

Working Paper on Acute Hospital Finance and Efficiency

1. Introduction and Key Messages

This Paper gives a brief overview of the trends relating to expenditure, inpatient and day case activity, complexity and efficiency in the acute hospital system. Where possible, 2008 is used as the baseline year for comparisons because it was after that point that the economic challenges faced by the country began to impact on the health budget. Where comparable data is not available for 2008, 2009 data is used with the reasons outlined. 2014 data is used as a comparator because this is the most recent year for which full year data is available. The expenditure data in this report relates to the 38 hospitals participating in the Activity Based Funding Programme. This represents the majority of expenditure in acute hospitals in Ireland. The activity and complexity data relates to all hospitals that report on their activity using the HIPE¹ database.

The data in this Paper provides some of the evidence to support a number of key messages in relation to the hospital system:

- Expenditure in 2014 on acute hospital services was below 2008 levels in both gross and net terms;
- There has been a considerable rise in the percentage of the gross acute hospital budget that is funded by non-Exchequer income;
- There has been a significant increase in the volume of activity as measured by discharges;
- The complexity associated with that activity has increased, particularly so for day cases;
- Efficiency has improved significantly as evident from reductions in unit costs; and
- The Exchequer is therefore deriving better value for money from its expenditure on the acute hospital system.

2. Expenditure in Hospitals

Table 1 below outlines both gross and net spending by acute hospitals, split into areas which will be covered by the Activity Based Funding (ABF) system and other areas that will remain block funded (ie non-ABF) during the initial phase of implementation of the new funding model. As such, the ABF category represents inpatient and day case cost.

Table 1 – Gross and Net Expenditure by Hospital Split into ABF and Block/Non ABF Spending

	2008	2009	2010	2011	2012	2013	2014	% Change
	€,000	€,000	€,000	€,000	€,000	€,000	€,000	
ABF cost	3,383,215	3,418,252	3,167,063	3,069,791	3,105,586	3,152,151	3,253,483	-3.83%
Block/Non ABF cost	1,427,102	1,467,008	1,396,628	1,406,280	1,398,294	1,378,512	1,410,245	-1.18%
Gross expenditure	4,810,317	4,885,260	4,563,691	4,476,070	4,503,880	4,530,663	4,663,728	-3.05%
Non-Exchequer Income	- 614,272	- 707,223	- 687,934	- 768,872	- 807,779	- 778,018	- 849,395	38.28%
Net Expenditure	4,196,045	4,178,037	3,875,757	3,707,198	3,696,101	3,752,645	3,814,332	-9.10%

Source: Healthcare Pricing Office, HSE

Note: This expenditure relates to the 38 hospitals participating in the ABF system.

¹ The Hospital In-Patient Inquiry System (HIPE) is the principal source of national data on discharges from acute hospitals in Ireland.

Table 2 – Non-Exchequer and Exchequer Income as a Percentage of Gross Expenditure

	2008	2009	2010	2011	2012	2013	2014
Non-Exchequer Income % of Gross	12.8%	14.5%	15.1%	17.2%	17.9%	17.2%	18.2%
Exchequer Income - % of Gross	87.2%	85.5%	84.9%	82.8%	82.1%	82.8%	81.8%

Source: Healthcare Pricing Office, HSE

Note: This expenditure relates to the 38 hospitals participating in the ABF system.

Key Messages on Hospital Expenditure and Sources of Funding

- The data shows a 3.05% reduction in gross expenditure across both ABF and non-ABF headings between 2008 and 2014. As such, in 2014, hospital expenditure had not recovered to pre-crisis levels.
- However, an examination of the balance between Exchequer and non-Exchequer income as sources of funding shows a trend towards increasing levels of non-Exchequer income. This is clear from Table 2 which shows that non-Exchequer income as a percentage of gross expenditure increase from 12.8% in 2008 to 18.2% in 2014.
- Net expenditure was down approximately 9.1% between 2008 and 2014. This was due to a decrease in the level of Exchequer funding as well as the aforementioned increase in non-Exchequer income.

3. Increase in Inpatient Activity

The tables and charts below outline total inpatient discharge activity, by age, for the years 2008 and 2014.

Table 3 – Total Inpatient Discharge Activity 2008 – 2014, By Age Group

	2008	2009	2010	2011	2012	2013	2014	Change 2008-2014	Change
Age Category	N	N	N	N	N	N	N	N	%
1. 0-4	54,966	54,439	53,133	55,646	58,057	54,166	54,178	- 788	-1.4%
2. 5-14	29,128	28,599	28,521	29,889	31,125	30,539	31,181	2,053	7.0%
Sub Total 0-14	84,094	83,038	81,654	85,535	89,182	84,705	85,359	1,265	1.5%
3. 15-44	241,991	240,001	235,233	235,017	241,995	235,727	236,370	- 5,621	-2.3%
4. 45-54	49,331	49,173	49,294	49,122	53,550	54,943	54,766	5,435	11.0%
5. 55-64	61,305	61,008	60,499	60,888	64,580	66,048	67,008	5,703	9.3%
Sub Total 15-64	352,627	350,182	345,026	345,027	360,125	356,718	358,144	5,517	1.6%
6. 65-74	66,725	66,278	66,859	68,504	73,686	78,363	79,769	13,044	19.5%
7. 75-84	66,701	66,903	65,611	67,833	72,354	74,971	76,024	9,323	14.0%
8. 85+	27,414	28,420	29,606	30,889	33,789	36,027	36,165	8,751	31.9%
Sub Total 65+	160,840	161,601	162,076	167,226	179,829	189,361	191,958	31,118	19.3%
Total	597,561	594,821	588,756	597,788	629,136	630,784	635,461	37,900	6.3%
Year on Year Change		-0.5%	-1.0%	1.5%	5.2%	0.3%	0.7%		
Cumulative Change		-0.5%	-1.5%	0.0%	5.3%	5.6%	6.3%		

Source: Healthcare Pricing Office, HSE

Notes:

This data relates to all hospitals that report on their activity using the HIPE database

No estimations have been made for data that is not on hospital Patient Administration Systems (PAS).

Medical Assessment Unit (MAU) activity was recorded since late 2012 as requested by the Acute Medicine Programme.

Chart 1 – Breakdown of Increase in Inpatient Discharges 2008 – 2014, by Age Cohort

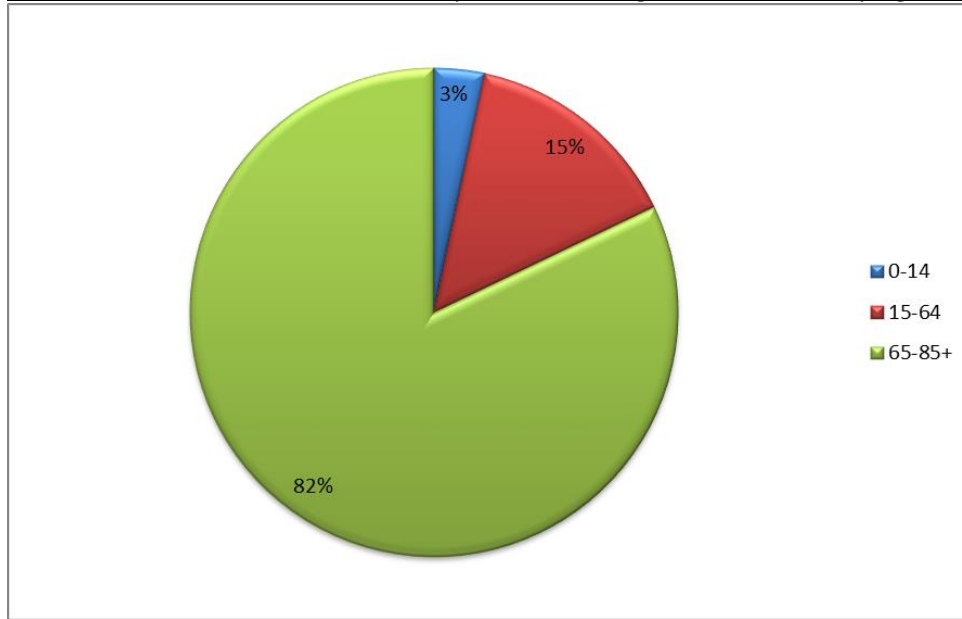
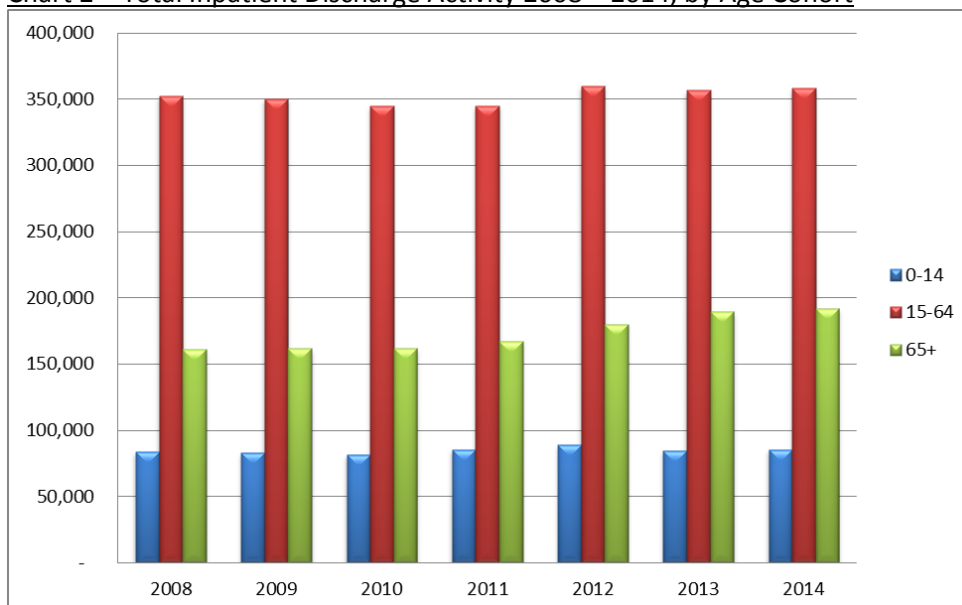


Table 4 – Age cohorts as a % of Total Inpatient Discharges 2008 - 2014

	2008	2009	2010	2011	2012	2013	2014
0-14	14%	14%	14%	14%	14%	13%	13%
15-64	59%	59%	59%	58%	57%	57%	56%
65+	27%	27%	28%	28%	29%	30%	30%
Total	100%	100%	100%	100%	100%	100%	100%

Chart 2 – Total Inpatient Discharge Activity 2008 – 2014, by Age Cohort



Key messages on inpatient activity:

- The number of inpatient discharges has increased by 37,900 (6.3%) during the period in question.
- An analysis of the increase in activity by age shows that the vast majority (31,100 or 82%) of the increase was among the 65+ age cohort. The other age cohorts saw much lower increases in

activity with the 0-14 cohort increasing by 1,300 discharges (3% of the overall increase) and the 15-64 cohort increasing by 5,500 discharges (15% of the overall increase).

- The high level of the increase associated with the 65+ cohort has led to a change in the breakdown of total inpatient discharges when considered by age group. As a proportion of overall inpatient discharges, the 0-14 category decreased from 14% to 13%; the 15-64 category has decreased from 59% to 56%; and the 65+ category has increased from 27% to 30%.

4. Increase in Day Case Activity

The tables and charts below outline total day case discharge activity, by age, for the years 2008 and 2014.

Table 5 – Total Day Case Discharge Activity 2008 – 2014, By Age Group

	2008	2009	2010	2011	2012	2013	2014	Change 2008-2014	Change
Age Category	N	N	N	N	N	N	N	N	%
1. 0-4	20,778	21,724	22,365	23,167	21,167	21,496	20,691	- 87	-0.4%
2. 5-14	22,608	22,656	24,546	27,282	27,071	26,164	26,830	4,222	18.7%
Sub Total 0-14	43,386	44,380	46,911	50,449	48,238	47,660	47,521	4,135	9.5%
3. 15-44	188,093	196,220	204,120	211,497	219,753	226,924	230,368	42,275	22.5%
4. 45-54	121,281	121,846	127,171	134,376	139,926	140,458	144,107	22,826	18.8%
5. 55-64	157,658	164,196	169,119	173,516	176,916	175,955	177,292	19,634	12.5%
Sub Total 15-64	467,032	482,262	500,410	519,389	536,595	543,337	551,767	84,735	18.1%
6. 65-74	147,366	161,505	172,728	176,120	184,162	193,057	200,901	53,535	36.3%
7. 75-84	94,649	105,951	115,248	119,491	122,981	124,507	130,824	36,175	38.2%
8. 85+	18,656	22,393	23,242	25,548	27,772	29,071	30,321	11,665	62.5%
Sub Total 65+	260,671	289,849	311,218	321,159	334,915	346,635	362,046	101,375	38.9%
Total	771,089	816,491	858,539	890,997	919,748	937,632	961,334	190,245	24.7%
Year on Year Change		5.9%	5.1%	3.8%	3.2%	1.9%	2.5%		
Cumulative Change		5.9%	11.3%	15.6%	19.3%	21.6%	24.7%		

Source: Healthcare Pricing Office, HSE

Notes:

This data relates to all hospitals that report on their activity using the HIPE database

No estimations have been made for data that is not on PAS.

Medical Assessment Unit activity was recorded since late 2012 as requested by the Acute Medicine Programme.

Chart 3 – Breakdown of Increase in Day Case Discharges 2008 – 2014, by Age Cohort

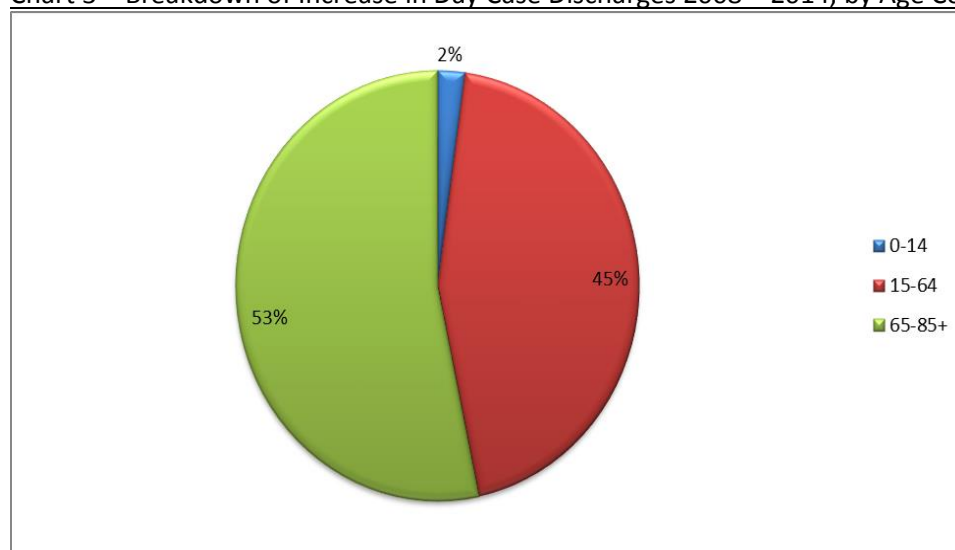
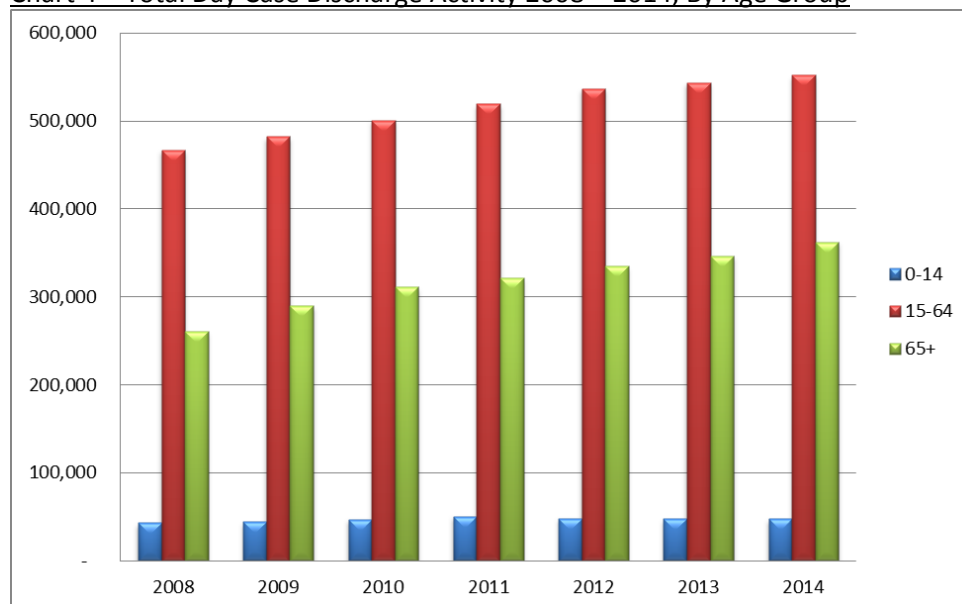


Table 6 – Age cohorts as a % of Total Day Case Discharges 2008 – 2014

	2008	2009	2010	2011	2012	2013	2014
0-14	6%	5%	5%	6%	5%	5%	5%
15-64	61%	59%	58%	58%	58%	58%	57%
65+	34%	35%	36%	36%	36%	37%	38%
Total	100%	100%	100%	100%	100%	100%	100%

Chart 4 – Total Day Case Discharge Activity 2008 – 2014, By Age Group



Key messages on day case activity:

- The number of day case discharges has increased by 190,200 (24.7%) between 2008 and 2014. This represents a significant increase in output during a time of financial constraint.
- The large increase in day case activity when compared with the increase in inpatient activity is evidence of the acute system managing increased demand by delivering care in lower cost settings.
- Of this increase, over half (101,400 or 53%) were in the 65+ age cohort. The 15-64 cohort also made up a significant part of the increase with an additional 84,700 discharges (45% of the overall increase). The 0-14 cohort saw the smallest increase with 4,100 additional discharges (2% of the overall increase) during the period in question.
- As a proportion of overall day case discharges, the 0-14 category decreased slightly from 6% to 5%; the 15-64 category decreased from 61% to 57%; and the 65+ category increased from 34% to 38%.

5. Increase in Complexity

While an analysis of discharges (as outlined in Sections 3 and 4) provides an indication of hospital activity at a high level, it does not take into account the complexity of the activity. Complexity of cases is a crucial factor when measuring hospital activity because, for instance, one complex case such as a heart transplant requires far more hospital resources than less complex cases such as an appendectomy. Table 7 below therefore provide a fuller picture of the complexity of hospital activity over recent years.

The tables outline by age, for the years 2009, 2012 and 2014, the Casemix Index (CMI) and the percentage change in CMI. CMI is a measure of the average complexity of cases and is calculated by dividing the number of weighted units of activity by the number of cases. The analysis applies the

latest relative values for complexity to all years in order to examine fluctuations in the complexity of cases. By applying the same relative values to each year, it allows for time series, year on year comparisons.

2009, as opposed to 2008 data is used for this analysis because an update in the classification system was implemented between 2008 and 2009 as follows:

- In 2008, the classification systems in use were the ICD 10 AM 4th edition for the diagnosis and ACHI 4th for the procedures and the Australian DRG V5.1 grouper for the DRG.
- In 2009, the system moved to the ICD 10 AM 6th edition for the diagnosis and ACHI 6th for procedures and the Australian DRG V6 grouper for the DRG. The 6th edition has been used since.

Implementation of the 6th Edition required changes such as additions/deletions and changes to the grouping methodology applied to allocate DRGs. This means that comparisons with 2008 would not be accurate.

Table 7 – Complexity Profile of Acute Public Hospitals, 2009 – 2014, By Age Group

Inpatient Activity					Day Case Activity				
	2009	2012	2014	% Chg in		2009	2012	2014	% Chg
Age	CMI	CMI	CMI	CMI	Age	CMI	CMI	CMI	in CMI
1. 0-4	0.98	0.92	0.96	-2.0%	1. 0-4	1.25	1.25	1.26	0.8%
2. 5-14	0.73	0.7	0.69	-5.5%	2. 5-14	1.33	1.34	1.37	3.0%
3. 15-44	0.7	0.67	0.68	-2.9%	3. 15-44	0.98	1.03	1.03	5.1%
4. 45-54	1.17	1.19	1.2	2.6%	4. 45-54	0.94	1.01	1.03	9.6%
5. 55-64	1.38	1.43	1.41	2.2%	5. 55-64	0.9	0.98	1	11.1%
6. 65-74	1.51	1.55	1.55	2.6%	6. 65-74	0.88	0.95	0.98	11.4%
7. 75-84	1.63	1.63	1.62	-0.6%	7. 75-84	0.87	0.96	0.97	11.5%
8. 85+	1.67	1.63	1.69	1.2%	8. 85+	0.88	0.95	0.98	11.4%
All	1.08	1.07	1.10	1.6%	All	0.94	1.00	1.02	8.5%

Source: Healthcare Pricing Office, HSE

Notes:

CMI- Complexity/Casemix Index.

The latest relative values were applied to all years to get a consistent analysis of complexity change in the system.

Medical Assessment Units (MAU) came into operation at the end of 2012; to have a consistent baseline for comparison across years the Inpatients quoted are therefore Inpatients excluding MAU patients that were admitted and discharged from the same MAU.

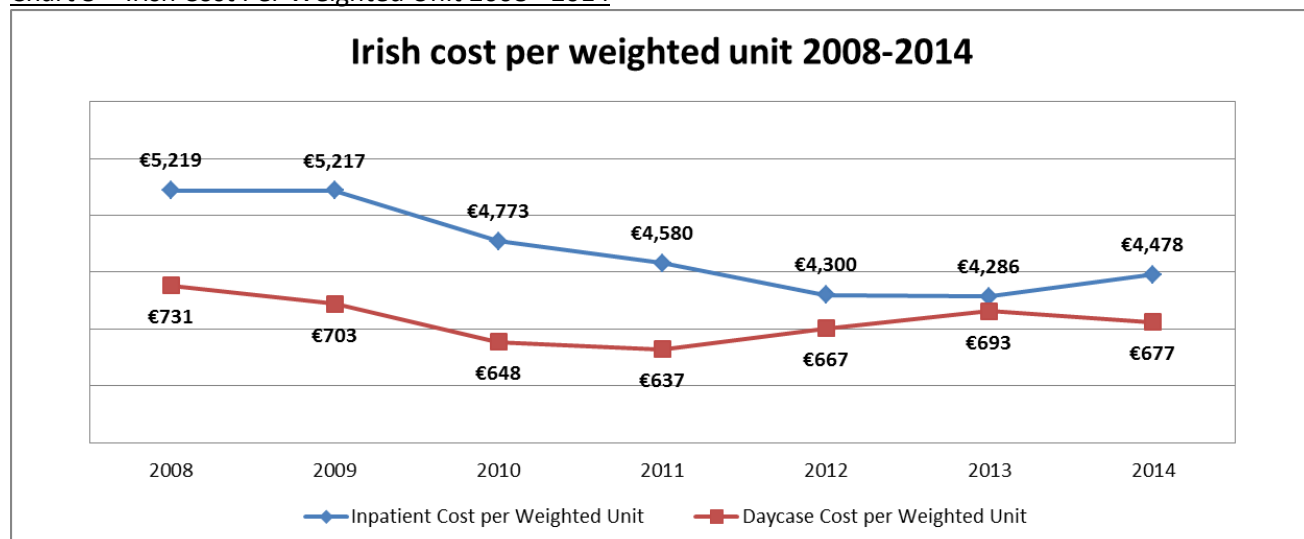
Key messages on complexity:

- Inpatients: As evident from Table 7, inpatient cases relating to older patients are generally more complex than younger cohorts (see CMI inpatient activity column – scores ranging from 1.55 to 1.69 for over 65s are significantly higher and therefore more complex than scores for younger cohorts). This is a particularly important point given the previously established increase in the volume of inpatient activity associated with the older age groups (see Table 3).
- Day Cases: The complexity of day cases in acute hospitals has increased considerably between 2009 and 2014 (+8.5%). This increase in complexity has happened at the same time as a considerable increase in the volume of day case activity. While additional day case complexity means greater demands on hospital resources, it is a welcome efficiency improvement trend reflecting the progress made in moving a wider range of more complex care from inpatient to day case settings.

6. Improvements in Efficiency

Comparing weighted unit cost over a number of years is a useful approach to measuring hospital system efficiency and identifying trends in relation to value for money. Weighted unit cost is derived by dividing the cost of providing inpatient/day case care by the number of weighted units of inpatient/day case care. The chart below shows the cost of a unit of care in Irish hospitals between 2008 and 2014.

Chart 5 – Irish Cost Per Weighted Unit 2008 - 2014



Source: Healthcare Pricing Office, HSE

As evident from the chart, the cost per weighted unit of care between 2008 and 2014 fell by 14.2% for inpatient activity and 7.4% for day case activity. The previously noted increase in the volume and complexity of inpatient and day case activity, combined with a prolonged period of budgetary restraint has led to these significant reductions in unit costs. While the cost reductions were partly due to central pay policy, there were also important improvements in a range of other productivity/efficiency metrics, as outlined below.

(i) Reductions in Staff Numbers

Staff costs represent a sizeable element of the running costs of public hospitals. In addition to the aforementioned pay reductions, WTE numbers also reduced significantly between 2008 and 2014 as outlined in Table 8 below.

Table 8 – Number of Whole Time Equivalents working in Acute Hospitals

Year	2008	2009	2010	2011	2012	2013	2014	Change 2008 - 2014	%Change 2008 - 2014
Total WTEs	53,150	50,402	49,119	48,258	47,350	47,638	49,631	-3,519	-7%

Source: Healthcare Pricing Office, HSE and National HR Unit, Department of Health

(ii) Reductions in Average Length of Stay

The average length of stay is a recognised indicator of hospital productivity. All other things being equal, a shorter stay will reduce the cost per discharge and shift care from inpatient to other less expensive settings.

Table 9 – Average Length of Stay in Acute Hospitals 2008 – 2014

	2008	2009	2010	2011	2012	2013	2014
Average Length of Stay in Days	6.03	5.96	5.9	5.72	5.43	5.42	5.43

Source: Information Unit, Department of Health

(iii) Improvement in Day of Surgery Admissions

A day of surgery admission (DOSA) refers to an elective, inpatient, surgical patient who is admitted on the day of their surgical procedure with all necessary work-up having been carried out prior to admission. Higher rates of DOSA help to improve resource utilisation and efficiency through improved through-put, reduced patient length of stay and lower surgical bed requirements².

Table 10 – Number and Percentage of Inpatients Admitted on their Day of Surgery 2008 and 2014

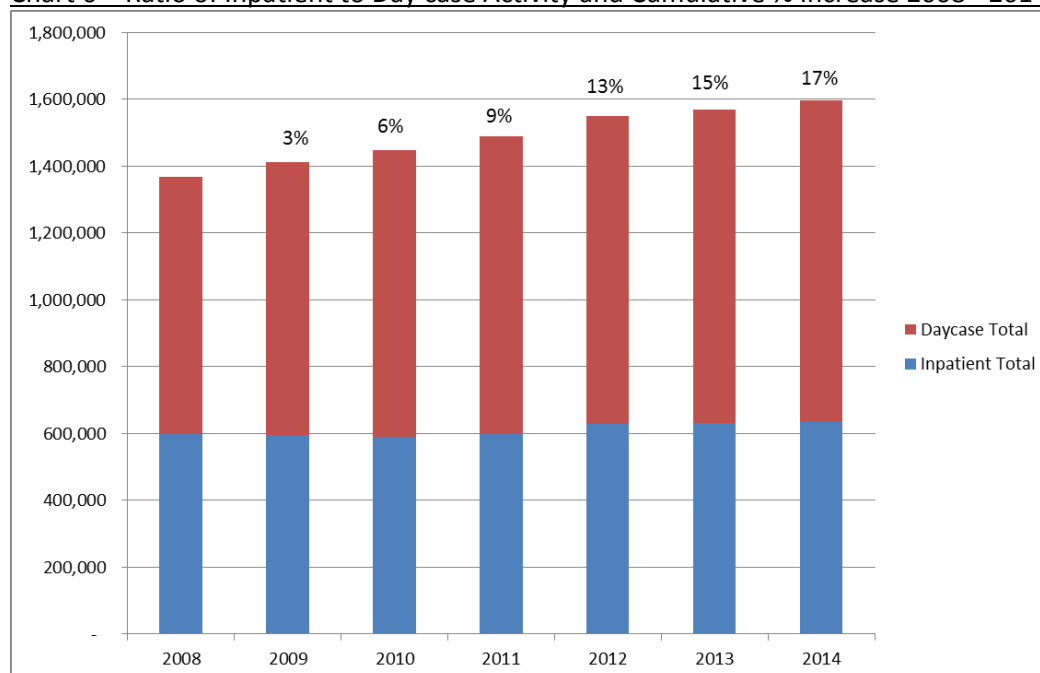
	2008	2014
Surgical In-patients with surgery same day (Number)	68,945	76,447
Surgical In-patients with surgery same day (Percentage)	48.07	57.00

Source: Information Unit, Department of Health

(iv) Shift in Activity to Day Setting

Performing procedures on a day surgery basis, where clinically appropriate, has a number of potential advantages over inpatient treatment including reduced cost of treatment and lower wait times for patients. As evident from Chart 6 below, while overall discharge activity increased by 17% between 2008 and 2014, this growth mainly occurred on the day case side, with inpatient activity increasing at a much lower rate. Chart 6 shows how the ratio of inpatient to day case activity changed during the period in question as well as the overall percentage increase.

Chart 6 – Ratio of Inpatient to Day case Activity and Cumulative % Increase 2008 - 2014



Source: Healthcare Pricing Office, HSE

While the shift to day case represents a more efficient use of resources overall, it is important to recognise the impact that this has on the inpatient and day case weighted unit costs. The activity that was previously considered inpatient but is now carried out on a day case basis tends to be the less complex inpatient work. However, this work tends to be more complex than the previous day case activity. By shifting this less complex inpatient work to a day case setting, the overall level of complexity of both inpatient and day case work increases. This then has the knock-on effect of

² RCSI, Irish College of Anaesthetists & HSE (2013) Model of Care for Elective Surgery

placing upward pressure on the unit cost of both inpatient and day case activity. This impact makes the reductions in weighted unit costs delivered in recent years even more impressive.

Key messages on efficiency

- The cost per weighted unit of care provides a reliable indicator of hospital efficiency over time.
- The cost per weighted unit of care between 2008 and 2014 fell by 14.2% (€741) for inpatient activity and 7.4% (€54) for day case activity. These are strong indicators that the Exchequer is getting better value for hospital spending.
- The reductions have been delivered as a result of reductions in input costs, increases in productivity and an increased level of outputs. Example of such input cost savings and efficiency measures include:
 - Lower staff costs due to wage reductions and lower WTE numbers;
 - Reductions in Average Length of Stay;
 - Improved proportion of patients that are admitted on the day of surgery;
 - Improved ratio of day case to inpatient activity.

System Financing and Value Unit, May, 2016