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Factors responsible for differences in average length of stay in US hospitals

Dr Rodney P Jones (ACMA, CGMA)
Statistical Advisor
Healthcare Analysis & Forecasting
UK
hcaf_rod@yahoo.co.uk

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Key Points

- 75% of US hospitals have fewer than 200 beds
- Half have fewer than 100 beds
- The smallest hospitals occur in the States with the lowest average income
- Small US hospitals tend to have the lowest length of stay
- This is not a measure of efficiency but of commercial pressure to achieve a profit within a health care system which cannot gain the benefits of economy of scale for its acute providers
- After adjusting for income and size, US hospitals have a LOS equivalent to that in the UK

Abstract

In the pursuit of lower health care costs measures of efficiency such as length of stay (LOS) come under increased scrutiny. There is a general perception that the operation of a free market in the USA leads to higher efficiency. However, lower average LOS in US hospitals is shown to decrease in proportion to the number of beds per hospital. This is partly due to the role of hospital size and the truncating effect of Medicare DRG payments on costs and hence upon average LOS. The USA should not be used as a so-called efficiency benchmark for LOS and on a like-for-like basis seems to have an average LOS which is comparable to that in England.

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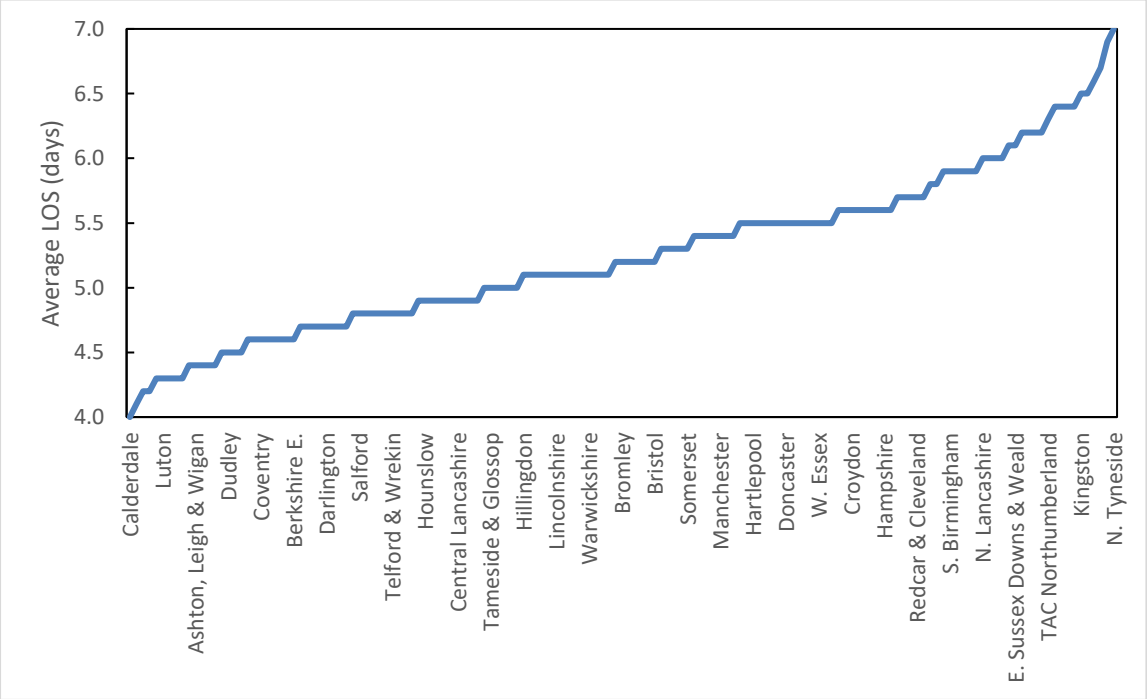
Introduction

The length of stay (LOS) in acute hospitals is the outcome of a complex system of hospital-specific and location-specific factors (Westert et al 1993, Rae et al 2007, Foer et al 2012, Goodwin et al 2012, Singh et al 2012). Non-medical factors (mainly nursing home availability) can account for 30% of long-stay days (Foer et al 2012). The ability to discharge a patient is a key factor in overall LOS (Rae et al 2007 , Connolly et al 2009) and discharge destination is commonly recognised as a major determinant of LOS (Kulinskaya et al 2005). The availability of supporting infrastructure such as hospice care, step-down community facilities, nursing homes, GPs per weighted head of population and social care funding will all play a role in delivering lower acute LOS.

The pursuit of lower health care costs is an ongoing endeavour and international comparisons are often made against systems with perceived higher efficiency. Due to the lower average LOS in acute hospitals in the USA there is a perception that there are lessons to be learned from this health care system (Ham et al 2003). However America is a very different healthcare environment to the UK and these differences need to be appreciated before we all jump to the conclusion that LOS efficiency is genuinely higher somewhere else.

Figure 1: Average length of stay for English Primary Care Trusts



Footnote: Data covers acute, mental health and maternity in 2011/12 and is from http://www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=213

Length of Stay in the UK

Figure 1 shows the distribution of average LOS for English Primary Care Trusts (PCTs) in 2011/12 and can be seen to range from 4.0 to 7.0 days. A PCT is similar to a Primary Car Organisation (PCO) in the US or a Primary Health Organisation (PHO) in New Zealand. This average includes acute, mental

health and maternity and is the average for the range of hospitals providing services to each PCT. These are raw figures and have not been adjusted for age, gender, case mix or deprivation. The temptation is to declare that Calderdale or Kirklees are more efficient health care systems while Isle of Wight and North Tyneside exhibit 'poor' efficiency and that 19.5 million bed days could be saved if everyone were to exhibit the 'efficiency' exemplified in Calderdale.

On this occasion the author is aware that counting issues, especially to do with the definition of a day case and an emergency admission make a huge contribution the apparent high LOS at the Isle of Wight (Jones 2007, 2009b). Bed utilisation and LOS are not automatically linked and Torbay, which has the lowest number of bed days per death in England (Jones 2011c), does not have the lowest LOS but at 4.5 days is in the lower quartile while the average for England is 5.3 days. How do we understand these figures in the light of the USA.

Population Density

The US is perceived as a big country with a big population yet only has 9 cities with a population greater than one million. Some 79% of the US population lives in urban areas (38% in Vermont to 94% in California) and the average population density in cities with >100,000 population is 4,138 per square mile (http://www.census.gov/compendia/statab/cats/population.html) but these large cities only account for 27% of the population. In comparison, a slightly higher 81% of the population of England lives in urban areas but some 68% of the English population lives in areas with a population density higher than the average for large US cities (http://data.gov.uk/dataset/population_density).

Table 1: Twenty largest US hospitals

Hospital	State	Beds
1. Presbyterian Hospital/Weill Cornell Medical Center	New York	2272
2. Florida Hospital (Orlando)	Florida	2001
3. University of Pittsburgh Medical Center	Pennsylvania	1601
4. Indiana University Health Methodist Hospital (Indianapolis)	Indiana	1510
5. Baptist Medical Center (San Antonio)	Texas	1443
6. Montefiore Medical Center-Moses Division Hospital	New York	1427
7. Orlando Regional Medical Center	Florida	1401
8. Methodist University Hospital (Memphis)	Tennessee	1237
9. The Cleveland Clinic	Ohio	1270
10. Barnes-Jewish Hospital (St. Louis)	Missouri	1258
11. Buffalo (N.Y.) General Hospital	New York	1241
12. Norton Hospital (Louisville)	Kentucky	1238
13. The Mount Sinai Medical Center (New York)	New York	1223
14. Christiana Hospital (Newark)	Delaware	1075
15. Beaumont Hospital-Royal Oak (Michigan)	Michigan	1061
16. North Shore University Hospital (Manhasset, N.Y.)	New York	1029
17. Jewish Hospital (Louisville)	Kentucky	1012
18. Albert Einstein Medical Center (Philadelphia)	Philadelphia	1012
19. Beth Israel Medical Center-Petrie Division (New York)	New York	988
20. Spectrum Health Butterworth Hospital (Grand Rapids)	Michigan	978

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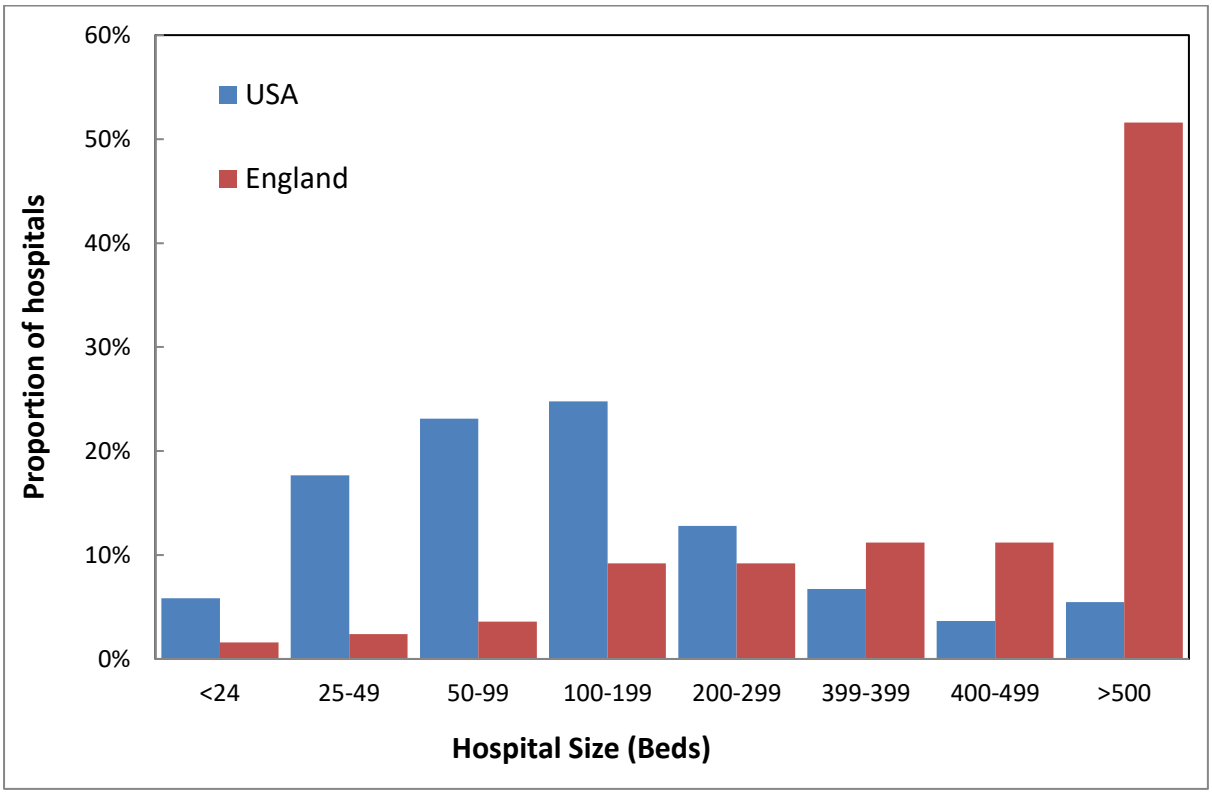
Data is from http://www.beckershospitalreview.com/lists/50-largest-non-profit-hospitals-in-america.html. Some hospitals may have more than one site.

The higher dispersion of the US population coupled with competition between hospitals implies that health care is largely delivered via very small hospitals (See Figure 2 and Table 1). The US only has around 320 hospitals with greater than 500 beds or roughly one large hospital for every town/city with a population above 100,000 (27% of the entire population).

Figure 2: Relative hospital size USA and England



Footnote: Data for England includes all bed categories and hospital types (http://www.dh.gov.uk/en/Publicationsandstatistics/Statistics/Performancedataandstatistics/Beds/DH_083781) as does that for the USA (Dudden et al 2006)

In reality the bulk of large hospitals are to be found in the relatively wealthy north east corner of the US (Jones 2011b). The average size of acute hospitals in US states is 188 ± 48 beds (range 74 to 292) while in one study the average size for hospitals attended by those with private insurance was 286 ± 193 beds (Ho 2006). As can be seen from Table 1 size of the 20th largest hospital is only 978 beds while the 50th largest only has 820 beds. Note also the predominance of large hospitals in New York City and State (six out of the top 20), a fact which probably leads most visitors to conclude that all US hospitals must therefore be large. However as per Figure 2 the majority of US residents receive acute care from relatively small (the English equivalent to a community) hospitals.

Wealth & Healthcare

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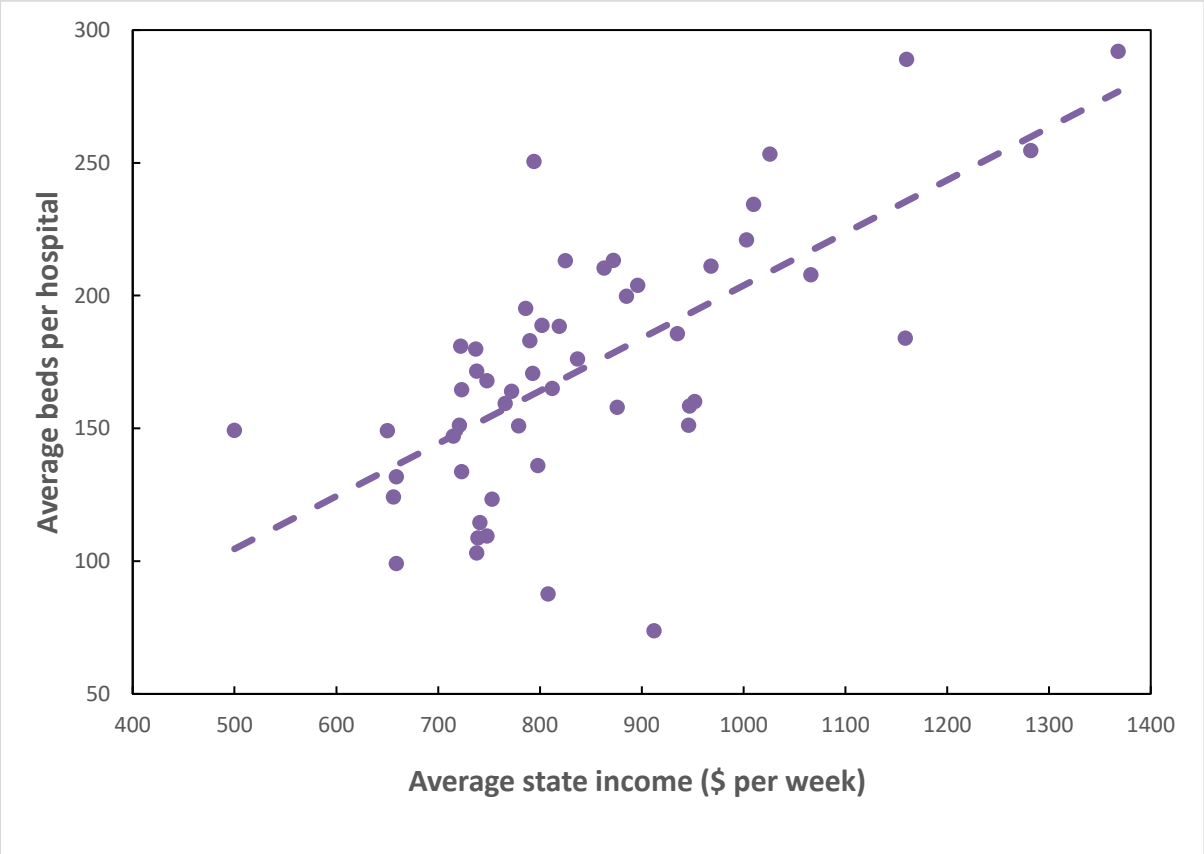
Some 20% of people in the USA are uninsured (accounting for only 5% of admissions) and therefore may have minimal access to basic acute care due to prohibitive costs. Medical debt contributes to nearly 50% of personal bankruptcy (Wier et al 2010). Government programmes (Medicare, Medicaid, Veterans, Indians, Children, etc) cover around 28% of the population and account for nearly 60% of total health care expenditure and occupied bed days. In 2000 it was estimated that nearly 45,000 excess deaths occurred each year due to the lack of universal health coverage (Wilper et al 2009) and the US has the second highest death rate for children (age 1 to 19) among OECD countries.

Figure 3: Hospital size and average state income



Footnote: Average beds per hospital has been calculated from http://www.ahd.com/state_statistics.html

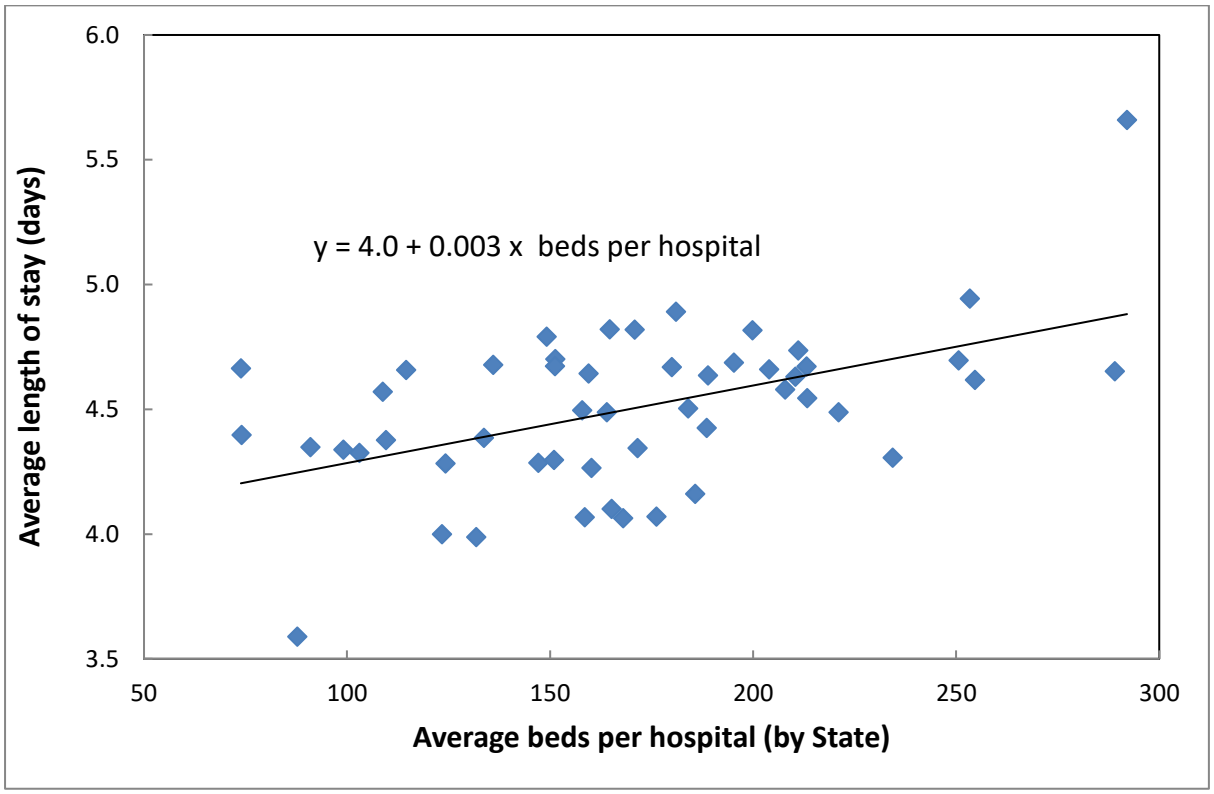
The distribution of primary care in the US follows money and the 17,000 residents of Clark County, Mississippi do not have a single primary care doctor while in Manhattan there is one doctor for every 500 people (see http://www.washingtonpost.com/blogs/ezra-klein/post/where-america-needs-doctors-in-one-map/2012/04/06/gIQApOyizS_blog.html). To compound a bad situation the states with lowest population density usually have the lowest average income and, hence, income and average hospital size are linked (Figure 3).

Length of Stay

Lower length of stay in smaller US acute hospitals is not a new observation and is largely due to the fact that Medicare/Medicaid admissions are reimbursed using the DRG tariff which implies that the

length of stay is effectively truncated for many such admissions (Kominski & Witsberger 1993) and this will disproportionately affect those states with the lowest income (see Figure 3). Not surprisingly re-admission rates in the USA are high especially for Medicare patients (Epstein et al 2011). In the above context the lowest average LOS of 3.6 days which occurs in Wyoming is due to low average wages, very low population density and below average hospital size.

Figure 4: Length of stay and state average hospital size



Footnote: Average beds per hospital and length of stay has been calculated from http://www.ahd.com/state_statistics.html

Using Figure 4 a reasonable extrapolation of a UK equivalent LOS for the US would be somewhere around 5.5 days which is not far removed from the 5.3 or 5.5 day average for England in 2011/12 and 2010/11 respectively (data fromhttp://www.ic.nhs.uk/searchcatalogue?q=title%3A%22Hospital+Episode+Statistics%2C+Admitted+patient+care+-+England%22&area=&size=10&sort=Relevance). Indeed, New York state which is the closest approximation to England in terms of hospital size and population density has an average LOS of 5.7 days. It would therefore appear that there is no difference in average LOS once a like-for-like comparison is made. One study concluded that greater use of nursing/community facilities in the US probably accounted for over 50% of the apparent shorter LOS (Jarman et al 2004) which in theory further increases the residual LOS in the US. In addition, the USA a far higher proportion of deaths occur at home and hence only 45% of deaths occur in hospital (http://www.cdc.gov/nchs/data/dvs/Mortfinal2005_worktable_309.pdf) while in England 55% occur

in hospital (http://www.endoflifecare-intelligence.org.uk/profiles/2/Place_of_Death/atlas.html) and this difference alone is likely to add around 5 bed days per death to the difference between the two countries (Jones 2011a).

Economy of Scale

Due to their small average size (Figure 2) US hospitals suffer from unavoidable low average occupancy, poor economy of scale and hence higher unit costs (Jones 2011b, 2013). Like the HRG tariff in the UK the Medicare DRG tariff in the USA does not take hospital size into account (Jones 2009a, 2013) hence a vicious cycle of lower LOS and high re-admission therefore ensues as small hospitals attempt to make a commercial profit.

Commercial Factors

Comparisons are often made with Kaiser Permanente in California (Ham et al 2003) which at an average of 208 beds per hospital and 4.6 days average LOS lies exactly on the trend line in Figure 4, i.e. it is an average state for LOS. For comparison Kaiser hospital's in California have an average of 262 beds per hospital which is slightly larger than the state average. There have been claims that in the past Kaiser was very good at selecting its Medicare enrolees, i.e. favourable risk selection or 'cherry picking', and the average result for California as a whole may suggest that commercial interests add a further dimension into attempts to compare like-with-like even within the US.

Indeed in the early 1990's pressure from health insurers to reduce the costs of maternity care led to the absurd case of an average post-partum LOS close to 1.0 day. This led to an explosion in newborn emergency department attendances, admissions, deaths and re-admission for complications in mother's and led to the introduction of the 'Newborn's and Mother's Health Protection Act' (Madden et al 2002, Datar & Sood 2006, Paul et al 2006). The authors own studies indicate that a similar situation now exists in England, although the cause is due to capacity constraints rather than cost reduction per se. The lowest LOS is not necessarily the most desirable benchmark.

Bed days

Reducing acute LOS ad infinitum is probably a distraction. The author's analysis of English hospital reference costs indicates that there is a tenuous link between LOS and cost and this view is shared by others (Advisory Board International 2009). The real issue is around capacity and in this respect the lower level of admissions in the US (Ham et al 2003) is probably more to the point. Indeed the 20% lower level of bed days per death in Torbay (Jones 2011a) is best understood in the context of admission avoidance rather than LOS reduction, per se. Hence from an acute perspective LOS reduction is required to meet future capacity requirements but from the perspective of the newly formed Clinical Commissioning Groups (CCGs) the focus of cost reduction is around admission avoidance.

Conclusions

Apparently lower average LOS in the USA partly arises from a health care system operating out of small hospitals. Such small hospitals cannot provide genuine multi-consultant acute care and suffer from higher costs due to a lack of economy of scale. Length of stay is therefore truncated and re-admission often follows.

While genuine LOS savings can be found in any health care system the UK needs to do so out of a belief that good patient care is paramount and that we are capable of creating our own benchmarks for efficiency – which need to be sensitive to the relative availability of bed equivalents (hospice beds, nursing home places, hospital at home and social care funding). This is not to say that there are shining examples of efficiency in the USA, as indeed there are in every health care system around the world, however, country specific context can shed light on the issues surrounding perceived 'efficiency'.

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