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# Volatile costs in GP commissioning: insights from Medicare

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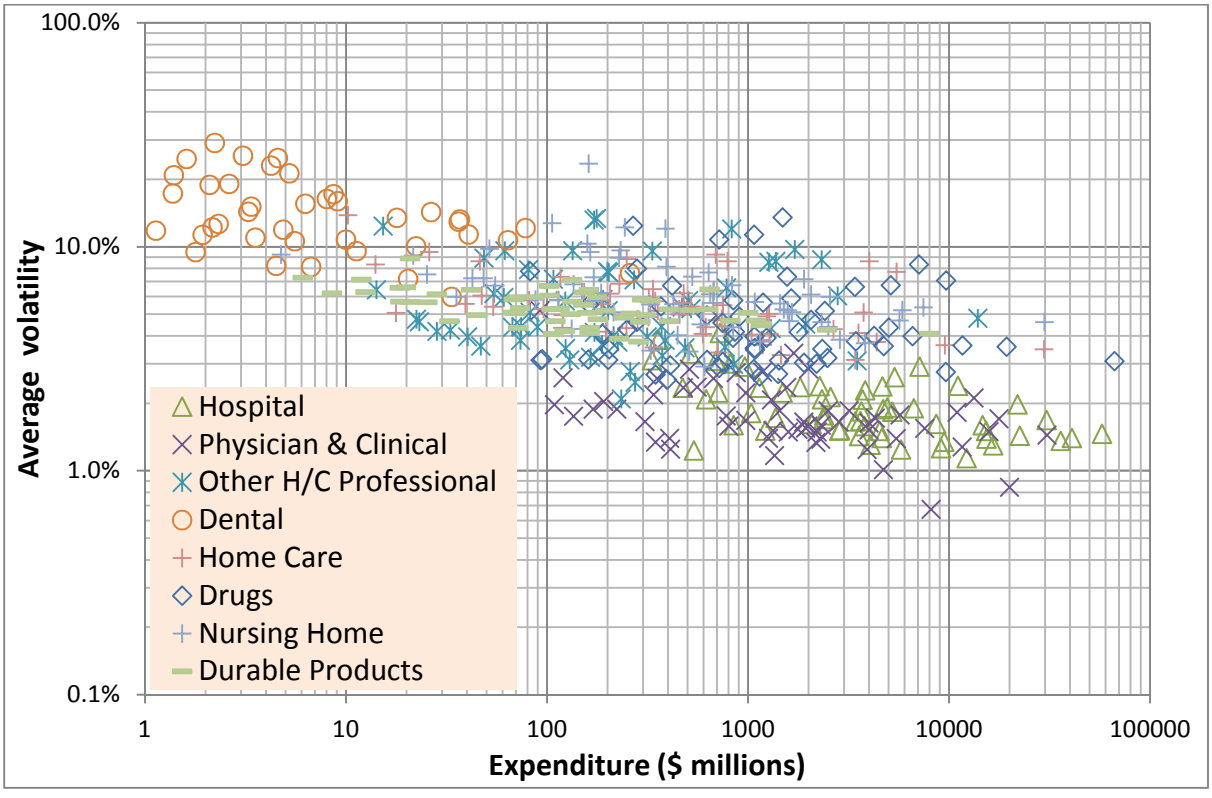
A series of articles in BJHCM have been investigating the 'real world' volatility associated with health care costs (Jones 2010a-b, 2011, 2012a). Volatility has been measured as the percentage difference in expenditure from one year to the next. This has been averaged over many years to gain insights into which aspects of health care are more volatile and hence create problems in the context of a fixed total budget (Jones 2012a-g).

**Figure 1: Average year-to-year volatility in health care costs within the USA**




Footnote: Data is from http://tinyurl.com/2fmrnbm from the 'Health expenditure by state of residence' download. Growth adjusted year-to-year volatility has been calculated as in previous papers. Growth in costs has been estimated as a running three year average and this has been subtracted from the difference between successive years. Volatility is an 18 year average.

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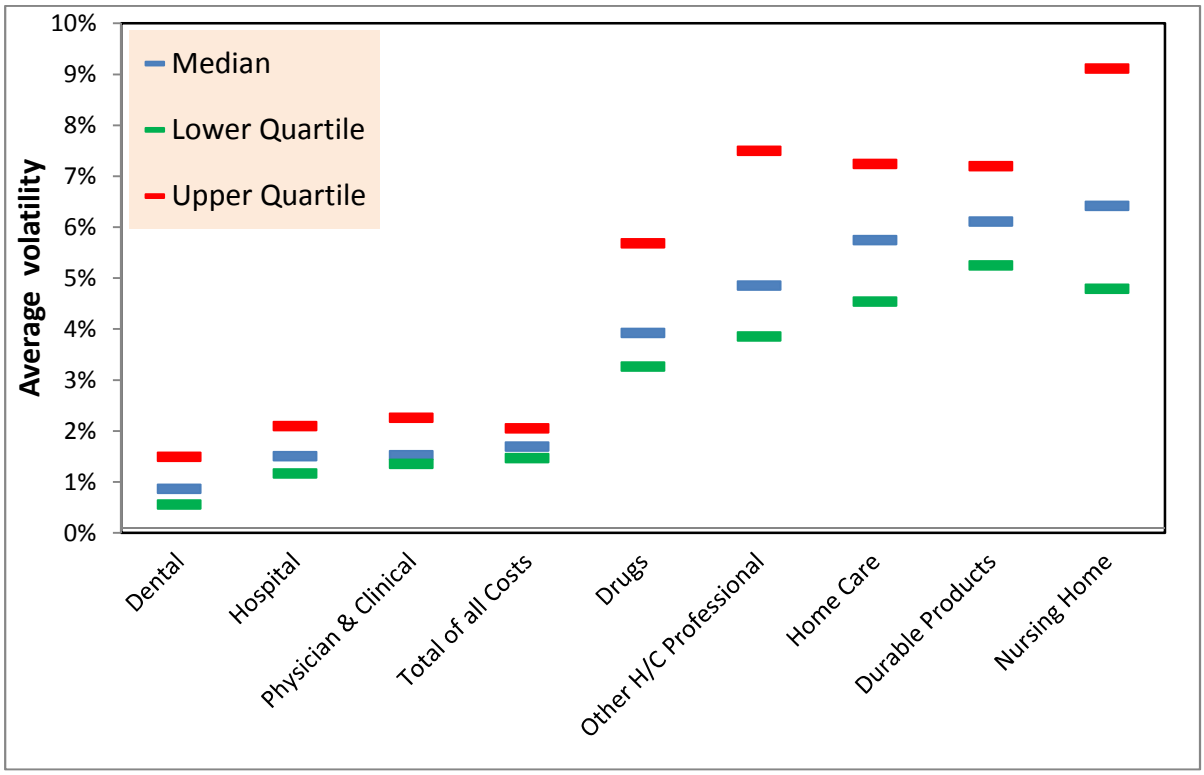
One of the key observations has been that volatility is higher in some locations than others, i.e. it is more difficult to maintain a balanced budget in some locations than others. It is of interest to demonstrate that such observations apply elsewhere in the world. In this respect the USA has been collecting costs related to Medicare expenditure for many years which are aggregated into eight categories. Average volatility for these categories has been calculated over an eighteen year period (1991 to 2009) and the results for the volatility at state and regional level are given in Figure 1. Adjusting the volatility for the USA total to the expenditure size of England gives 1.8% average volatility compared to 2% for England, i.e. given the different cost types and age groups (Medicare covers 65+ age groups) counted in the two countries there is good overall agreement regarding the fundamental level of volatility associated with total expenditure which will arise out of the intrinsic human/environment interface.

Similar results to the previous studies for England are obtained with:

- Volatility reducing with higher expenditure
- A spread in volatility depending on location  for both states or regions
- Higher intrinsic volatility in some health care cost categories than others

The issue of the intrinsically higher volatility experienced in particular aspects of health care is further explored in Figure 2 where volatility has been adjusted for size to give the equivalent volatility at $1,000 million expenditure.

**Figure 2: Intrinsic volatility associated with different types of cost**




Footnote: Volatility in each cost group was adjusted to that which would arise at $1,000 million of cost. Each cost group has its own unique relationship between volatility and size which was modelled using a power law function. The unique power law coefficient was then used to adjust the volatility for each state and region. Adjusted volatility was then ranked and the robust statistical measures of the mode, upper and lower quartiles calculated.

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Figure 2 appears to give the answer to the question posed in the earlier paper relating to end-of-life costs (Jones 2012e), namely, are costs associated with end of life highly volatile. As can be seen all of the highly volatile cost groups in Figure 2 are largely associated with the decline in functional status seen toward the end of life. In the UK some of these costs are shared across health and social care, however, the message is clear and schemes to reduce end of life costs must also achieve the dual aim of reducing cost volatility (which will be largely sensitive to the environment) – something which is never included in NHS financial models.

In terms of the role of location (local environment) in determining volatility at state level the size-adjusted volatility associated with total costs ranges from ± 0.8% in New York to ± 3.4% in Wyoming while at regional level volatility ranges from ± 0.9% in the Mid-East (which includes New York) to ± 1.4% in the Plains (Iowa, Kansas, etc). Given that volatility is an average over nearly 20 years and for aggregate costs which are very large it is inescapable that the range in volatility is largely due to location (or more correctly to fluctuations and interactions between the parameters determining the local environment) *per se* and not statistical randomness. GP commissioners in England need to take note of this fact and insist that larger regional risk pools, which will carry the risk associated with around 15% of costs, are employed to protect the smaller CCGs from unacceptable and sometimes inescapable (due to location) volatility. An insurance policy is not required since all that is required is that the risk pool act as the conduit for risk to be equalised via credits/debits among the larger risk pools and then among the risk pool members, i.e. everyone shares in the far lower risk obtained for the national total.

In conclusion, the concept that certain types of health care costs are more volatile, i.e. more sensitive to the environment (weather, air quality, infectious outbreaks), should be obvious but has not been part of health policy. It should be equally apparent that costs will also be more volatile in some locations than others due to the differential environments so encountered. This likewise has direct policy implications, regarding which GPs need to be collectively vocal least the necessary adjustments to policy and implementation fail to be made a priority.

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