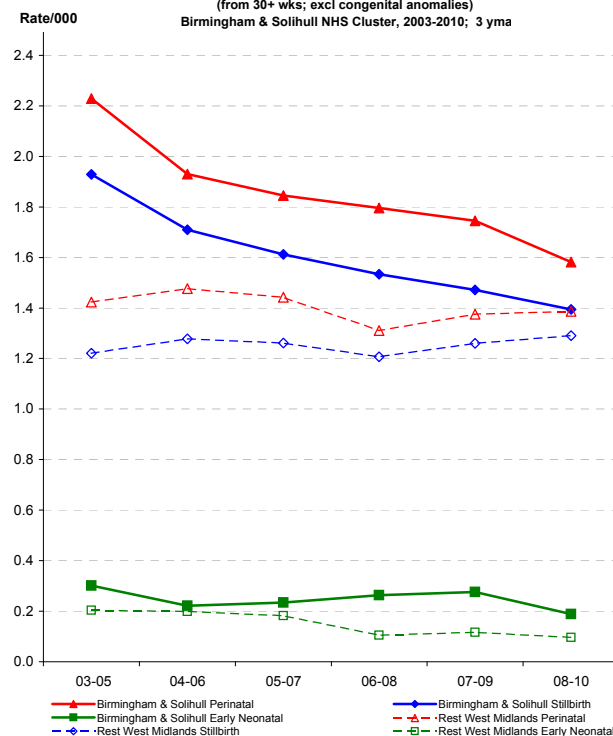
Birth - OSN

	2003	2004	2005	2006	2007	2008	2009	2010
Rest of West Midlands								
Births	46568	48454	48306	49557	51215	52516	51873	52852
Live births	46325	48210	48028	49289	50948	52236	51580	52598
Birmingham & Solihull								
Births	17512	17846	18044	18507	19257	19610	19579	19607
Live births	17360	17707	17918	18384	19125	19476	19439	19467

3 year moving averages

	03-05	04-06	05-07	06-08	07-09	08-10	08-10 C.I.
Rest of West Midlands							
Perinatal	1.42	1.48	1.44	1.31	1.38	1.39	1.21 - 1.58
Stillbirth	1.22	1.28	1.26	1.21	1.26	1.29	1.13 - 1.48
Early Neonatal	0.20	0.20	0.18	0.10	0.12	0.10	0.06 - 0.16
Birmingham & Solihull							
Perinatal	2.23	1.93	1.85	1.80	1.75	1.58	1.29 - 1.94
Stillbirth	1.93	1.71	1.61	1.53	1.47	1.39	1.12 - 1.73
Early Neonatal	0.30	0.22	0.23	0.26	0.28	0.19	0.11 - 0.34

Fig. 8.2 - Perinatal deaths with Fetal Growth Restriction
(from 30+ wks; excl congenital anomalies)
Birmingham & Solihull NHS Cluster, 2003-2010; 3 yma



Comment:

This analysis looked at perinatal mortality in more mature babies, born at or after 30 weeks gestation.

Fig 8.1. illustrates that congenital anomaly and fetal growth restriction (FGR) are the two largest categories, while immaturity plays a much lesser role.

The Table shows that the perinatal mortality rate dropped from 2.23/1000 in the 2003-5 triennium to 1.58/1000 in 2008-10, representing a decrease of 29% and a significant downward trend ($p < 0.01$). Year on year, the rate nearly halved, from 2.4/1000 in 2003 to 1.3/1000 in 2010 (reduction: 46%). During the same period, the rate in the rest of the West Midlands remained essentially unchanged.

As illustrated in Fig 8.2, the reduction in deaths was mainly due to fewer stillbirths, with no compensatory increase in neonatal deaths.