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Dear Colleague

**Perinatal & Infant Mortality Report - 2010**

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

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

The report also examines trends within the main 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 gestational ages where immaturity plays a lesser role (Section 8).

The results within each section can be summarised as follows:

Section	Main Finding
1. Birth rate	Upward trend in Cluster, following regional and national trend
2. Maternity population	Low deprivation rates outside Coventry. KPIs variable; units above as well as below regional average for antenatal detection of IUGR. High NICU admission rate of term babies at Warwick Hospital.
3. Stillbirths	Below WM average, and (non-significant) downward trend. LAs within or below the prediction interval adjusted for social deprivation.
4. Stillbirth categories	Largest group: fetal growth restriction.
5. Early neonatal & perinatal rates	Rates below WM average. No downward trend in neonatal deaths.
6. Infant deaths	Below WM average, but no sustained downward trend. LAs with 2 exceptions within deprivation-adjusted prediction interval
7. Infant death categories	Largest groups: immaturity - downward trend; congenital anomalies-upward trend (neither significant as numbers small).
8. Perinatal deaths from 30+weeks	Increased rate of perinatal deaths with fetal growth restriction, with a significant upward trend in stillbirths.

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 10<sup>th</sup> 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](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](http://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](http://www.pi.nhs.uk/rpnm/IfH_KPI_Evidence_Targets.pdf)

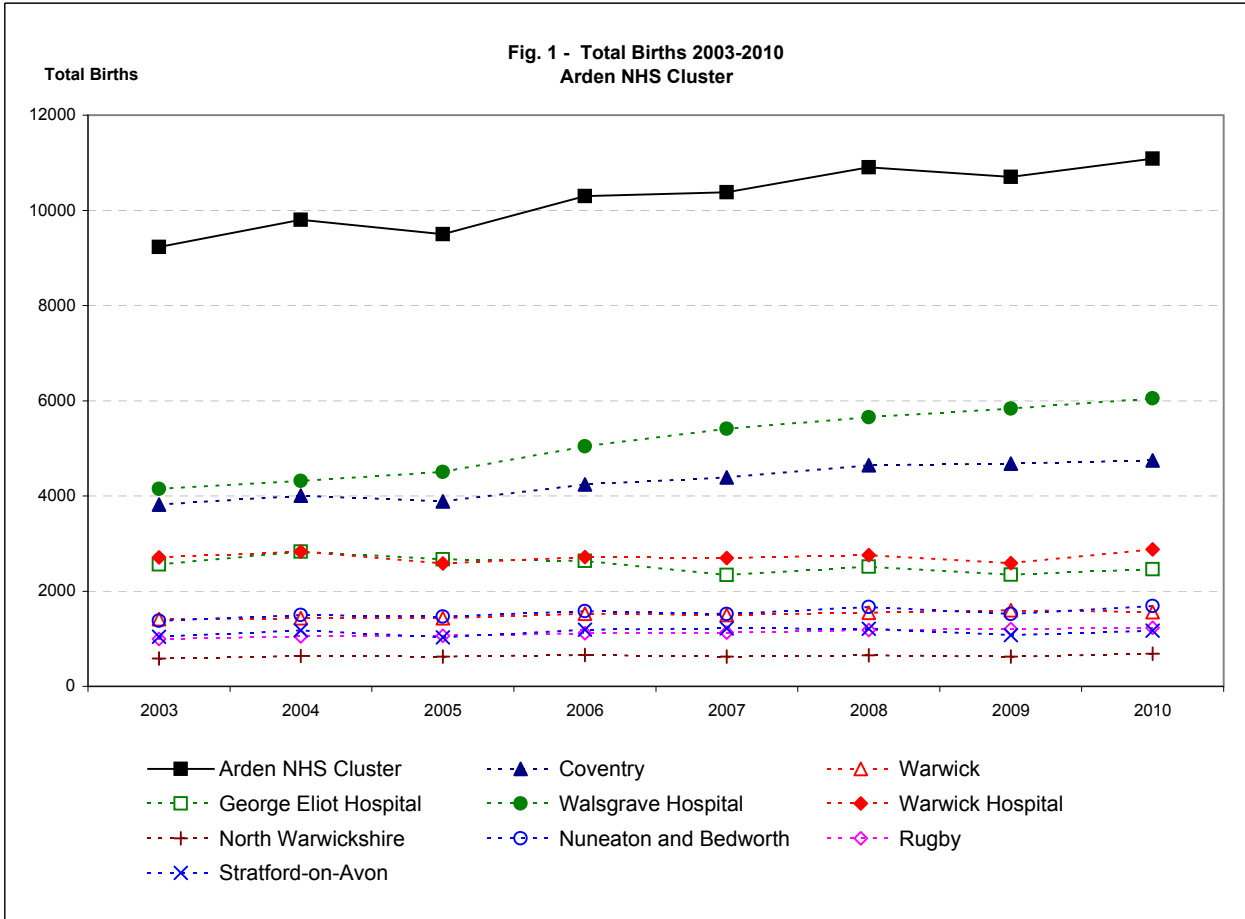
## AUTHORS / CITATION:

Abdel EISheikh, Asad Malik, Jason Gardosi. Perinatal and Infant Mortality Report 2010: Arden NHS Cluster. West Midlands Perinatal Institute, 2012

# 1. Births: Arden NHS Cluster, West Midlands 2003-2010

Source: ONS

	2003	2004	2005	2006	2007	2008	2009	2010
<b>LA/UA</b>								
England and Wales	624816	643026	649094	672966	693356	712328	709936	726879
West Midlands	64080	66300	66350	68064	70472	72126	71452	72459
Arden NHS Cluster	9230	9800	9498	10301	10382	10904	10702	11083
Coventry	3820	4004	3887	4239	4389	4643	4680	4747
North Warwickshire	582	641	625	659	627	651	627	684
Nuneaton and Bedworth	1378	1499	1463	1578	1519	1668	1516	1687
Rugby	993	1051	1064	1113	1130	1185	1205	1232
Stratford-on-Avon	1045	1175	1029	1189	1217	1208	1077	1170
Warwick	1412	1430	1430	1523	1500	1549	1597	1563
<b>Delivery Unit</b>								
George Eliot Hospital	2562	2830	2668	2637	2338	2511	2343	2462
Walsgrave Hospital	4147	4317	4504	5042	5414	5652	5837	6049
Warwick Hospital	2707	2827	2580	2719	2695	2753	2591	2878



**Comments:**

The Table and Figure illustrate the birth rate trend in E&W, WM and West Mercia Cluster, and its constituent LAs and units (data up to 2010)

## 2. Demographics: Arden NHS Cluster, 2010

Source: PEER | Jan - Dec, 2010

	West Midlands	Arden NHS Cluster	Coventry LA	North Warwickshire LA	Nuneaton & Bedworth LA	Rugby LA	Stratford Upon Avon LA	Warwick LA	George Eliot Hospital	Walsgrave Hospital	Warwick Hospital
<b>Total Births:</b>	72,459	11,083	4,747	684	1,687	1,232	1,170	1,563	2,462	6,049	2,878
<b>Submissions:</b>	58,718	9,474	3,828	596	1,552	1,027	960	1,511	2,312	4,899	2,803
<b>% Submissions:</b>	81.0	85.5	80.6	87.1	92.0	83.4	82.1	96.7	93.9	81.0	97.4
<b>Deprivation - IMD Quintile</b>											
1 (least)	8.6%	14.6%	3.7%	2.0%	8.8%	27.6%	42.6%	26.8%	7.5%	7.9%	35.7%
2	12.7%	20.8%	11.1%	35.1%	9.2%	26.3%	40.5%	35.3%	15.1%	13.5%	34.8%
3	16.5%	20.9%	16.2%	36.9%	21.6%	25.7%	15.4%	26.1%	24.0%	18.6%	20.7%
4	21.2%	23.0%	28.1%	21.5%	39.7%	17.8%	1.5%	10.5%	35.1%	26.7%	7.5%
5 (most)	41.0%	20.7%	40.9%	4.5%	20.7%	2.6%	0.0%	1.3%	18.3%	33.3%	1.4%
<b>Ethnic Origin</b>											
African	3.5%	4.4%	9.6%	0.2%	1.1%	1.7%	0.4%	0.7%	0.7%	8.1%	0.6%
African Caribbean	2.0%	0.7%	1.0%	0.3%	0.5%	0.8%	0.1%	0.5%	0.3%	0.9%	0.3%
British European	67.9%	72.9%	57.7%	93.5%	84.8%	79.5%	86.9%	77.8%	88.1%	62.0%	81.6%
Eastern European	3.7%	5.5%	6.9%	1.0%	3.7%	7.1%	5.4%	4.3%	2.5%	7.0%	4.6%
Middle Eastern	1.1%	0.6%	1.2%	0.2%	0.3%	0.1%	0.3%	0.2%	0.2%	1.0%	0.3%
South Asian	15.6%	8.5%	14.4%	0.9%	6.9%	2.8%	0.9%	7.0%	4.5%	12.4%	4.7%
Bangladeshi	1.9%	0.7%	1.7%	0.0%	0.1%	0.0%	0.1%	0.1%	0.0%	1.4%	0.1%
Indian	5.1%	5.6%	8.2%	0.5%	5.7%	1.9%	0.8%	6.3%	3.5%	7.3%	4.1%
Pakistani	8.6%	2.2%	4.4%	0.3%	1.1%	0.9%	0.0%	0.7%	1.0%	3.7%	0.4%
Other/Mixed	6.2%	7.4%	9.2%	3.9%	2.7%	8.0%	5.9%	9.5%	3.7%	8.5%	8.0%
<b>Migrants</b>											
Non UK Born	20.6%	22.1%	34.1%	5.4%	11.7%	19.2%	11.8%	17.1%	10.1%	30.9%	14.6%
<b>Maternal Age</b>											
< 16	0.2%	0.1%	0.1%	0.2%	0.4%	0.0%	0.0%	0.0%	0.4%	0.1%	0.0%
< 18	1.9%	1.8%	1.9%	2.0%	3.0%	1.1%	1.1%	1.2%	2.9%	1.8%	0.9%
< 20	6.9%	6.0%	6.0%	10.1%	8.1%	5.1%	3.9%	4.4%	8.7%	6.0%	3.4%
20 - 24	22.4%	19.7%	22.5%	16.6%	25.7%	17.7%	14.8%	11.9%	24.0%	21.4%	12.3%
25 - 29	29.2%	28.0%	30.9%	26.7%	30.5%	29.1%	21.4%	22.0%	29.3%	30.3%	22.2%
30 - 34	25.4%	27.9%	25.8%	26.7%	23.3%	27.9%	32.2%	35.6%	23.5%	26.4%	34.8%
35 - 39	13.1%	15.4%	12.4%	15.3%	11.5%	16.9%	22.6%	21.5%	12.5%	13.5%	22.8%
35+	16.1%	18.4%	14.7%	20.0%	12.5%	20.2%	27.8%	26.1%	14.6%	16.0%	27.3%
40+	3.0%	3.0%	2.3%	4.7%	1.0%	3.3%	5.2%	4.6%	2.1%	2.5%	4.6%
<b>Body Mass Index</b>											
< 18.5	3.3%	3.3%	4.2%	2.0%	3.0%	3.4%	1.7%	3.1%	3.2%	3.8%	2.8%
18.5 - 24.9	48.0%	51.7%	50.2%	47.1%	48.1%	51.1%	56.4%	58.0%	46.8%	50.6%	57.7%
25 - 29.9	28.3%	26.7%	26.4%	29.9%	26.7%	28.3%	25.6%	25.7%	27.3%	26.7%	25.7%
30 - 34.9	12.7%	11.2%	11.7%	12.1%	13.3%	10.3%	10.1%	8.4%	13.1%	11.7%	8.7%
35 - 39.9	5.1%	4.8%	5.0%	5.8%	5.8%	4.7%	4.4%	3.2%	6.0%	4.9%	3.4%
30+	20.4%	18.3%	19.2%	21.0%	22.2%	17.1%	16.3%	13.1%	22.7%	18.9%	13.7%
35+	7.6%	7.1%	7.4%	8.9%	8.8%	6.9%	6.2%	4.7%	9.6%	7.2%	5.0%
40+	2.5%	2.3%	2.4%	3.1%	3.1%	2.2%	1.8%	1.5%	3.5%	2.3%	1.6%

cont'd.

	West Midlands	Arden NHS Cluster	Coventry LA	North Warwickshire LA	Nuneaton & Bedworth LA	Rugby LA	Stratford Upon Avon LA	Warwick LA	George Eliot Hospital	Walsgrave Hospital	Warwick Hospital
<b>Prematurity</b>											
< 37 Weeks	6.0%	5.0%	5.4%	5.1%	5.1%	4.9%	4.7%	4.3%	4.8%	5.8%	4.0%
< 34 Weeks	1.8%	1.5%	1.6%	1.2%	1.9%	1.2%	1.1%	1.7%	1.1%	1.9%	1.1%
<b>Onset of Labour</b>											
Induced	22.3%	19.4%	17.9%	25.5%	23.0%	19.4%	18.8%	17.9%	24.8%	18.1%	17.8%
<b>Mode of Delivery</b>											
Forceps/Ventouse	10.6%	11.6%	10.1%	13.2%	10.2%	11.3%	13.6%	15.2%	10.9%	10.5%	14.7%
Caesarean Section	23.0%	24.3%	25.8%	22.4%	19.8%	26.3%	23.0%	25.1%	19.5%	26.3%	24.3%
Elective	9.2%	9.8%	10.0%	8.4%	7.9%	10.7%	10.5%	10.6%	8.0%	10.1%	10.6%
Non-Elective	13.8%	14.5%	15.8%	13.9%	11.9%	15.5%	12.5%	14.5%	11.5%	16.2%	13.7%
<b>Outcome</b>											
Apgar < 7 @ 5 Min.	1.4%	1.5%	1.6%	2.2%	1.0%	1.9%	1.3%	1.2%	1.1%	1.8%	1.1%
NICU Admission (37+ Wks) <sup>a</sup>	2.3%	3.7%	2.0%	3.3%	3.7%	3.6%	6.0%	5.7%	3.3%	2.2%	5.7%
<b>Early Booking &lt; 13 Weeks *</b>											
Average	83.7%	88.4%	87.0%	90.1%	90.5%	90.3%	85.7%	89.6%	90.3%	87.8%	86.3%
Range <sup>b</sup>	(63.1% - 90.7%)	(86.3% - 90.3%)									
<b>Fetal growth restriction *</b>											
Birthweight <10th cust. centile											
Average	13.8%	12.9%	13.6%	13.0%	13.5%	13.8%	10.7%	11.1%	13.1%	14.0%	10.5%
Range <sup>b</sup>	(10.3% - 16.4%)	(10.5% - 14%)									
FGR Detection											
Average	31.0%	30.6%	24.8%	39.7%	37.1%	29.9%	29.3%	37.8%	33.0%	26.3%	35.2%
Range <sup>b</sup>	(11.5% - 48.3%)	(26.3% - 35.2%)									
Detection after referral for FH											
Average	61.5%	58.6%	45.0%	84.6%	75.4%	61.8%	39.1%	57.4%	78.0%	50.7%	51.9%
Range <sup>b</sup>	(30.9% - 72.5%)	(50.7% - 78%)									
<b>Smoking *</b>											
At booking	18.8%	18.0%	18.2%	20.4%	23.8%	20.3%	13.0%	12.4%	23.7%	18.6%	11.5%
Late in pregnancy	13.6%	12.0%	13.3%	12.7%	12.9%	13.4%	9.1%	9.0%	12.0%	13.7%	8.4%
Ceased During Pregnancy	27.3%	21.7%	23.7%	18.5%	16.6%	26.8%	18.2%	21.0%	17.8%	24.3%	18.8%
Range <sup>b</sup>	(15.4% - 61.4%)	(17.8% - 24.3%)									
<b>Breastfeeding Initiation *</b>											
Average	60.5%	63.9%	58.4%	57.0%	56.2%	66.9%	76.7%	76.8%	56.0%	60.2%	78.1%
Range <sup>b</sup>	(43.1% - 78.0%)	(56% - 78.1%)									

Notes

\* KPI - Definitions are available [here](#)

\*\* No data given as submissions of denominator <100

<sup>a</sup> Collected since 10/2010 only; 12 months data to 09/2011 shown

<sup>b</sup> Range based on annual average within WM or Cluster

**Comment:**

This table compares the characteristics of the maternity population in the West Midlands overall with that in Arden Cluster and its constituent LAs and maternity units. Social deprivation rates are much lower than in the West Midlands in all LAs except Coventry. Breastfeeding and early booking rates are above the regional average, but the KPIs for detection of fetal growth restriction and smoking cessation are below that of the region, and show variation across the LAs and provider units. Warwick Hospital's rate of admissions of term babies (37+ weeks) to neonatal intensive care is 5.7% (CI 4.9-6.7, significantly higher than the WM rate (2.3%, CI 2.1-2.5) .

### 3. Stillbirths 2003-2010

Arden

#### 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
Arden NHS Cluster	39	43	46	52	42	45	47	46
LA/UA								
Coventry	18	17	16	21	17	28	18	24
North Warwickshire	2	1	3	2	3	4	1	1
Nuneaton and Bedworth	8	9	13	12	7	4	10	5
Rugby	3	7	6	2	4	3	3	5
Stratford-on-Avon	3	4	4	5	8	4	8	4
Warwick	5	5	4	10	3	2	7	7
Delivery Unit								
George Eliot Hospital	13	11	17	21	13	9	12	6
Walsgrave Hospital	20	20	21	23	22	32	22	30
Warwick Hospital	8	8	7	10	7	5	11	12

#### 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
Arden NHS Cluster	4.2	4.4	4.8	5.0	4.0	4.1	4.4	4.2	3.1 - 5.5
LA/UA									
Coventry	4.7	4.2	4.1	5.0	3.9	6.0	3.8	5.1	3.4 - 7.5
North Warwickshire	3.4	1.6	4.8	3.0	4.8	6.1	1.6	1.5	0.3 - 8.2
Nuneaton and Bedworth	5.8	6.0	8.9	7.6	4.6	2.4	6.6	3.0	1.3 - 6.9
Rugby	3.0	6.7	5.6	1.8	3.5	2.5	2.5	4.1	1.7 - 9.5
Stratford-on-Avon	2.9	3.4	3.9	4.2	6.6	3.3	7.4	3.4	1.3 - 8.8
Warwick	3.5	3.5	2.8	6.6	2.0	1.3	4.4	4.5	2.2 - 9.2
Delivery Unit									
George Eliot Hospital	5.1	3.9	6.4	8.0	5.6	3.6	5.1	2.4	1.1 - 5.3
Walsgrave Hospital	4.8	4.6	4.7	4.6	4.1	5.7	3.8	5.0	3.5 - 7.1
Warwick Hospital	3.0	2.8	2.7	3.7	2.6	1.8	4.2	4.2	2.4 - 7.3

#### 3 year moving averages

	03-05	04-06	05-07	06-08	07-09	08-10	C.I.
England and Wales*	5.5	5.4	5.3	5.2	5.1	5.1	5.0 - 5.2
West Midlands	6.0	5.9	5.8	5.7	5.8	5.7	5.4 - 6.1
Arden NHS Cluster	4.5	4.8	4.6	4.4	4.2	4.2	3.6 - 5.0
LA/UA							
Coventry	4.4	4.5	4.3	5.0	4.6	5.0	3.9 - 6.3
North Warwickshire	3.2	3.1	4.2	4.6	4.2	3.1	1.4 - 6.7
Nuneaton and Bedworth	6.9	7.5	7.0	4.8	4.5	3.9	2.5 - 6.1
Rugby	5.1	4.6	3.6	2.6	2.8	3.0	1.7 - 5.4
Stratford-on-Avon	3.4	3.8	4.9	4.7	5.7	4.6	2.9 - 7.5
Warwick	3.3	4.3	3.8	3.3	2.6	3.4	2.1 - 5.5
Delivery Unit							
George Eliot Hospital	5.1	6.0	6.7	5.7	4.7	3.7	2.5 - 5.4
Walsgrave Hospital	4.7	4.6	4.4	4.8	4.5	4.8	3.9 - 5.9
Warwick Hospital	2.8	3.1	3.0	2.7	2.9	3.4	2.4 - 4.9

#### Comments:

The tables present year on year numbers and rates of stillbirth for Cluster, LAs and provider units, as well as 3 year averages.

Fig 3.1 shows that stillbirth rates are significantly below the WM average and follow a (non-significant) downward trend.

Fig 3.2 shows each LA's stillbirth rate is plotted according to its respective deprivation score. All are within or below the prediction limits adjusted for social deprivation

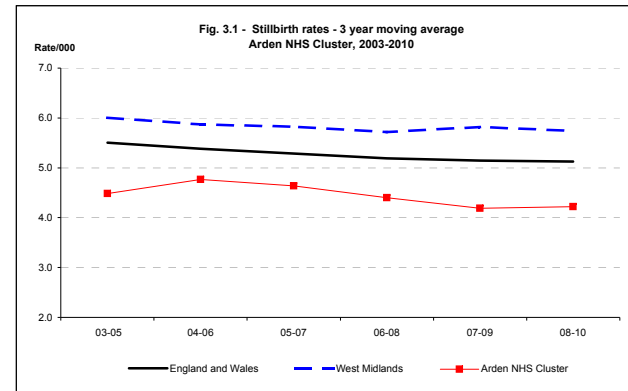


Fig 3.1 Stillbirth trend for Arden NHS Cluster, West Midlands and England and Wales, 2003-10.

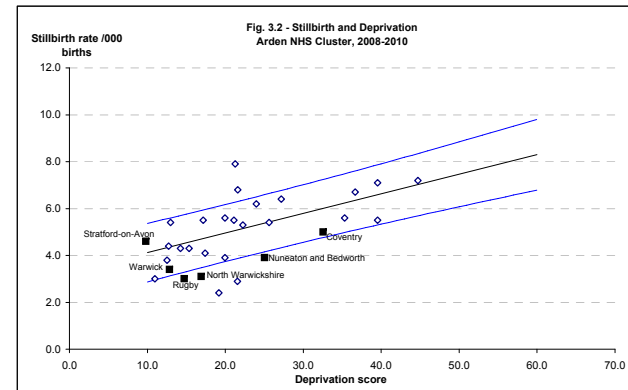


Fig 3.2 Stillbirth rates for last triennium (2008-10) for the Arden NHS Cluster, plotted against each LA's deprivation score (IMD 2007). Regression lines represent 90% prediction intervals, based on WM 2003 -10.

## 4. Stillbirths in Arden NHS Cluster, 2003 -2010: Classification in main groups

Groups based on ReCoDe classification

	Arden NHS Cluster		George Eliot Hospital		Walsgrave Hospital		Warwick Hospital	
Births 2008-10	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Births 2008-10	32689		7316		17538		8222	
<b>MAIN GROUPS - 2008-10</b>								
Congenital anomaly	22	0.7	4	0.5	13	0.7	5	0.6
Fetal growth restriction	57	1.7	13	1.8	34	1.9	12	1.5
Placenta / Umbilical chord	12	0.4	0	0.0	11	0.6	1	0.1
Maternal conditions	4	0.1	2	0.3	1	0.1	1	0.1
Infection	3	0.1	0	0.0	2	0.1	1	0.1
Intrapartum asphyxia	3	0.1	0	0.0	3	0.2	0	0.0
Miscellaneous	12	0.4	1	0.1	5	0.3	3	0.4
Unclassified / Unexplained	25	0.8	7	1.0	15	0.9	5	0.6

Births	2003	2004	2005	2006	2007	2008	2009	2010
Births	9230	9800	9498	10301	10382	10904	10702	11083

### MAIN GROUPS Arden NHS Cluster Numbers

Congenital anomaly	6	8	6	17	9	6	12	4
Fetal growth restriction	10	15	22	15	14	18	15	24
Placenta/Umbilical chord	10	5	6	5	8	4	1	7
Maternal conditions	2	0	2	0	0	1	3	0
Infection	1	2	0	1	1	0	3	0
Intrapartum asphyxia	2	1	0	3	1	0	0	3
Miscellaneous	1	2	2	3	3	5	4	3
Unclassified / Unexplained	7	10	8	8	6	11	9	5

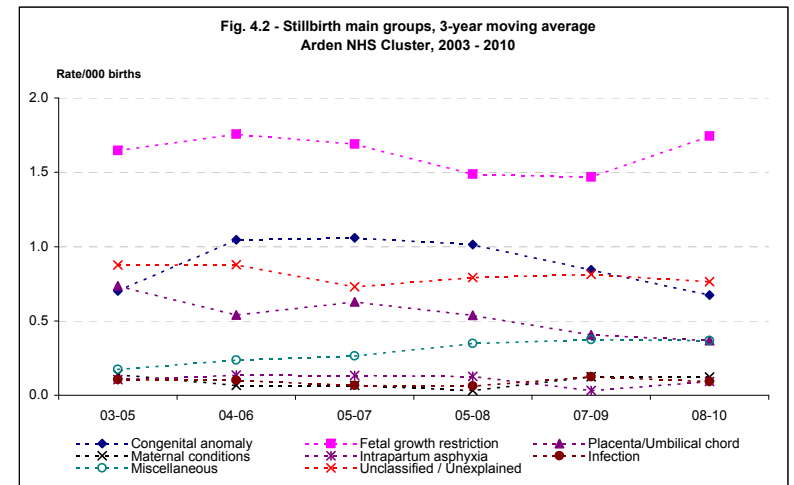
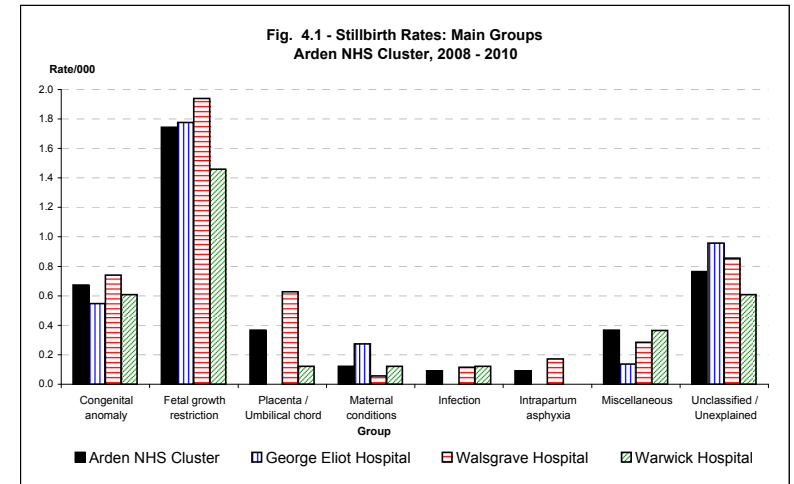
### 3-year moving averages

	03-05	04-06	05-07	05-08	07-09	08-10
Congenital anomaly	0.7	1.0	1.1	1.0	0.8	0.7
Fetal growth restriction	1.6	1.8	1.7	1.5	1.5	1.7
Placenta/Umbilical chord	0.7	0.5	0.6	0.5	0.4	0.4
Maternal conditions	0.1	0.1	0.1	0.0	0.1	0.1
Infection	0.1	0.1	0.1	0.1	0.1	0.1
Intrapartum asphyxia	0.1	0.1	0.1	0.1	0.0	0.1
Miscellaneous	0.2	0.2	0.3	0.3	0.4	0.4
Unclassified / Unexplained	0.9	0.9	0.7	0.8	0.8	0.8

### Comments:

Fig 4.1. shows the main categories of stillbirth within the Cluster and provider units. The largest category is fetal growth restriction within each unit.

Fig 4.2. shows 3 year moving average trends - with no significant overall change in main groups.



## 5 A. Early Neonatal Deaths 2003-2010

Arden

### Numbers - PDNs

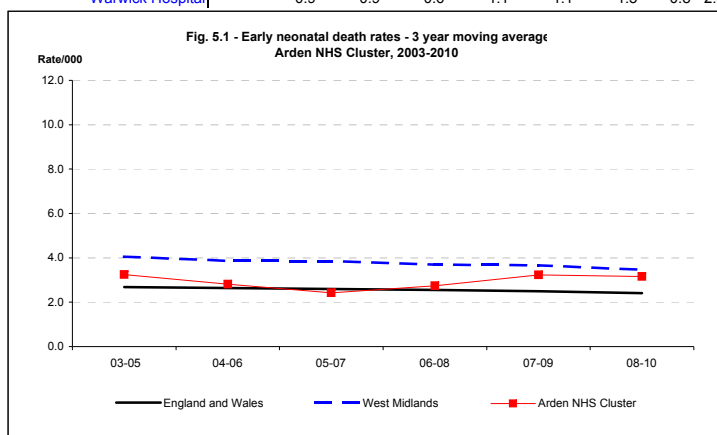
	2003	2004	2005	2006	2007	2008	2009	2010
England and Wales*	1726	1714	1681	1750	1762	1763	1715	1675
West Midlands	267	255	270	246	268	260	253	229
Arden NHS Cluster	30	36	26	21	26	39	38	26
LA/UA								
Coventry	16	21	12	7	10	19	22	8
North Warwickshire	4	3	1	1	1	1	2	2
Nuneaton and Bedworth	4	4	3	3	9	8	4	6
Rugby	1	1	6	2	1	3	5	3
Stratford-on-Avon	3	2	1	4	2	6	2	3
Warwick	2	5	3	4	3	2	3	4
Delivery Unit								
George Eliot Hospital	4	4	5	5	8	8	7	4
Walsgrave Hospital	20	23	12	11	11	21	20	16
Warwick Hospital	2	4	1	2	2	5	2	5

### 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
Arden NHS Cluster	3.3	3.7	2.8	2.0	2.5	3.6	3.6	2.4	1.6 - 3.4
LA/UA									
Coventry	4.2	5.3	3.1	1.7	2.3	4.1	4.7	1.7	0.9 - 3.3
North Warwickshire	6.9	4.7	1.6	1.5	1.6	1.5	3.2	2.9	0.8 - 10.6
Nuneaton and Bedworth	2.9	2.7	2.1	1.9	6.0	4.8	2.7	3.6	1.6 - 7.8
Rugby	1.0	1.0	5.7	1.8	0.9	2.5	4.2	2.4	0.8 - 7.2
Stratford-on-Avon	2.9	1.7	1.0	3.4	1.7	5.0	1.9	2.6	0.9 - 7.5
Warwick	1.4	3.5	2.1	2.6	2.0	1.3	1.9	2.6	1.0 - 6.6
Delivery Unit									
George Eliot Hospital	1.6	1.4	1.9	1.9	3.4	3.2	3.0	1.6	0.6 - 4.2
Walsgrave Hospital	4.8	5.4	2.7	2.2	2.0	3.7	3.4	2.7	1.6 - 4.3
Warwick Hospital	0.7	1.4	0.4	0.7	0.7	1.8	0.8	1.7	0.7 - 4.1

### 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
Arden NHS Cluster	3.2	2.8	2.4	2.7	3.2	3.2	2.6 - 3.8
LA/UA							
Coventry	4.2	3.3	2.3	2.7	3.7	3.5	2.6 - 4.6
North Warwickshire	4.3	2.6	1.6	1.6	2.1	2.6	1.1 - 6.0
Nuneaton and Bedworth	2.6	2.2	3.3	4.2	4.5	3.7	2.3 - 5.9
Rugby	2.6	2.8	2.7	1.8	2.6	3.0	1.7 - 5.4
Stratford-on-Avon	1.9	2.1	2.0	3.3	2.9	3.2	1.8 - 5.7
Warwick	2.3	2.7	2.3	2.0	1.7	1.9	1.0 - 3.6
Delivery Unit							
George Eliot Hospital	1.6	1.7	2.4	2.8	3.2	2.6	1.7 - 4.1
Walsgrave Hospital	4.3	3.3	2.3	2.7	3.1	3.3	2.5 - 4.2
Warwick Hospital	0.9	0.9	0.6	1.1	1.1	1.5	0.8 - 2.6



## 5 B. Perinatal Deaths 2003-2010

### Numbers - PDNs

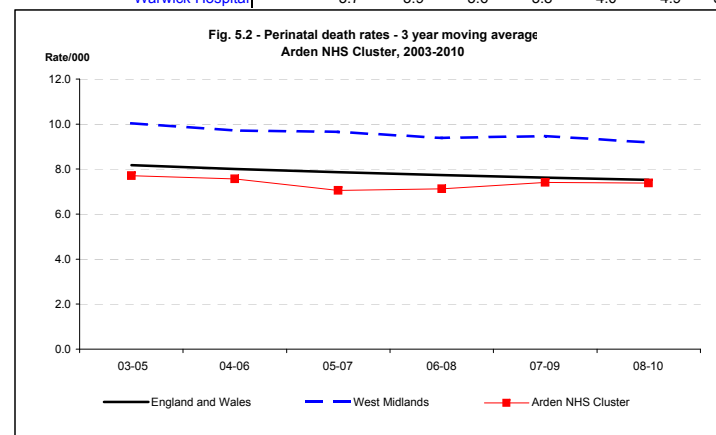
	2003	2004	2005	2006	2007	2008	2009	2010
England and Wales*	5291	5231	5154	5340	5347	5380	5403	5389
West Midlands	662	638	674	637	667	674	686	623
Arden NHS Cluster	69	79	72	73	68	84	85	72
LA/UA								
Coventry	34	38	28	28	27	47	40	32
North Warwickshire	6	4	4	3	4	5	3	3
Nuneaton and Bedworth	12	13	16	15	16	12	14	11
Rugby	4	8	12	4	5	6	8	8
Stratford-on-Avon	6	6	5	9	10	10	10	7
Warwick	7	10	7	14	6	4	10	11
Delivery Unit								
George Eliot Hospital	17	15	22	26	21	17	19	10
Walsgrave Hospital	40	43	33	34	33	53	42	46
Warwick Hospital	10	12	8	12	9	10	13	17

### 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
Arden NHS Cluster	7.5	8.1	7.6	7.1	6.5	7.7	7.9	6.5	5.2 - 8.2
LA/UA									
Coventry	8.9	9.5	7.2	6.6	6.2	10.1	8.5	6.7	4.8 - 9.5
North Warwickshire	10.3	6.2	6.4	4.6	6.4	7.7	4.8	4.4	1.5 - 12.8
Nuneaton and Bedworth	8.7	8.7	10.9	9.5	10.5	7.2	9.2	6.5	3.6 - 11.6
Rugby	4.0	7.6	11.3	3.6	4.4	5.1	6.6	6.5	3.3 - 12.8
Stratford-on-Avon	5.7	5.1	4.9	7.6	8.2	8.3	9.3	6.0	2.9 - 12.3
Warwick	5.0	7.0	4.9	9.2	4.0	2.6	6.3	7.0	3.9 - 12.6
Delivery Unit									
George Eliot Hospital	6.6	5.3	8.2	9.9	9.0	6.8	8.1	4.1	2.2 - 7.5
Walsgrave Hospital	9.6	10.0	7.3	6.7	6.1	9.4	7.2	7.6	5.7 - 10.1
Warwick Hospital	3.7	4.2	3.1	4.4	3.3	3.6	5.0	5.9	3.7 - 9.4

### 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
Arden NHS Cluster	7.7	7.6	7.1	7.1	7.4	7.4	6.5 - 8.4
LA/UA							
Coventry	8.5	7.7	6.6	7.7	8.3	8.5	7.1 - 10.1
North Warwickshire	7.6	5.7	5.8	6.2	6.3	5.6	3.1 - 10.0
Nuneaton and Bedworth	9.4	9.7	10.3	9.0	8.9	7.6	5.5 - 10.5
Rugby	7.7	7.4	6.4	4.4	5.4	6.1	4.0 - 9.2
Stratford-on-Avon	5.2	5.9	7.0	8.0	8.6	7.8	5.4 - 11.3
Warwick	5.6	7.1	6.1	5.2	4.3	5.3	3.6 - 7.8
Delivery Unit							
George Eliot Hospital	6.7	7.7	9.0	8.5	7.9	6.3	4.7 - 8.4
Walsgrave Hospital	8.9	7.9	6.7	7.4	7.6	8.0	6.8 - 9.5
Warwick Hospital	3.7	3.9	3.6	3.8	4.0	4.9	3.6 - 6.6



### 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 illustrates a downward trend which by and large follows that in WM and E&W.



## 6. Infant Deaths 2003-2010

### Arden

#### 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
Arden NHS Cluster	53	65	40	33	48	63	65	57
LA/UA								
Coventry	25	34	19	14	24	36	31	22
North Warwickshire	6	3	3	1	2	2	3	5
Nuneaton and Bedworth	6	12	6	5	10	9	8	10
Rugby	5	5	6	4	1	5	13	5
Stratford-on-Avon	5	6	2	5	4	9	5	7
Warwick	6	5	4	4	7	2	5	8
Delivery Unit								
George Eliot Hospital	7	8	8	8	9	9	10	10
Walsgrave Hospital	32	43	19	19	27	39	32	32
Warwick Hospital	6	8	2	2	6	6	6	9

#### 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
Arden NHS Cluster	5.8	6.7	4.2	3.2	4.6	5.8	6.1	5.2	4.0 - 6.7
LA/UA									
Coventry	6.6	8.5	4.9	3.3	5.5	7.8	6.6	4.7	3.1 - 7.0
North Warwickshire	10.3	4.7	4.8	1.5	3.2	3.1	4.8	7.3	3.1 - 17.0
Nuneaton and Bedworth	4.4	8.1	4.1	3.2	6.6	5.4	5.3	5.9	3.2 - 10.9
Rugby	5.1	4.8	5.7	3.6	0.9	4.2	10.8	4.1	1.7 - 9.5
Stratford-on-Avon	4.8	5.1	2.0	4.2	3.3	7.5	4.7	6.0	2.9 - 12.3
Warwick	4.3	3.5	2.8	2.6	4.7	1.3	3.1	5.1	2.6 - 10.1
Delivery Unit									
George Eliot Hospital	2.7	2.8	3.0	3.1	3.9	3.6	4.3	4.1	2.2 - 7.5
Walsgrave Hospital	7.8	10.0	4.2	3.8	5.0	6.9	5.5	5.3	3.8 - 7.5
Warwick Hospital	2.2	2.8	0.8	0.7	2.2	2.2	2.3	3.1	1.7 - 6.0

#### 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
Arden NHS Cluster	5.6	4.7	4.0	4.6	5.5	5.7	4.9 - 6.6
LA/UA							
Coventry	6.7	5.5	4.6	5.6	6.7	6.4	5.2 - 7.8
North Warwickshire	6.5	3.6	3.2	2.6	3.7	5.1	2.8 - 9.4
Nuneaton and Bedworth	5.6	5.1	4.6	5.1	5.8	5.6	3.8 - 8.1
Rugby	5.2	4.7	3.3	2.9	5.4	6.4	4.2 - 9.5
Stratford-on-Avon	4.0	3.8	3.2	5.0	5.2	6.1	4.0 - 9.3
Warwick	3.5	3.0	3.4	2.9	3.0	3.2	1.9 - 5.3
Delivery Unit							
George Eliot Hospital	2.9	3.0	3.3	3.5	3.9	4.0	2.8 - 5.7
Walsgrave Hospital	7.3	5.9	4.4	5.3	5.8	5.9	4.9 - 7.2
Warwick Hospital	2.0	1.5	1.3	1.7	2.2	2.6	1.7 - 3.9

#### Comments:

The tables present year on year numbers and rates of infant deaths for the Cluster, LAs and provider units, as well as 3 year averages. **Figure 6.1** shows that the infant mortality is below the regional average. It appears to have risen in recent years although numbers are small and have dropped again in 2010. In **Figure 6.2**, each LA's infant mortality rate is plotted according to its respective deprivation score. Most are within the prediction interval adjusted for social deprivation, but two are above the upper limit.

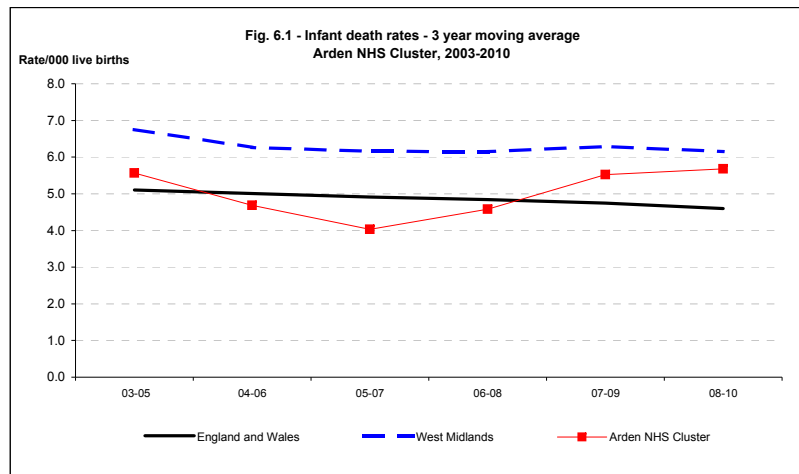


Fig 6.1 Infant death trend for Arden NHS, West Midlands and England and Wales, 2003 - 2010.

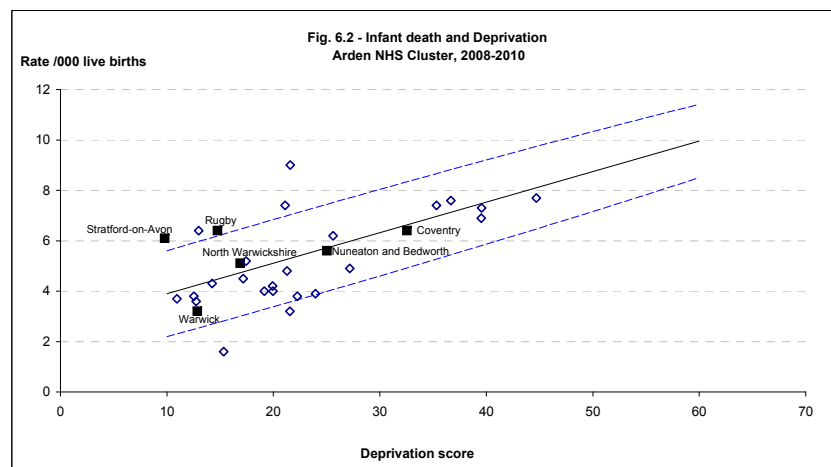


Fig 6.2 Infant death rates for last triennium (2008-10) for the Arden NHS Cluster, plotted against each LA's deprivation score (IMD 2007). Regression lines represent 90% prediction intervals, based on WM 2002 - 2010.

## 7. Infant Deaths in Arden NHS Cluster, 2003 -2010: Classification in main groups

Groups based on Fetal/Neonatal/Infant classification

	Arden NHS Cluster		George Eliot Hospital		Walsgrave Hospital		Warwick Hospital	
<b>Births 2008-10</b>	32551		7289		17454		8194	
<b>MAIN GROUPS - 2008-10</b>	<b>No.</b>	<b>Rate</b>	<b>No.</b>	<b>Rate</b>	<b>No.</b>	<b>Rate</b>	<b>No.</b>	<b>Rate</b>
Congenital anomaly	53	1.6	9	1.2	26	1.5	4	0.5
Pre-viability	21	0.6	4	0.5	12	0.7	3	0.4
Pulmonary immaturity	61	1.9	10	1.4	39	2.2	8	1.0
Intrapartum asphyxia	10	0.3	0	0.0	8	0.5	2	0.2
Infection	17	0.5	1	0.1	10	0.6	1	0.1
SUDI	8	0.2	0	0.0	6	0.3	0	0.0
Miscellaneous	19	0.6	5	0.7	7	0.4	2	0.2
Unclassified	17	0.5	4	0.5	7	0.4	4	0.5

	2003	2004	2005	2006	2007	2008	2009	2010
<b>Live births</b>	9191	9757	9452	10249	10340	10859	10655	11037

### MAIN GROUPS

#### Arden NHS Cluster

Numbers	2003	2004	2005	2006	2007	2008	2009	2010
Congenital anomaly	7	19	13	8	18	22	19	12
Pre-viability	10	10	4	0	3	11	6	4
Pulmonary immaturity	20	28	13	13	13	25	21	15
Intrapartum asphyxia	0	1	1	2	2	2	4	4
Infection	10	4	4	4	3	5	6	6
SUDI	2	2	3	1	4	4	2	2
Miscellaneous	13	9	6	2	3	2	9	8
Unclassified/Undocumented	1	2	0	3	5	3	4	10

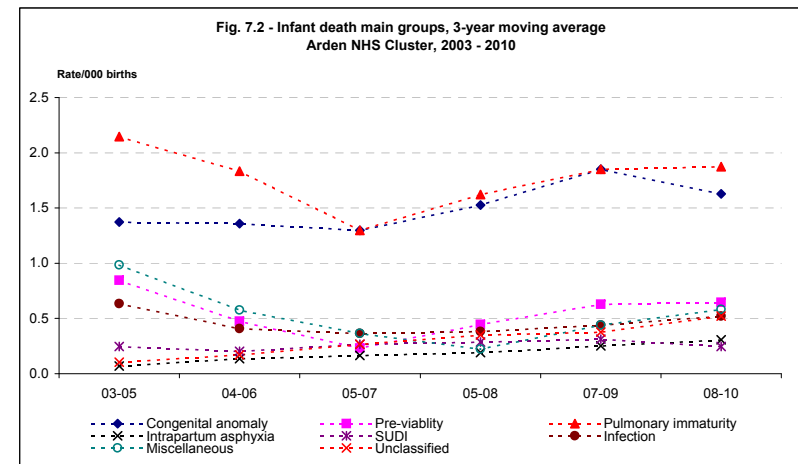
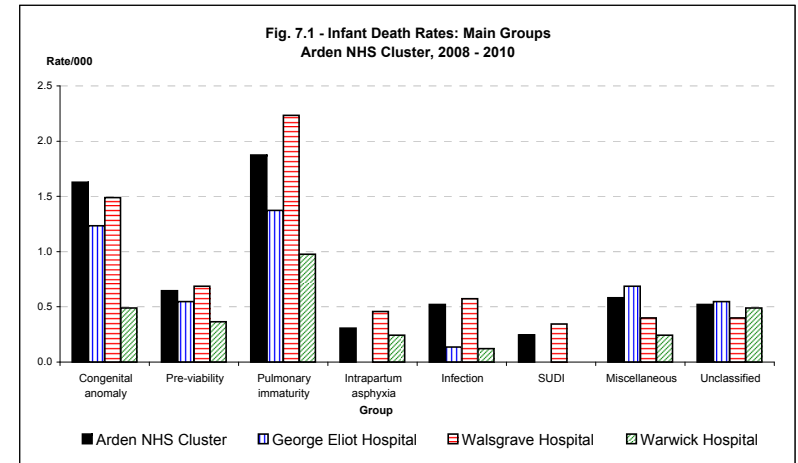
#### 3-year moving averages

	03-05	04-06	05-07	05-08	07-09	08-10
Congenital anomaly	1.4	1.4	1.3	1.5	1.9	1.6
Pre-viability	0.8	0.5	0.2	0.4	0.6	0.6
Pulmonary immaturity	2.1	1.8	1.3	1.6	1.9	1.9
Intrapartum asphyxia	0.1	0.1	0.2	0.2	0.3	0.3
Infection	0.6	0.4	0.4	0.4	0.4	0.5
SUDI	0.2	0.2	0.3	0.3	0.3	0.2
Miscellaneous	1.0	0.6	0.4	0.2	0.4	0.6
Unclassified	0.1	0.2	0.3	0.3	0.4	0.5

### Comments:

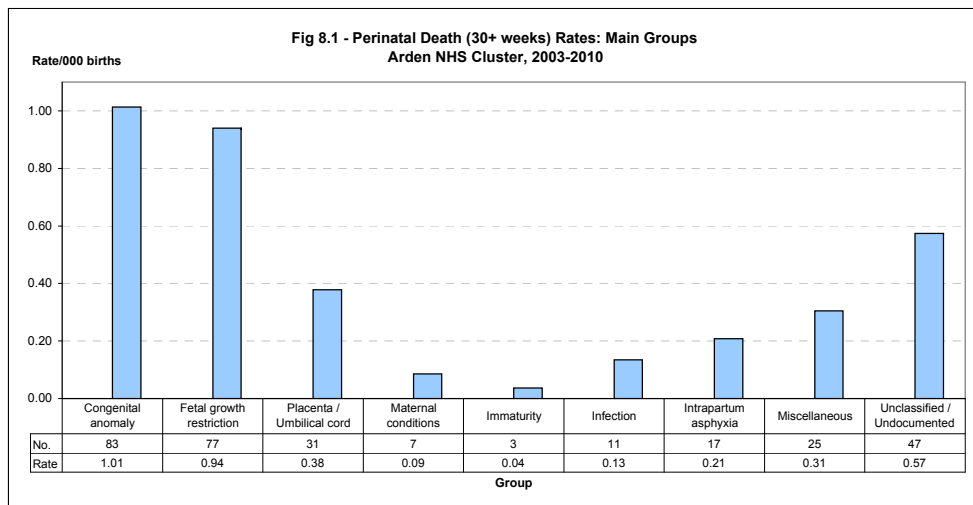
The tables and Fig 7.1. show the main categories of infant deaths within the Cluster and the respective units. Immaturity related deaths and congenital anomalies represent the largest category, the former varying with the level of neonatal unit.

Fig 7.2. shows 3 year moving average trends, with a non-significant increase in congenital anomaly deaths.



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

### MAIN GROUPS



### TRENDS IN PERINATAL DEATHS WITH FETAL GROWTH RESTRICTION

#### Numbers - PDN

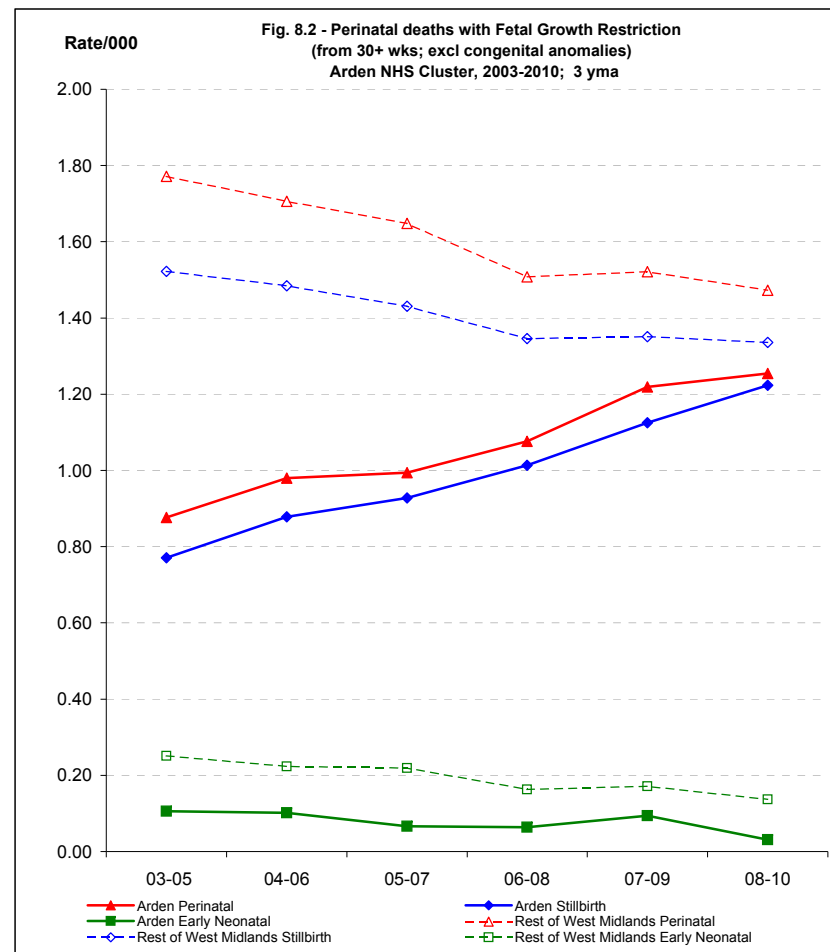
	2003	2004	2005	2006	2007	2008	2009	2010	p
<b>Rest of West Midlands</b>									
Perinatal	94	95	109	88	91	91	95	84	<b>0.044</b>
Stillbirth	82	81	93	80	77	84	85	76	
Early Neonatal	12	14	16	8	14	7	10	8	
<b>Arden</b>									
Perinatal	4	13	8	8	14	12	13	16	0.067
Stillbirth	4	10	8	8	12	12	12	16	<b>0.033</b>
Early Neonatal	0	3	0	0	2	0	1	0	

#### Rate/1,000

	2003	2004	2005	2006	2007	2008	2009	2010	2010 C.I.
<b>Rest of West Midlands</b>									
Perinatal	1.71	1.68	1.92	1.52	1.51	1.49	1.56	1.37	1.11 - 1.69
Stillbirth	1.49	1.43	1.64	1.38	1.28	1.37	1.40	1.24	0.99 - 1.55
Early Neonatal	0.22	0.25	0.28	0.14	0.23	0.12	0.17	0.13	0.07 - 0.26
<b>Arden</b>									
Perinatal	0.43	1.33	0.84	0.78	1.35	1.10	1.21	1.44	0.89 - 2.34
Stillbirth	0.43	1.02	0.84	0.78	1.16	1.10	1.12	1.44	0.89 - 2.34
Early Neonatal	0.00	0.31	0.00	0.00	0.19	0.00	0.09	0.00	0.00 - 0.35

#### 3 year moving averages

	03-05	04-06	05-07	06-08	07-09	08-10	03-05 C.I.	08-10 C.I.
<b>Rest of West Midlands</b>								
Perinatal	1.77	1.71	1.65	1.51	1.52	1.47	1.58 - 1.98	1.31 - 1.66
Stillbirth	1.52	1.48	1.43	1.35	1.35	1.34	1.35 - 1.72	1.18 - 1.51
Early Neonatal	0.25	0.22	0.22	0.16	0.17	0.14	0.19 - 0.34	0.09 - 0.20
<b>Arden</b>								
Perinatal	0.88	0.98	0.99	1.08	1.22	1.25	0.59 - 1.29	0.92 - 1.70
Stillbirth	0.77	0.88	0.93	1.01	1.13	1.22	0.51 - 1.17	0.90 - 1.67
Early Neonatal	0.11	0.10	0.07	0.06	0.09	0.03	0.04 - 0.31	0.01 - 0.17



#### Comment:

This analysis looks at perinatal deaths from 30+ weeks gestation.

**Fig 8.1.** shows the trend in perinatal deaths from 30+ weeks gestation. In contrast to the rest of the WM, the rate (/1000) has increased from 0.88 in 2003-5 to 1.25 in 2008-10 (+42%), although confidence intervals are wide because of small numbers. Trend analysis shows that this increase has borderline significance for perinatal mortality (p=0.067) but is significant for the observed upward trend of stillbirths with fetal growth restriction p=0.033)

**Fig 8.2.** shows the trend in perinatal deaths with fetal growth restriction. In contrast to the rest of the WM, the rate (/1000) has increased from 0.88 in 2003-5 to 1.25 in 2008-10 (+42%), although confidence intervals are wide because of small numbers. Trend analysis shows that this increase has borderline significance for perinatal mortality (p=0.067) but is significant for the observed upward trend of stillbirths with fetal growth restriction p=0.033)