

Deaths and acute hospital beds in the Sustainability and Transformation Plans

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Key Points

- End-of-life constitutes the period of highest acute bed occupancy
- A count of deaths (all-cause mortality) therefore is a good proxy for bed demand
- The ratio of occupied beds per death in England has been declining by around 0.3% per annum
- However up to +7% excursions from the trend-line are possible
- Deaths are due to increase for the next 20 years as the WW II baby boomers begin to die
- Bed demand will therefore start to increase rather than decrease
- Plans to reduce bed numbers in the Sustainability and Transformation Plans (STPs) are seriously flawed

A series of articles and papers in BJHCM over the past six years has highlighted the role played by deaths, or more correctly end-of-life, in the demand for adult acute beds. Unexpected changes in deaths (total deaths as opposed to age standardized mortality) has been demonstrated to be linked with unexpected changes in staff sickness absence, admission for medical conditions (sometimes with a surgical resolution), the gender ratio at birth, and hospital standardized mortality (HSMR) (Jones 2015a-d, 2016). Put simply, the majority of a person's lifetime acute bed occupancy occurs in the last year of life (Payne et al 2007, Clarke et al 2015, Stenholm et al 2015, Beeknoo and Jones 2016b), hence, deaths rather than demography are the principle driving force for bed numbers.

A 25-year career in forecasting healthcare demand resoundingly indicates that demography is an abysmally poor method for forecasting bed demand. The Department of Health and other government agencies promoted demographic forecasting simply because it gave a totally misleading picture of declining bed demand (Beeknoo and Jones 2016b). Seasonal trends in bed occupancy add another layer of complexity (Beeknoo and Jones 2016a).

Figure 1 shows the annual average occupied adult acute beds per 1,000 adult deaths in England. Total occupied beds (elective and emergency) have been adjusted for day case (assumed 4 hours stay in a bed) and assessment unit activity (assumed 8 hours in a bed). The underlying trend downward is only -0.56 (or -0.3%) fewer occupied beds per death per year – a figure massively below the assumed NHS efficiency target. This reduction is due to increasing day surgery rates, reduction in overnight length of stay and emergency admissions treated in medical assessment units, however, there is little evidence to suggest that despite hundreds of worthy schemes

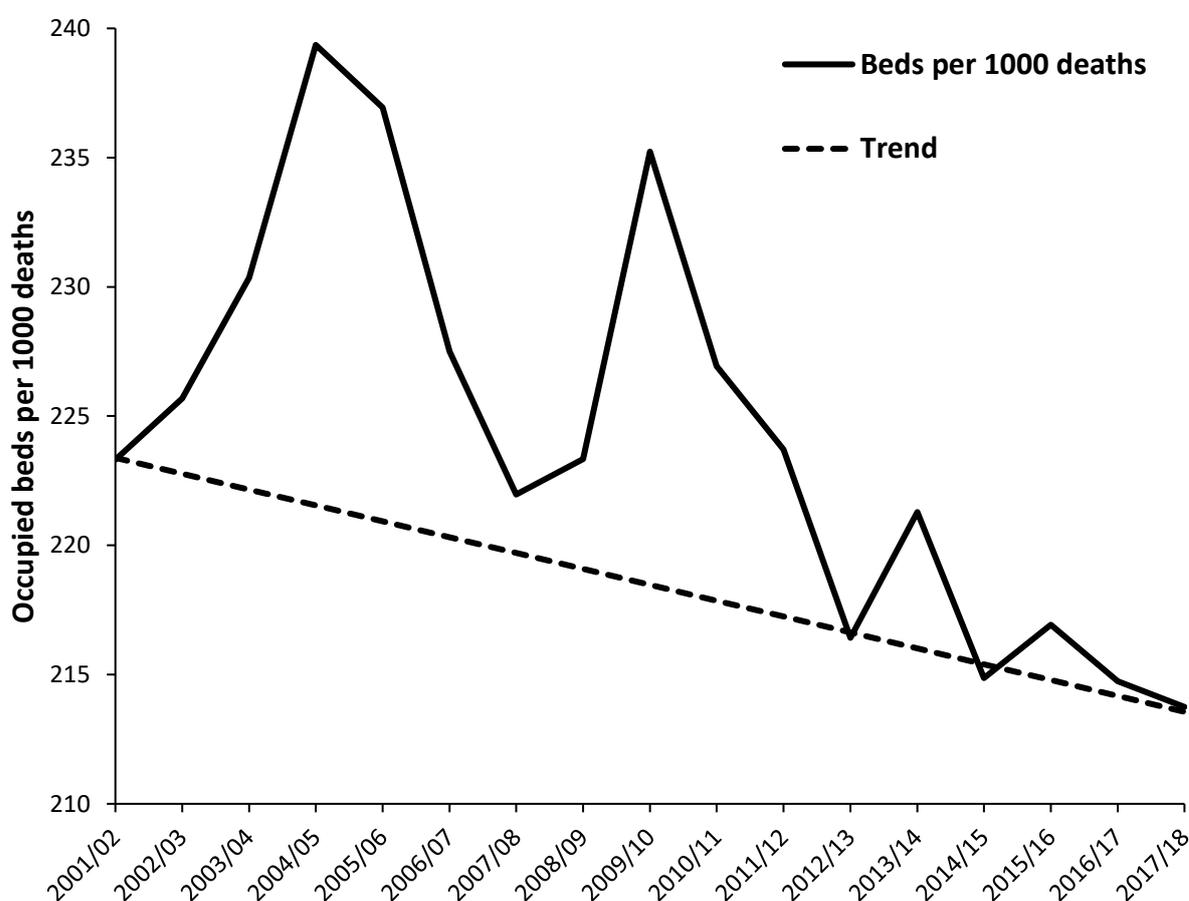
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PCTs/CCGs have made any real impact on the long-term trend, i.e. whatever primary care is doing it is merely scratching the surface or not addressing the core issues. Recall that available and occupied beds are two totally different entities.

The very large +7% excursions from the trend line centred around 2004/05 and 2009/10 are concerning, however, they do eventually abate (Jones 2015d), although they are part of the inherent uncertainty in bed demand (Jones 2011, 2012). The nature and costs associated with the large excursions have been previously investigated (Jones 2012), and that which has happened in the past can presumably happen again in the future.

From Figure 1 the obvious conclusion is that bed numbers should be reducing. However, this assumes that the number of deaths per year stays constant, which is not the case.

Figure 1: Trend in occupied adult acute beds in England per 1,000 adult deaths



Footnote: 2017/18 is an estimate. Data on occupied beds is from Hospital Episode Statistics (HES)

(<http://content.digital.nhs.uk/article/2021/Website-Search?q=title%3A%22Hospital+Episode+Statistics%2C+Admitted+patient+care+-+England%22+or+title%3A%22Hospital+Admitted+Patient+Care+Activity%22&go=Go&area=both>)

while adult deaths per financial year are from the ONS

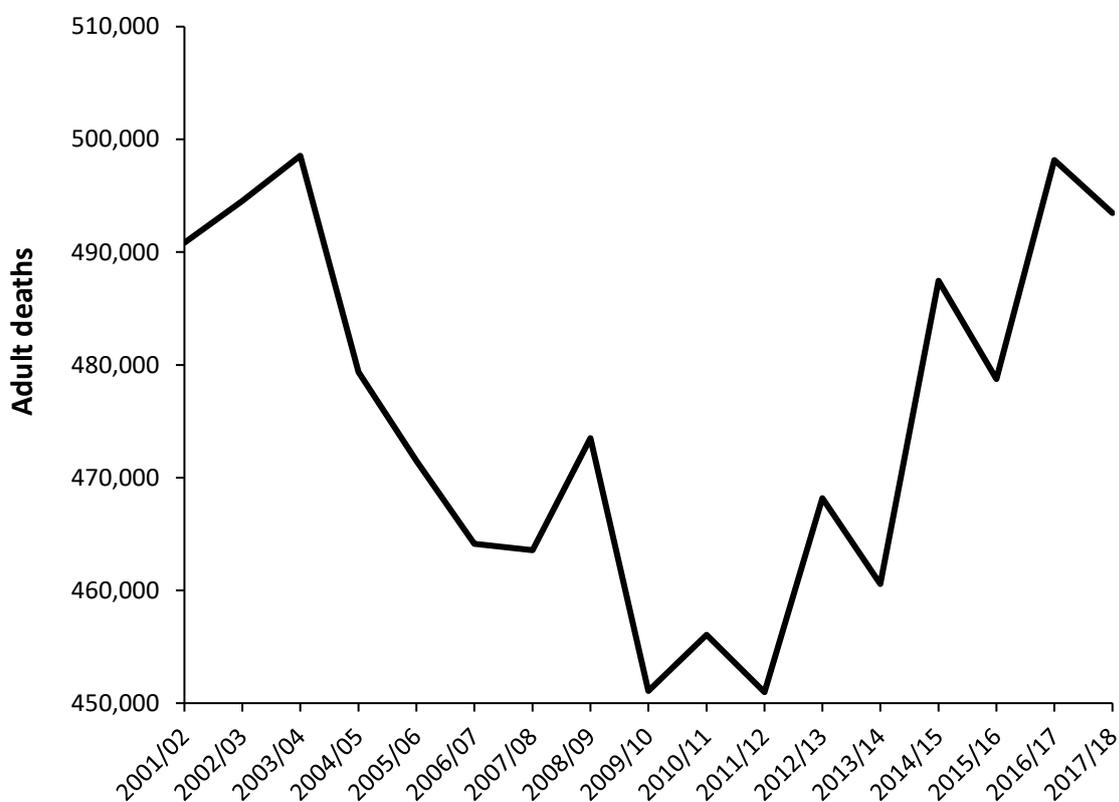
(<https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/deathregistrationssummarytablesenglandandwalesdeathsbyingleyearofagetables> and <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/monthlyfiguresondeathsregisteredbyareaofusualresidence>)

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Figure 2 therefore explores the number of adult deaths in England over the same period. As can be seen total deaths declined to a minimum between 2009/10 and 2011/12, but has since shot upward. In other words, total bed demand in the NHS (total deaths x occupied beds per death) reduced over the period 2001/02 to 2009/10 largely due to falling total deaths, however, since 2011/12 pressure on occupied beds is due to rising deaths. Due to the impact of the World War II baby boom deaths are projected to keep increasing for the next 20 years or more!

Note the saw-tooth patterns in Figure 2 which seemingly arise from fundamental behaviour of deaths (over many years) which defies any current explanation (Jones 2017). Clearly the NHS has a largely unacknowledged problem. The Department of Health and NHS England are quite happy to accuse the NHS of failure to manage demand, simply because it suits government policy. Also, the STP plans to reduce acute bed numbers almost certainly have monumental flaws based on totally inappropriate bed modelling (Edwards 2017).

Figure 2: Adult deaths in England in financial years, 2001/02 to 2017/18



Footnote: Data from ONS as in Fig. 1.

While it may be true that around 75% of persons who die would benefit from a more palliative type of care toward the end-of-life (Steventon et al 2012), it is still unclear if the cost of providing the bed equivalents in the community are cost reducing, or indeed if there is the nursing and other care capacity to do this in the short term. The simple fact that deaths are expected to go on increasing for the next 20 years suggests that there is a fundamental and intractable problem which requires genuine solutions.

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Provenance: Dr Rodney Jones has over 25-years' experience in health care demand forecasting and capacity planning. He has published over 200 papers in this area including bed planning, limitations of the HRG tariff, and the financial risk in health care commissioning.