An edited version of this paper has been published as: Jones R. Trends in critical care bed numbers in England. ***British Journal of Healthcare Management*** 2018; 24(10): 516-517. Please use this to cite.

Trends in critical care bed numbers in England

Rodney P Jones, PhD (ACMA, CGMA)
Statistical Advisor
Healthcare Analysis & Forecasting
hcaf_rod@yahoo.co.uk
NHS staff can access this article via an Athens login at www.bjhcm.co.uk
Part of a wider series of studies available at http://www.hcaf.biz/2010/Publications_Full.pdf

The last year of life represents a period of intense use of acute services in which 55% of lifetime bed usage can occur (Hanlon et al 1998, Busse et al 2002, Aaltonen et al 2017, Flojstrup et al 2017). This will include the use of critical care beds. The absolute number of deaths therefore represents a good proxy for acute demand, however, this factor is completely absent from all current demand models which rely on the entirely fallacious assumption that demand is driven by age alone (Busse et al 2002, Beeknoo and Jones 2016, Jones 2018d).

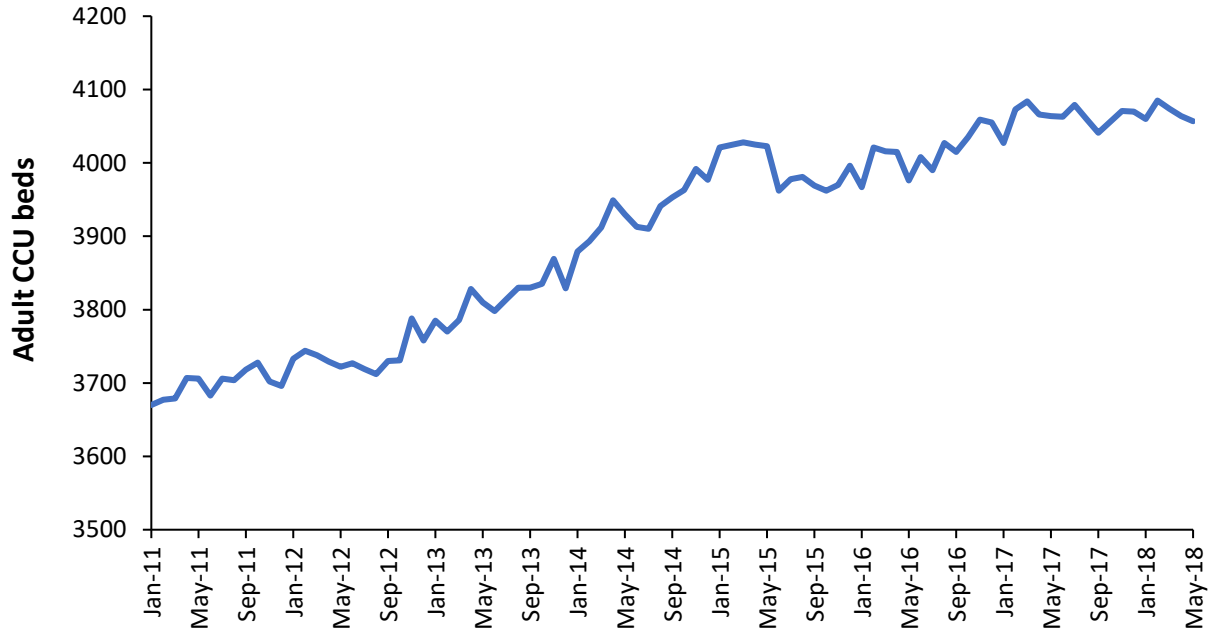
In England and Wales, the total number of deaths reached a maximum of 598,516 in 1976, and in response to rising life expectancy showed a decline over the next 35 years, reaching a minimum of 484,367 in 2011 (Office for National Statistics 2017). After 2011 deaths have shown a rapid and unexplained increase (Jones 2017a-d, 2018a-d). This presents the opportunity to see how rising deaths since 2011 have influenced the number of adult critical care beds.

Figure 1 shows the trend in available adult critical care beds in England from a census taken of the last Thursday of each month. A rapid rise can be discerned from late 2012. Deaths start to rise in early 2012 (Jones 2017a, 2018c), however, there is an understandable lag between rising deaths and the availability of new critical care beds.

Figure 2 therefore investigates if there is a direct relationship between rising deaths and the number of adult CCU beds. Figure 2 is the moving (rolling) 12-month average of available/occupied beds divided by the moving (rolling) 12-month total of deaths in England. This is required to smooth the more volatile monthly data which is influenced by seasonal demand and the summer holidays. Figure 2 shows that the ratio of available beds per 1000 deaths has remained remarkably constant over an 8-year period and varies from a minimum of 7.83 available beds per 1000 deaths for the 12-months ending at April 2013 (7.89 for the 12-month ending April 2018) up to a maximum of 8.51 available beds per 1000 deaths for the 12-month period ending May 2014. This maximum corresponds to the period of sharply rising total beds seen in Figure 1.

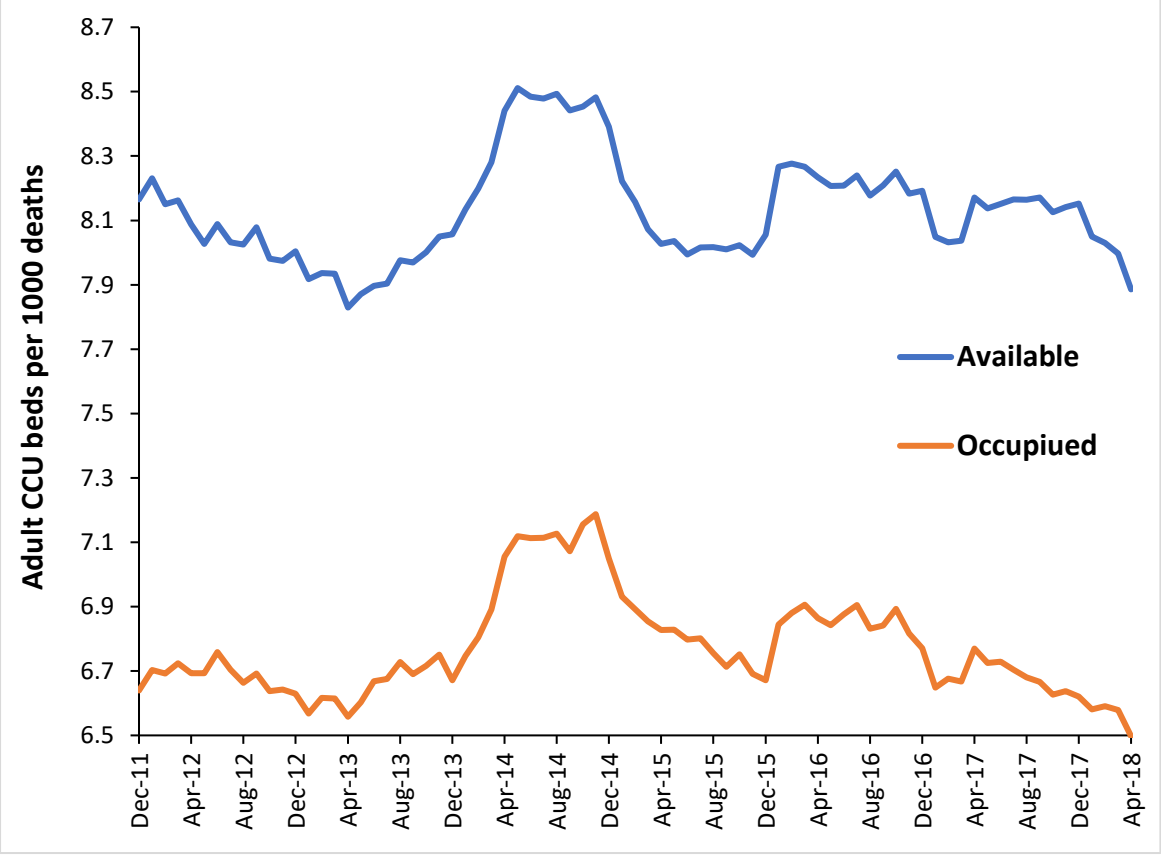
An edited version of this paper has been published as: Jones R. Trends in critical care bed numbers in England. ***British Journal of Healthcare Management*** 2018; 24(10): 516-517. Please use this to cite.

Figure 1: Trend in number of available adult critical care beds in England



Footnote: Number of available CCU beds is from NHS England (2018).

Figure 2: Trend in number of available and occupied adult critical care beds per 1,000 deaths in England



Footnote: Deaths in England is from the Office for National Statistics (2018)

An edited version of this paper has been published as: Jones R. Trends in critical care bed numbers in England. ***British Journal of Healthcare Management*** 2018; 24(10): 516-517. Please use this to cite.

Note that occupied CCU beds roughly track the trend for available beds, although the minimum of 6.5 occupied beds per 1000 deaths occurs for the 12-months ending April 2018, indicating a period of below average CCU bed demand per death. The average over the 8-year period is 8.1/6.8 for available/occupied beds per 1000 deaths, which represents a suitable benchmark to estimate future CCU bed numbers. Persons born during the World War II baby boom are about to start dying in increasing numbers and this coupled with high inward immigration over past years leads the Office for National Statistics to forecast that the number of deaths per year will continue to rise for the next 25 years (Office for National Statistics 2018). By 2041 the ONS estimate a 25% increase in deaths across England, however, this varies greatly by location with a 4% to 8% ***reduction*** in the number of deaths in Blackpool and the Isles of Scilly respectively, through to a 57% increase in Milton Keynes, Uttlesford (Essex) and East Northamptonshire (Office for National Statistics 2018).

Hence, in 2041 in England it is estimated that there will be around 4,680 available adult CCU beds (12-month average) of which around 3,810 will be the 12-month average number occupied. As pointed out above, this will vary greatly between hospitals depending on the surrounding population, such that the Milton Keynes hospital CCU likely to be around 60% larger than current capacity. It is hoped that hospitals like Milton Keynes, who are experiencing the highest growth in population deaths, are making suitable and detailed plans for a very busy future. It is also hoped that detailed plans to train the required number of CCU staff are also well under way.

References

Aaltonen M, Forma L, Pulkki J, et al. Changes in older people's care profiles during the last 2 years of life, 1996-1998 and 2011-2013: a retrospective nationwide study in Finland. BMJ Open 2017; &: e015130.
Beeknoo N, Jones R. The demography myth - how demographic forecasting underestimates hospital admissions and creates the illusion that fewer hospital beds or community-based bed equivalents will be required in the future. Brit J Med Medical Res 2016; 19(2): 1-27. doi: 10.9734/BJMMR/2017/29984
Busse R, Krauth C, Schwartz F. Use of acute hospital beds does not increase as the population ages: results from a seven-year cohort study in Germany. J Epidemiol Community Health 2002; 56: 289-293.
Flojstrup M, Henriksen D, Braband M. An acute admission greatly increases one-year mortality – Getting sick and ending up in hospital is bad for you: A multicentre retrospective cohort study. Eur J Internal Med 2017; 25: 5-7.
Hanlon P, Walsh D, Whyte B, et al. Hospital use by an ageing cohort: an investigation into the association between biological, behavioural and social risk markers and subsequent hospital utilization. J Public Health Med 1998; 20(4): 467-476.
Jones R. What government data on death rates fail to show. BJHCM 2017a; 23(8): 572-573.
Jones R. Did austerity cause the rise in deaths seen in England and Wales in 2015? BJHCM 2017b; 23(9): 418-424.
Jones R. The link between seasonal death rates and workloads. BJHCM 2017c; 23(9): 448-450.
Jones R. Volatility in emergency admissions per death. BJHCM 2017d; 23(11): 554-556.
Jones R. Do outbreaks of 'Disease X' regulate NHS beds and costs? BJHCM 2018a; 24(4): 204-205.
Jones R. Clinical workload trends. BJHCM 2018b; 24(6): 308-309.
Jones R. Deaths in the UK show another large increase in 2018. BJHCM 2018c; 24(8): in press.
Jones R. Admissions for certain conditions show explosive growth in England following a sudden and unexpected increase in deaths. Eur J Internal Med 2018d; In press. doi: https://doi.org/10.1016/j.ejim.2018.03.005
NHS England. Critical care bed capacity. 2018. https://www.england.nhs.uk/statistics/statistical-work-areas/critical-care-capacity/critical-care-bed-capacity-and-urgent-operations-cancelled-2018-19-data/

An edited version of this paper has been published as: Jones R. Trends in critical care bed numbers in England. ***British Journal of Healthcare Management*** 2018; 24(10): 516-517. Please use this to cite.

Office for National Statistics. Deaths by single year of age tables. 2017. https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/deathregistrationssummarytablesenglandandwalesdeathsbysingleyearofagetables
Office for National Statistics. Subnational population projections -deaths. 2018. https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/datasets/deathsz4