

## Appendix 2 – Supplementary results

**Table S1:** Distribution of length of stay of admissions by year, age, ethnic group, Government Office Region of residence, deprivation category and main diagnosis.

	Number of admissions with length of stay						Unknown
	0 days	1 day	2 to 4 days	5 to 7 days	8 to 14 days	> 14 days (> 1 year)	
<b>Financial year of admission</b>							
2003/04	36,500	26,506	24,170	6,085	4,969	4,432 (21)	163
	35.5%	25.8%	23.5%	5.9%	4.8%	4.3%	0.2%
2004/05	38,673	27,072	22,730	6,103	4,989	4,777 (51)	131
	37.0%	25.9%	21.8%	5.8%	4.8%	4.6%	0.1%
2005/06	43,734	28,166	23,243	6,641	5,266	5,159 (39)	161
	38.9%	25.1%	20.7%	5.9%	4.7%	4.6%	0.1%
2006/07	50,095	28,525	23,243	6,740	5,108	5,157 (38)	104
	42.1%	24.0%	19.5%	5.7%	4.3%	4.3%	0.1%
2007/08	55,807	27,279	22,748	6,664	5,229	5,304 (52)	103
	45.3%	22.2%	18.5%	5.4%	4.2%	4.3%	0.1%
2008/09	57,384	27,962	22,530	6,718	5,150	5,372 (40)	202
	45.8%	22.3%	18.0%	5.4%	4.1%	4.3%	0.2%
2009/10	63,719	30,719	24,490	7,185	5,572	5,823 (54)	227
	46.3%	22.3%	17.8%	5.2%	4.0%	4.2%	0.2%
2010/11	70,826	33,244	26,573	7,687	5,881	6,010 (62)	88
	47.1%	22.1%	17.7%	5.1%	3.9%	4.0%	0.1%
2011/12	76,471	35,576	26,921	7,592	5,952	6,076 (56)	99
	48.2%	22.4%	17.0%	4.8%	3.8%	3.8%	0.1%
2012/13	80,835	37,054	26,900	8,142	6,146	6,404 (56)	202
	48.8%	22.4%	16.2%	4.9%	3.7%	3.9%	0.1%
2013/14	89,811	40,083	28,326	8,491	6,405	6,616 (52)	180
	49.9%	22.3%	15.7%	4.7%	3.6%	3.7%	0.1%
2014/15	93,880	41,468	28,925	8,691	6,417	6,487 (28)	287
	50.4%	22.3%	15.5%	4.7%	3.4%	3.5%	0.2%
<b>Ethnic group</b>							
White	592,752	302,880	238,705	66,868	50,463	49,008	1,451
	45.5%	23.3%	18.3%	5.1%	3.9%	3.8%	0.1%
Indian	14,993	6,543	5,089	1,801	1,574	1,675	59
	47.2%	20.6%	16.0%	5.7%	5.0%	5.3%	0.2%
Pakistani	42,353	18,062	16,542	5,397	4,702	4,738	93
	46.1%	19.7%	18.0%	5.9%	5.1%	5.2%	0.1%
Bangladeshi	9,289	4,424	3,399	1,237	1,022	1,159	30
	45.2%	21.5%	16.5%	6.0%	5.0%	5.6%	0.1%
Black	33,829	18,184	12,141	3,890	3,351	4,067	127
	44.8%	24.1%	16.1%	5.1%	4.4%	5.4%	0.2%
Chinese	2,021	708	646	230	196	253	≤10
	49.8%	17.4%	15.9%	5.7%	4.8%	6.2%	≤0.2%
Mixed	21,465	11,774	8,355	2,375	1,848	2,116	54
	44.7%	24.5%	17.4%	4.9%	3.9%	4.4%	0.1%

	Number of admissions with length of stay						Unknown
	0 days	1 day	2 to 4 days	5 to 7 days	8 to 14 days	> 14 days (> 1 year)	
Other	27,292	12,589	9,168	3,086	2,597	3,339	81
	46.9%	21.6%	15.8%	5.3%	4.5%	5.7%	0.1%
Unknown	13,741	8,490	6,754	1,855	1,331	1,262	46
	41.0%	25.4%	20.2%	5.5%	4.0%	3.8%	0.1%
<b><u>Age group</u></b>							
Under 1	69,176	35,789	48,370	21,559	18,960	27,156	696
	31.2%	16.1%	21.8%	9.7%	8.6%	12.2%	0.3%
1 to 4	214,191	108,610	61,209	17,266	12,399	9,824	217
	50.6%	25.6%	14.4%	4.1%	2.9%	2.3%	0.1%
5 to 9	196,166	91,696	59,123	13,642	9,701	7,041	219
	52.0%	24.3%	15.7%	3.6%	2.6%	1.9%	0.1%
10 to 14	157,125	83,387	70,227	15,983	12,226	10,134	220
	45.0%	23.9%	20.1%	4.6%	3.5%	2.9%	0.1%
15 to 19	121,077	64,172	61,870	18,289	13,798	13,462	595
	41.3%	21.9%	21.1%	6.2%	4.7%	4.6%	0.2%
<b><u>Main diagnostic group</u></b>							
Malignant neoplasms (C)	66,003	7,091	11,432	3,569	2,688	2,502	48
	70.7%	7.6%	12.2%	3.8%	2.9%	2.7%	0.1%
Benign neoplasms (D)	1,330	184	346	162	162	121	≤10
	57.7%	8.0%	15.0%	7.0%	7.0%	5.2%	≤0.4%
Metabolic (E)	34,008	9,119	8,970	2,572	2,084	1,993	46
	57.8%	15.5%	15.3%	4.4%	3.5%	3.4%	0.1%
Mental/behavioural (F)	128,501	70,388	54,965	9,895	6,106	7,599	336
	46.3%	25.3%	19.8%	3.6%	2.2%	2.7%	0.1%
Nervous system (G)	359,215	221,651	156,146	46,436	37,605	35,800	983
	41.9%	25.8%	18.2%	5.4%	4.4%	4.2%	0.1%
Congenital (Q)	136,758	59,105	49,935	17,941	15,335	17,612	413
	46.0%	19.9%	16.8%	6.0%	5.2%	5.9%	0.1%
Other (R)	31,920	16,116	19,005	6,164	3,104	1,990	119
	40.7%	20.6%	24.2%	7.9%	4.0%	2.5%	0.2%
<b><u>Deprivation category</u></b>							
1 (most deprived)	215,379	106,146	85,557	26,052	20,732	21,711	647
	45.2%	22.3%	18.0%	5.5%	4.4%	4.6%	0.1%
2	161,208	83,072	63,325	18,582	14,548	14,964	397
	45.3%	23.3%	17.8%	5.2%	4.1%	4.2%	0.1%
3	136,789	75,643	57,623	15,555	11,881	11,645	306
	44.2%	24.4%	18.6%	5.0%	3.8%	3.8%	0.1%
4	124,458	60,943	48,925	13,591	10,069	9,881	280
	46.4%	22.7%	18.2%	5.1%	3.8%	3.7%	0.1%
5 (least deprived)	119,384	57,312	43,973	12,555	9,696	9,193	218
	47.3%	22.7%	17.4%	5.0%	3.8%	3.6%	0.1%
Unknown	517	538	1,396	404	158	223	99
	15.5%	16.1%	41.9%	12.1%	4.7%	6.7%	3.0%
<b><u>Government Office Region of residence</u></b>							
North East	46,384	26,086	19,947	5,110	3,746	3,187	81
	44.4%	25.0%	19.1%	4.9%	3.6%	3.0%	0.1%
North West	120,418	53,267	39,337	12,915	10,709	11,074	481
	48.5%	21.5%	15.8%	5.2%	4.3%	4.5%	0.2%

	Number of admissions with length of stay						Unknown
	0 days	1 day	2 to 4 days	5 to 7 days	8 to 14 days	> 14 days (> 1 year)	
Yorkshire and Humber	66,192	37,740	29,989	9,190	6,879	6,789	152
	42.2%	24.0%	19.1%	5.9%	4.4%	4.3%	0.1%
East Midlands	57,654	29,381	25,602	7,512	5,906	5,472	167
	43.8%	22.3%	19.4%	5.7%	4.5%	4.2%	0.1%
West Midlands	91,870	49,756	37,808	10,307	7,702	7,634	237
	44.7%	24.2%	18.4%	5.0%	3.8%	3.7%	0.1%
East of England	74,133	36,180	32,103	9,072	6,337	5,956	127
	45.2%	22.1%	19.6%	5.5%	3.9%	3.6%	0.1%
London	109,463	49,760	36,460	11,962	10,018	11,825	359
	47.6%	21.6%	15.9%	5.2%	4.4%	5.1%	0.2%
South East	108,835	60,469	48,812	12,641	9,562	9,400	141
	43.6%	24.2%	19.5%	5.1%	3.8%	3.8%	0.1%
South West	82,786	41,015	30,741	8,030	6,225	6,280	202
	47.2%	23.4%	17.5%	4.6%	3.6%	3.6%	0.1%

**Table S2:** Distribution of bed days per person per year by year, age, ethnic group, Government Office Region of residence, deprivation category and main diagnosis.

	Number of persons in year with					
	1 bed day	2 to 4 bed days	5 to 7 bed days	8 to 14 bed days	Over 14 bed days	Unknown bed days
<b><u>Financial year</u></b>						
2003/04	13,235	15,387	8,131	4,961	7,058	156
	27.0%	31.4%	16.6%	10.1%	14.4%	0.3%
2004/05	14,145	15,625	8,216	4,951	7,328	127
	28.1%	31.0%	16.3%	9.8%	14.5%	0.3%
2005/06	16,150	16,992	9,079	5,509	7,785	135
	29.0%	30.5%	16.3%	9.9%	14.0%	0.2%
2006/07	18,378	18,014	9,452	5,304	7,764	109
	31.1%	30.5%	16.0%	9.0%	13.2%	0.2%
2007/08	20,212	18,974	9,833	5,673	7,897	102
	32.2%	30.3%	15.7%	9.0%	12.6%	0.2%
2008/09	21,725	20,065	10,337	5,771	8,031	196
	32.9%	30.3%	15.6%	8.7%	12.1%	0.3%
2009/10	23,219	21,886	10,979	6,034	8,577	224
	32.7%	30.9%	15.5%	8.5%	12.1%	0.3%
2010/11	26,410	24,669	12,145	6,621	8,973	143
	33.4%	31.2%	15.4%	8.4%	11.4%	0.2%
2011/12	28,182	25,710	12,548	6,625	9,242	100
	34.2%	31.2%	15.2%	8.0%	11.2%	0.1%
2012/13	30,217	28,099	13,261	7,090	9,636	201
	34.1%	31.7%	15.0%	8.0%	10.9%	0.2%
2013/14	33,783	31,676	15,175	7,596	9,814	170
	34.4%	32.3%	15.5%	7.7%	10.0%	0.2%
2014/15	36,080	33,344	15,779	7,704	9,645	288
	35.1%	32.4%	15.3%	7.5%	9.4%	0.3%
<b><u>Ethnic group</u></b>						
White	220,599	207,505	104,306	56,613	76,100	1,434
	33.1%	31.1%	15.6%	8.5%	11.4%	0.2%
Indian	5,399	5,150	2,835	1,628	2,293	62
	31.1%	29.7%	16.3%	9.4%	13.2%	0.4%
Pakistani	12,415	11,732	6,531	4,186	6,943	93
	29.6%	28.0%	15.6%	10.0%	16.6%	0.2%
Bangladeshi	3,310	3,437	1,662	1,038	1,539	31
	30.0%	31.2%	15.1%	9.4%	14.0%	0.3%
Black	12,422	15,169	7,055	3,749	5,398	129
	28.3%	34.5%	16.1%	8.5%	12.3%	0.3%
Chinese	691	618	321	177	351	≤10
	31.9%	28.5%	14.8%	8.2%	16.2%	≤0.4%
Mixed	7,640	8,021	3,990	2,124	2,973	60
	30.8%	32.3%	16.1%	8.6%	12.0%	0.2%

	Number of persons in year with					
	1 bed day	2 to 4 bed days	5 to 7 bed days	8 to 14 bed days	Over 14 bed days	Unknown bed days
Other	9,338	9,702	4,679	2,657	4,381	88
	30.3%	31.5%	15.2%	8.6%	14.2%	0.3%
Unknown	9,922	9,107	3,556	1,667	1,772	45
	38.1%	34.9%	13.6%	6.4%	6.8%	0.2%
<b><u>Age group</u></b>						
Under 1	18,309	27,503	28,545	17,695	31,949	700
	14.7%	22.1%	22.9%	14.2%	25.6%	0.6%
1 to 4	74,974	79,392	29,895	14,920	16,977	218
	34.6%	36.7%	13.8%	6.9%	7.8%	0.1%
5 to 9	74,512	62,080	24,299	12,201	14,205	173
	39.7%	33.1%	13.0%	6.5%	7.6%	0.1%
10 to 14	61,746	51,881	24,894	13,476	18,009	238
	36.3%	30.5%	14.6%	7.9%	10.6%	0.1%
15 to 19	52,195	49,585	27,302	15,547	20,610	622
	31.5%	29.9%	16.5%	9.4%	12.4%	0.4%
<b><u>Main diagnostic group</u></b>						
Malignant neoplasms (C)	1,848	1,789	1,496	1,532	4,646	43
	16.3%	15.8%	13.2%	13.5%	40.9%	0.4%
Benign neoplasms (D)	289	186	200	199	173	≤10
	27.6%	17.7%	19.1%	19.0%	16.5%	0.2%
Metabolic (E)	3,146	3,696	2,884	1,928	3,650	51
	20.5%	24.1%	18.8%	12.6%	23.8%	0.3%
Mental/behavioural (F)	74,289	41,684	15,995	7,048	13,558	347
	48.6%	27.3%	10.5%	4.6%	8.9%	0.2%
Nervous system (G)	136,648	165,066	75,912	43,055	53,237	968
	28.8%	34.8%	16.0%	9.1%	11.2%	0.2%
Congenital (Q)	41,093	33,662	23,413	15,490	24,090	422
	29.7%	24.4%	16.9%	11.2%	17.4%	0.3%
Other (R)	24,423	24,358	15,035	4,587	2,396	118
	34.4%	34.3%	21.2%	6.5%	3.4%	0.2%
<b><u>Deprivation category</u></b>						
1	81,594	79,258	39,628	21,814	31,194	663
	32.1%	31.2%	15.6%	8.6%	12.3%	0.3%
2	60,935	58,689	29,451	15,872	22,072	400
	32.5%	31.3%	15.7%	8.5%	11.8%	0.2%
3	50,464	48,537	23,973	13,174	18,321	309
	32.6%	31.4%	15.5%	8.5%	11.8%	0.2%
4	45,069	42,032	20,747	11,682	15,434	257
	33.3%	31.1%	15.3%	8.6%	11.4%	0.2%
5	43,164	40,736	20,049	11,060	14,460	219
	33.3%	31.4%	15.5%	8.5%	11.1%	0.2%
Unknown	510	1,189	1,087	237	269	103
	15.0%	35.0%	32.0%	7.0%	7.9%	3.0%

	Number of persons in year with					
	1 bed day	2 to 4 bed days	5 to 7 bed days	8 to 14 bed days	Over 14 bed days	Unknown bed days
<b>Government Office Region of residence</b>						
North East	16,717	15,496	7,577	3,962	5,658	88
	33.8%	31.3%	15.3%	8.0%	11.4%	0.2%
North West	44,302	40,107	20,874	11,246	15,629	455
	33.4%	30.2%	15.7%	8.5%	11.8%	0.3%
Yorkshire and Humber	27,990	26,063	13,378	7,482	9,868	154
	33.0%	30.7%	15.8%	8.8%	11.6%	0.2%
East Midlands	21,117	21,631	10,774	6,245	8,389	152
	30.9%	31.7%	15.8%	9.1%	12.3%	0.2%
West Midlands	33,168	30,614	14,900	8,482	12,257	246
	33.3%	30.7%	14.9%	8.5%	12.3%	0.2%
East of England	28,129	26,909	13,596	7,360	9,555	133
	32.8%	31.4%	15.9%	8.6%	11.2%	0.2%
London	40,358	41,508	21,159	11,339	15,782	368
	30.9%	31.8%	16.2%	8.7%	12.1%	0.3%
South East	41,071	42,910	20,274	10,942	15,038	145
	31.5%	32.9%	15.5%	8.4%	11.5%	0.1%
South West	28,884	25,203	12,403	6,781	9,574	210
	34.8%	30.3%	14.9%	8.2%	11.5%	0.3%

**Table S3:** Multilevel random intercept negative binomial regression models for length of stay and bed days per person per year – sensitivity analysis for 2009/10 to 2014/15. IRR is incidence rate ratio compared to the reference category – the ratio of expected length of stay or number of bed days.

	<u>Length of Stay</u>				<u>Bed days per year</u>				
	IRR	95% CI		P value	IRR	95% CI		P value	
<u>Financial year</u>									
Change per year	0.97	0.96	0.97	< 0.01	0.98	0.98	0.98	< 0.01	
<u>Gender</u>									
Male	1 (ref)				1 (ref)				
Female	1.03	1.03	1.04	< 0.01	1.01	1.01	1.02	< 0.01	
<u>Ethnic group</u>									
White	1 (ref)				1 (ref)				
Indian	1.01	0.98	1.03	0.53	1.06	1.04	1.08	< 0.01	
Pakistani	1.01	1.00	1.03	0.14	1.06	1.05	1.08	< 0.01	
Bangladeshi	1.05	1.02	1.08	< 0.01	1.03	1.00	1.06	0.03	
Black	1.07	1.05	1.09	< 0.01	1.04	1.02	1.05	< 0.01	
Chinese	0.86	0.81	0.92	< 0.01	1.02	0.96	1.08	0.49	
Mixed	1.04	1.02	1.06	< 0.01	1.00	0.98	1.02	0.87	
Other	1.02	1.00	1.04	0.05	1.06	1.04	1.07	< 0.01	
<u>Age group</u>									
Under 1	1.90	1.88	1.93	< 0.01	2.30	2.27	2.32	< 0.01	
1 to 4	0.99	0.99	1.00	0.30	1.01	1.01	1.02	< 0.01	
5 to 9	1 (ref)				1 (ref)				
10 to 14	1.21	1.19	1.22	< 0.01	1.09	1.08	1.10	< 0.01	
15 to 19	1.35	1.33	1.36	< 0.01	1.18	1.17	1.19	< 0.01	
<u>Main diagnostic group</u>									
Malignant neoplasms (C)	0.36	0.36	0.37	< 0.01	1.53	1.49	1.57	< 0.01	
Benign neoplasms (D)	0.74	0.67	0.82	< 0.01	1.17	1.08	1.26	< 0.01	
Metabolic (E)	0.88	0.86	0.91	< 0.01	1.20	1.17	1.23	< 0.01	
Mental/behavioural (F)	0.83	0.82	0.84	< 0.01	0.84	0.83	0.84	< 0.01	
Nervous system (G)	1 (ref)				1 (ref)				
Congenital (Q)	0.79	0.78	0.80	< 0.01	1.02	1.02	1.03	< 0.01	
Other (R)	1.01	0.99	1.02	0.25	0.72	0.71	0.73	< 0.01	
<u>Deprivation category</u>									
1 (most deprived)	1(ref)				1(ref)				
2	1.01	1.00	1.02	0.08	1.00	0.99	1.01	0.44	
3	1.03	1.02	1.04	< 0.01	0.99	0.98	1.00	0.07	
4	0.98	0.97	0.99	< 0.01	0.98	0.97	0.99	< 0.01	
5 (least deprived)	0.97	0.96	0.99	< 0.01	0.98	0.97	0.99	< 0.01	
<u>Government Office Region of Residence</u>									
North East	1.20	1.18	1.22	< 0.01	1.00	0.99	1.02	0.72	
North West	1 (ref)				1 (ref)				

Yorkshire and Humber	1.18	1.17	1.20	< 0.01	1.01	1.00	1.02	0.12
East Midlands	1.30	1.28	1.32	< 0.01	1.06	1.04	1.07	< 0.01
West Midlands	1.16	1.15	1.18	< 0.01	1.00	0.99	1.02	0.55
East of England	1.12	1.10	1.13	< 0.01	1.02	1.01	1.04	< 0.01
London	1.04	1.02	1.05	< 0.01	1.01	1.00	1.02	0.10
South East	1.17	1.15	1.19	< 0.01	1.03	1.01	1.04	< 0.01
South West	1.01	0.99	1.02	0.50	0.99	0.98	1.00	0.13
<u>Model parameters</u>								
Degrees of freedom		34				34		
Log likelihood		-1731077				-1390278		
BIC		3462623				2781003		