

Trends in Maternity Casemix

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1 Background

- 1.1 Pressures on maternity services and maternity care costs may partly reflect trends in birth numbers and partly the complexity of the maternity caseload. To assess changes in maternity complexity, this report considers trends in the case-mix and cost-mix of maternity admissions in Outer NE London between 2006-07 and 2010-11. Also reviewed are trends in births and birthweight mix, since low birthweight is an indicator for complex maternity.
- 1.2 Trends in the cost-mix of maternities are analyzed using the PBR-HRG4 classification of maternity admissions in conjunction with 2010-11 tariff costings. This provides a constant cost basis for comparing maternity admission patterns of successive years.

2 Maternity Cost Trends in ONEL, Barking & Dagenham and Havering.

- 2.1 Table 1 shows maternity admissions across Outer NE London since 2006/07 disaggregated to HRG4 category together with 2010-11 tariff amounts. The final column contains the HRG4 disaggregation for England wide maternities in 2009-10. Tables 2 and 3 contain corresponding data for Barking & Dagenham and for Havering. The percent of deliveries with complications is based on the subtotal over four categories: normal deliveries to mothers aged 19 and over with complications; normal deliveries to mothers aged 18 and under with complications; assisted deliveries with complications; and Caesarean sections with complications. The percent of deliveries that are Caesarian sections includes Caesarean Sections without complications.
- 2.2 Table 1 shows (using the same costing method) that the average cost of each maternity in Outer NE London is broadly constant, with no consistent upward trend. This average cost reflects case-mix complexity, such as the proportion of maternities that have complications, and the proportion of maternities that are Caesarian sections. If, say, the proportion of complicated maternities had risen consistently, then so would the average cost, since complex maternities have a higher tariff.
- 2.3 However, Table 1 also shows that aggregate maternity costs (on a constant cost basis using the 2010-11 tariff) have risen from £26.3m in 2006-07 to

£29.6m in 2010-11. Since the average cost of each maternity has not risen, the main driver behind this rise in costs is the increase in maternities per se, rather than any increase in complexity.

Table 1 Trends in Maternity Casemix, Outer NE London

Outcome (HRG4 category)	2010-11 National Tariff (Daycase / Elective/ Non- elective)	2006- 07	2007- 08	2008- 09	2009- 10	2010- 11	England (2009/10)
Normal delivery 19 years and over with CC	2101	1417	1669	2115	1738	2009	98852
Normal delivery 19 years and over without CC	1324	8569	8576	8594	8757	8986	355322
Normal delivery 18 years and under with CC	2160	32	38	54	45	43	4086
Normal delivery 18 years and under without CC	1393	181	179	211	267	255	15445
Assisted delivery with CC	2612	127	132	246	218	170	13260
Assisted delivery without CC	1970	379	431	380	448	375	22243
Caesarean Section 19 years and over	2539	1068	1222	1121	1208	1312	56972
Caesarean Section 18 years and under	2864	7	5	5	5	4	537
Caesarean Section with complications	3311	2373	2636	2361	2565	2581	94184
All deliveries		14153	14888	15087	15251	15735	660901
Caesarian sections total		3448	3863	3487	3778	3897	151693
% Caesarian sections		24.4	25.9	23.1	24.8	24.8	23.0
Deliveries with Complications		3949	4475	4776	4566	4803	210382
% Deliveries with Complications		27.9	30.1	31.7	29.9	30.5	31.8
Payment (£mill) based on 2010-11 Tariff		26.3	28.2	28.3	28.7	29.6	1245.0
Average Payment per delivery		1859	1896	1876	1885	1884	1884

Table 2 Trends in Maternity Casemix, Barking & Dagenham Responsible

Outcome (HRG4 category)	2010-11 National Tariff (Daycase / Elective/ Non- elective)	2006-07	2007-08	2008-09	2009-10	2010-11
Normal delivery 19 years and over with CC	2101	305	408	519	389	395
Normal delivery 19 years and over without CC	1324	1934	1904	1916	1980	2021
Normal delivery 18 years and under with CC	2160	7	11	24	11	8
Normal delivery 18 years and under without CC	1393	60	48	71	75	84
Assisted delivery with CC	2612	29	28	55	68	20
Assisted delivery without CC	1970	61	84	71	79	61
Caesarean Section 19 years and over	2539	203	253	264	258	306
Caesarean Section 18 years and under	2864	1	0	1	0	1
Caesarean Section with complications	3311	479	581	470	545	536
All deliveries		3079	3317	3391	3405	3432
Caesarian sections total		683	834	735	803	843
% Caesarian sections		22.2	25.1	21.7	23.6	24.6
Deliveries with Complications		820	1028	1068	1013	959
% Deliveries with Complications		26.6	31.0	31.5	29.8	27.9
Payment (£mill) based on 2010-11 Tariff		5.6	6.3	6.3	6.4	6.4
Average Payment per delivery		1819	1891	1855	1868	1855

2.4 Table 2 shows that for maternities where Barking and Dagenham is the responsible PCT, there is again no consistent upward trend in average maternity costs. Here a recent decline in the proportion of deliveries with

complications has been offset by a recent rise in the proportion of Caesarian sections. The main driver for the upward trend in maternity costs is therefore the volume of demand.

Table 3 Trends in Maternity Casemix (HRG4 codes), Havering Responsible

Outcome	2010-11	2006-07	2007-08	2008-09	2009-10	2010-11
	National Tariff (Daycase / Elective/ Non- elective)					
Normal delivery 19 years and over with CC	2101	258	357	392	349	340
Normal delivery 19 years and over without CC	1324	1513	1447	1605	1535	1640
Normal delivery 18 years and under with CC	2160	6	8	12	11	12
Normal delivery 18 years and under without CC	1393	30	38	39	60	43
Assisted delivery with CC	2612	30	30	68	55	27
Assisted delivery without CC	1970	93	103	70	107	68
Caesarean Section 19 years and over	2539	212	242	213	239	231
Caesarean Section 18 years and under	2864	2	1	1	2	3
Caesarean Section with complications	3311	376	420	338	361	409
All deliveries		2520	2646	2738	2719	2773
Caesarian sections total		590	663	552	602	643
% Caesarian sections		23.4	25.1	20.2	22.1	23.2
Deliveries with Complications		670	815	810	776	788
% Deliveries with Complications		26.6	30.8	29.6	28.5	28.4
Payment (£mill) based on 2010-11 Tariff		4.7	5.0	5.0	5.0	5.1
Average Payment per delivery		1845	1899	1829	1852	1848

2.5 Table 3 relating to maternity case and cost-mix trends in Havering again shows no consistent upward trend in average maternity costs. Maternity volume has not increased as much as in other parts of outer NE London, and so aggregate maternity costs (penultimate row, constant costing method) are correspondingly broadly constant.

3 Differences in Complication and Caesarian Rates and Maternity Costs between Patient Groups

3.1 Changes in the demographic and socioeconomic mix of maternities are a potential source for changing cost. As to maternal age, Table 4 (and Figure 1) shows that older mothers have higher complication and Caesarian rates, and hence higher average maternity costs than younger mothers. So any trend to delayed maternity would tend to increase maternity costs. The lowest average maternity cost is in fact for mothers aged under 20.

3.2 Table 5 shows also some differences in maternity costs in outer NE London according to maternal ethnicity: higher costs are apparent for mothers of black ethnicity, due to higher levels of complication and higher Caesarian

section rates. This is particularly so for mothers of African Black or African Black British ethnicity for whom the complication and Caesarian section rates are respectively 36% and 34%, compared to overall rates of 31% and 24% respectively (Table 6, Figure 2).

3.3 Table 7 compares the age and ethnic mix of maternities in the main trusts in Outer NE London with all trusts nationally and in London. BHR Trust has a lower than nationally of mothers over 35, but a higher proportion of mothers with non-white ethnicity.

Table 4 Maternity Case-mix and costs by maternal age (SUS accumulated over 2008-9,2009-10,2010-11)

Outcome	Under 20	20-24	25-29	30-34	35-39	Over 40
Normal delivery 19 years and over with CC	96	939	1791	1719	1059	251
Normal delivery 19 years and over without CC	553	5389	8716	7388	3431	824
Normal delivery 18 years and under with CC	140	0	0	0	0	0
Normal delivery 18 years and under without CC	718	0	0	0	0	0
Assisted delivery with CC	25	93	191	189	117	19
Assisted delivery without CC	50	192	377	355	180	46
Caesarean Section 19 years and over	21	290	789	1270	950	280
Caesarean Section 18 years and under	14	0	0	0	0	0
Caesarean Section with complications	165	999	2123	2346	1423	414
All deliveries	1782	7902	13987	13267	7160	1834
Caesarian sections total	200	1289	2912	3616	2373	694
% Caesarian sections	11.2	16.3	20.8	27.3	33.1	37.8
Deliveries with Complications	426	2031	4105	4254	2599	684
% Deliveries with Complications	23.9	25.7	29.3	32.1	36.3	37.3
Payment (£mill) over 3 years, 2010-11 Tariff	3.0	13.8	25.6	25.6	14.6	3.8
Payment per delivery	1706	1743	1829	1928	2032	2094

Figure 1 Average Maternity Costs (2010-11 Tariffs) by Age of Mother

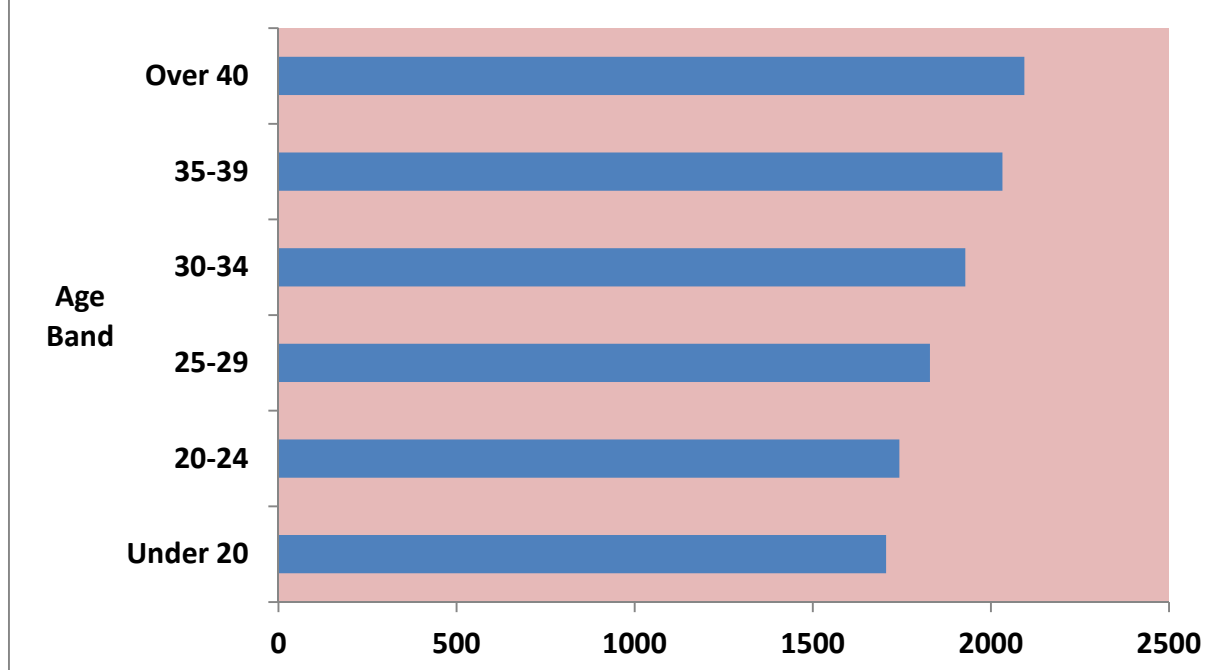


Table 5 Maternity Case-mix and costs by maternal ethnicity (SUS accumulated 2008-9,2009-10,2010-11)

Outcome	White	Mixed	Asian	Black	Chinese or Other	Not stated	All
Normal delivery 19 years and over with CC	2641	205	1562	862	358	105	5733
Normal delivery 19 years and over without CC	12139	868	6953	3784	1445	521	25710
Normal delivery 18 years and under with CC	96	11	9	18	5	1	140
Normal delivery 18 years and under without CC	467	57	45	106	21	14	710
Assisted delivery with CC	315	21	159	80	30	12	617
Assisted delivery without CC	659	31	298	106	57	29	1180
Caesarean Section 19 years and over	1679	121	831	713	196	68	3608
Caesarean Section 18 years and under	12	0	0	1	0	0	13
Caesarean Section with complications	3141	277	1846	1588	402	153	7407
All deliveries	21149	1591	11703	7258	2514	903	45118
Caesarian sections total	4832	398	2677	2302	598	221	11028
% Caesarian sections	22.8	25.0	22.9	31.7	23.8	24.5	24.4
Deliveries with Complications	6193	514	3576	2548	795	271	13897
% Deliveries with Complications	29.3	32.3	30.6	35.1	31.6	30.0	30.8
Payment (£mill) 3 years, 2010-11 Tariff	33.7	2.6	18.5	12.7	4.0	1.5	73.0
Payment per delivery	1596	1630	1582	1748	1580	1638	1618

Table 6 Maternity Complications and Costs by Maternal Ethnicity (SUS, 2008-9 to 2010-11)

	All deliveries	Caesarian sections total	% Caesarian sections	Deliveries with Complications	% Deliveries with Complications	Payment per delivery
British (White)	14798	3412	23	4328	29	1861
Irish (White)	268	74	28	80	30	1910
Any other White background	6081	1346	22	1785	29	1849
White and Black Caribbean (Mixed)	383	79	21	114	30	1831
White and Black African (Mixed)	757	220	29	265	35	1962
White and Asian (Mixed)	168	33	20	51	30	1827
Any other Mixed background	283	66	23	84	30	1872
Indian (Asian or Asian British)	3058	732	24	966	32	1889
Pakistani (Asian or Asian British)	4560	998	22	1307	29	1833
Bangladeshi (Asian or Asian British)	1396	301	22	442	32	1850
Any other Asian background	2689	646	24	861	32	1887
Caribbean (Black or Black British)	1369	357	26	442	32	1907
African (Black or Black British)	4326	1456	34	1557	36	2028
Any other Black background	1563	489	31	549	35	1993
Chinese (other ethnic group)	352	64	18	113	32	1823
All (incl not stated)	45116	11028	24	13897	31	1885

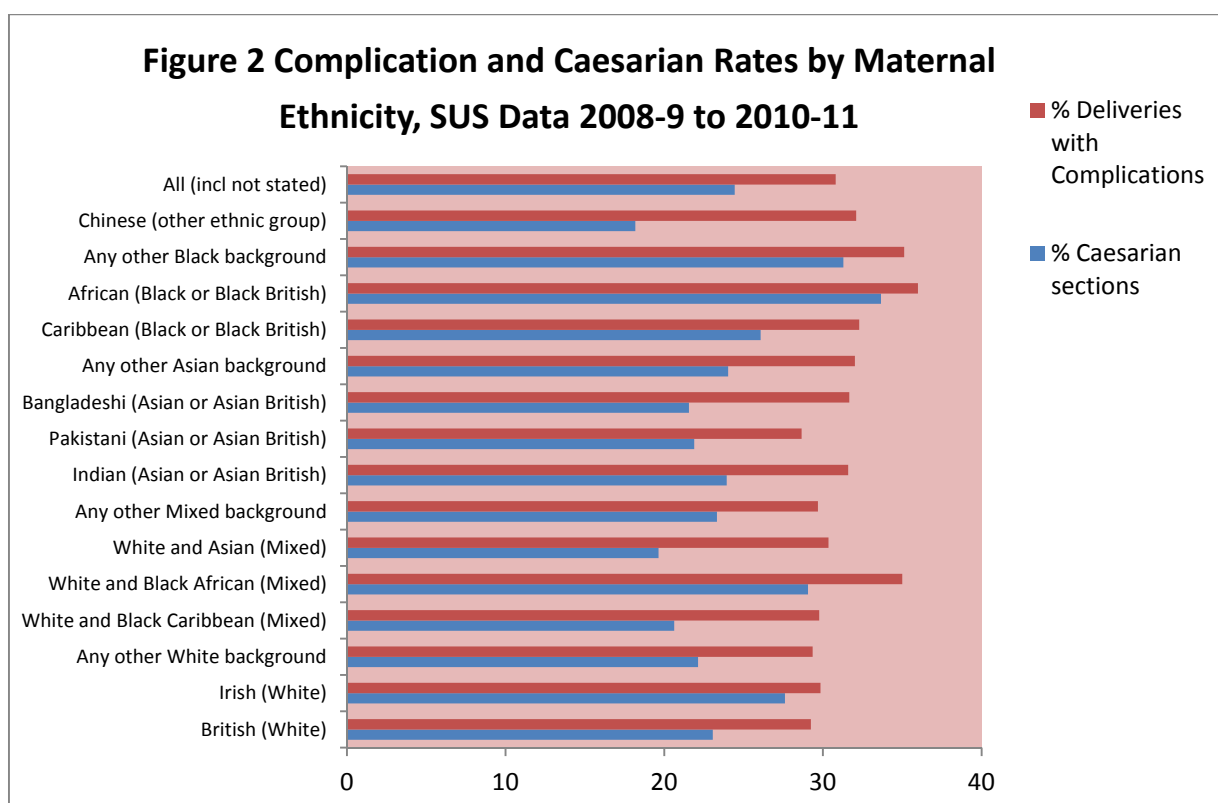
Table 7 Maternal Ethnicity & Age Comparisons, 2009

7a Maternities by Maternal Age, 2009

Area / Trust	Under 19	19 to 24	25 to 34	35 to 39	40&over	Total	% Over 35
National	23238	141115	349619	101693	23804	639469	19.6
London SHA	2746	21451	72760	24008	6367	127332	23.9
BHR NHS Trust	253	1926	5603	1303	319	9404	17.2
Whipps X NHS Trust	93	937	3081	887	237	5235	21.5

7b Maternities by Maternal Ethnicity, 2009

Area / Trust	White	Mixed	Asian	Black	Chinese/Other	Not stated	All	% non-white
National	451935	9992	63998	34515	21463	57566	639469	22.3
London SHA	60194	4301	21966	21195	9707	9969	127332	48.7
BHR NHS Trust	4494	377	2483	1396	352	302	9404	50.6
Whipps X NHS Trust	2330	244	1353	848	366	94	5235	54.7



3.4 There are different patterns of maternal age according to area socioeconomic mix, with the proportion of mothers aged over 35 higher in more affluent areas (neighbourhood IMD quintile 1) – see Table 8. The consequence is that the proportion of Caesarians is relatively high for mothers living in quintile 1 neighbourhoods, and the average cost of maternities also slightly higher than average. However, the percent of deliveries which are complex increases in deprived areas (IMD quintiles 4 and 5), and hence average maternity costs are also high in such areas – see Table 9.

Table 8 Maternal Age by IMD Quintile, SUS 2010-11, Outer NE London
IMD quintile*

Maternal Age	Q1	Q2	Q3	Q4	Q5	All Areas
Under 18	18	44	70	90	114	336
19-24	203	374	632	663	851	2723
25-34	1023	1583	1917	2017	2260	8800
35-39	318	379	493	539	550	2279
40 and over	97	109	124	103	134	567
All deliveries	1659	2489	3236	3412	3909	14705
% mother over 35	25.0	19.6	19.1	18.8	17.5	19.4

*IMD quintile based on LSOA of residence

Table 9 Maternities, Outer NE London, SUS 2010-11, By Neighbourhood Deprivation Quintile

	IMD quintile*				
	Q1	Q2	Q3	Q4	Q5
Normal delivery 19 years and over with CC	204	303	397	463	497
Normal delivery 19 years and over without CC	968	1484	1929	1907	2198
Normal delivery 18 years and under with CC	1	6	6	12	13
Normal delivery 18 years and under without CC	11	32	51	64	77
Assisted delivery with CC	17	26	28	40	45
Assisted delivery without CC	40	53	73	83	102
Caesarean Section 19 years and over	147	195	270	284	320
Caesarean Section 18 years and under	1	0	0	2	1
Caesarean Section with complications	270	390	482	557	656
All deliveries	1659	2489	3236	3412	3909
Caesarian sections total	418	585	752	843	977
% Caesarian sections	25.2	23.5	23.2	24.7	25.0
Deliveries with Complications	492	725	913	1072	1211
% Deliveries with Complications	29.7	29.1	28.2	31.4	31.0
Payment per delivery	1881	1855	1845	1891	1892

*IMD quintile based on LSOA of residence

4 Trends in Birthweight

4.1 A population level measure of maternity risk is provided by the proportion of births. Table 10 shows recent trends in the percent of births with low birthweight (under 2500g), or very low birthweight (under 1500g). Trends in low birthweight in outer NE London between 2006 and 2010 tend to confirm those in hospital maternities, namely no evidence of greater complexity associated with increased proportion of low birthweight. In fact the proportion of low weight and very low weight births seems to be falling.

Table 10 Births in Outer NE London, birthweight trends

Year	Total	All Low (under 2500g)	Very low (under 1500g)	Annual rates		Three year average	
				% Low	% Very low	% Low	% Very low
2004	12840	848	228	8.4	1.78		
2005	13125	929	236	8.9	1.81	8.8	1.79
2006	13894	980	245	8.9	1.79	8.7	1.73
2007	14603	967	230	8.3	1.60	8.4	1.64
2008	15100	978	228	8.1	1.53	8.2	1.53
2009	15206	1008	223	8.1	1.47	8.1	1.54
2010	15931	1037	257	8.2	1.63		
All years	100699	6747	1647	8.4	1.65		

4.2 The trend towards lower levels of low birthweight is also apparent for births to women living in Barking & Dagenham, and to women living in Havering (Tables 11 and 12), though the reduction is more striking in Barking & Dagenham.

Table 11 Births in Barking & Dagenham, birthweight trends

Year	Total	All Low (under 2500g)	Very low (under 1500g)	Annual rates		Three year average	
				% Low	% Very low	% Low	% Very low
2004	2780	180	53	8.4	1.91		
2005	3008	198	57	8.5	1.90	8.6	1.91
2006	3231	223	61	8.9	1.92	8.5	1.85
2007	3408	218	59	8.2	1.75	8.2	1.73
2008	3647	216	56	7.6	1.56	8.0	1.52
2009	3642	251	46	8.2	1.27	7.6	1.37
2010	3754	215	48	7.0	1.28		
All years	23470	1501	380	8.1	1.63		

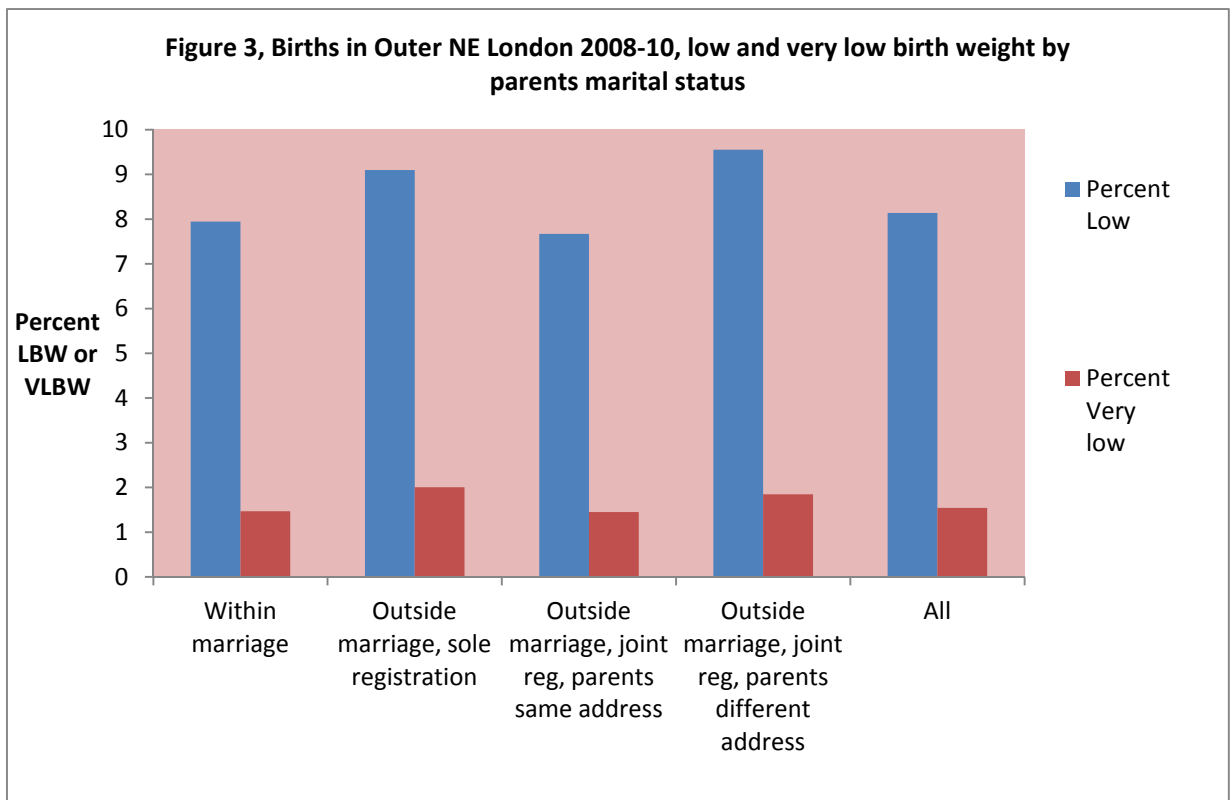
Table 12 Births in Havering, birthweight trends

Year	Total	All Low (under 2500g)	Very low (under 1500g)	Annual rates		Three year average	
				% Low	% Very low	% Low	% Very low
2004	2578	132	41	6.7	1.59		
2005	2492	158	30	7.6	1.21	7.2	1.44
2006	2442	143	37	7.4	1.52	7.4	1.51
2007	2597	142	46	7.3	1.79	7.2	1.46
2008	2797	157	30	6.8	1.10	7.1	1.50
2009	2714	152	44	7.2	1.63	7.2	1.33
2010	2831	176	36	7.6	1.28		
All years	18451	1060	264	7.2	1.44		

4.3 Birthweight data show a further patient category relevant to maternity risk, namely parental marital status, in addition to maternal age, ethnicity and neighbourhood deprivation (see Figure 3). The percent of low birthweight infants is highest for unmarried joint registration, with parents at different addresses, while the percent of very low birthweight is highest for lone parent mothers not living with the father. Contrasts in low birthweight rates according to marital status are greater in Havering than Barking & Dagenham (Table 13).

Table 13 Births 2008-10 by Marital status and percent low weight

Marital status of parents	Outer NE London		Barking & Dagenham		Havering	
	Percent Low	Percent Very low	Percent Low	Percent Very low	Percent Low	Percent Very low
Within marriage	7.9	1.47	7.3	1.25	6.7	1.28
Outside marriage, sole registration	9.1	2.01	8.4	2.05	8.6	1.40
Outside marriage, joint reg, parents same address	7.7	1.45	7.3	1.29	7.1	1.15
Outside marriage, joint reg, parents different address	9.6	1.85	8.3	1.39	9.2	2.05
All	8.1	1.54	7.6	1.37	7.2	1.33



5 Implications

5.1 The analysis above suggests that there is no evidence of an increased complexity in maternities in recent years, and that the main factor underlying rising maternity costs is simply the volume of births. This implies that cost forecasts can be based on projections of birth numbers with complexity taken to be constant.

5.2 The approximately constant level of maternity case-mix complexity and average cost holds despite countervailing tendencies, some of which in themselves might be associated with increased complexity. Factors

associated with maternity risk include higher maternal age, non-white maternal ethnicity, neighbourhood deprivation and unsupported mothers.