Are bigger nursing homes better?

by Edward Norton

Larger nursing homes appear to have lower mortality than smaller facilities. It is well known that larger homes tend to be lower cost, so we can ask whether economies of scale translate somehow into better quality. Is nursing home size related to quality of care?

It is very hard to figure out the level of nursing home quality. This is one of the fundamental problems of healthcare, not just for nursing homes but also for hospitals and doctors. How do you choose a high-quality nursing home if quality is hard to observe? If it was the case that size of nursing home and quality were related that would be important and helpful for consumer choice.

Another motivation for this research is to do with econometrics – how to disentangle things like size and quality or other characteristics. We cannot run a simple regression and see whether size and quality correlate because we know correlation does not equal causation. So how do we disentangle correlation from causation?

We have what we think is a clever way around this, using a novel instrumental variable. Rather than taking the size of the nursing home a particular patient is discharged to, we control for endogeneity of size by taking the average nursing home size of the previous five Medicare patients discharged from the same hospital.

We want to look at how health outcomes relate to the size of the home. We want to control for patient characteristics, the characteristics of the hospitals they have been discharged from and for the nursing home characteristics, other than nursing home size. But because patients choose nursing homes in part on the basis of quality, the choice of nursing home size is endogenous and we cannot run a simple regression analysis.

We have big datasets, from Medicare, a US government health insurance programme, broadly for people over-65. Our data covered more than 800,000 patients admitted to hospital and then discharged to a nursing home in 2009. Medicare provides short-stay, post-acute care following a hospital admission in a skilled nursing facility (SNF). These offer more rehabilitation and physical therapy than a typical nursing home, so this study does not completely generalise.

Let us look at the factors which influence nursing home choice. Choice depends on price, previous nursing home experience, clinical quality, hotel amenities, ties – formal or informal – to the hospital a patient is being discharged from and location – that is generally proximity to the patient's home and also to the hospital.

Under Medicare, the price is fixed so, for once, we can eliminate this from the equation. We can also easily remove nursing home experience by excluding from our study any patient who has stayed in a nursing home in the previous 12 months. Clinical quality and hotel amenities become unobserved variables.

The hospital-nursing home relationship may matter because hospitals have continuing relationships with nursing homes. Most people want to go to a nursing home near their own home. But what has a big bearing on their choice is the nursing home occupancy rate. The majority of nursing homes are at or near capacity much of the time.

Patients discharged around the same time as our particular patient will have a similar opportunity set over which nursing home they can go to. So, by choosing to use data relating to the previous

five patients discharged from the same hospital, we introduce random variation. By averaging the size of the nursing homes they go to, we have an instrumental variable not directly related to the patient's own health status or preference. It is also highly correlated because of nursing home occupancy rates.

This gets us a prediction which is remarkably well correlated with the next patient and yet avoids endogeneity of health status and preferences. A similar approach has been used before, including by Davies and colleagues (2013) in a study of prescribing patterns.

We took five dependent variables to measure outcomes over the following six months – much more than simple mortality. We counted the days each patient spent in a series of mutually exclusive states, ranging from death, through hospital readmission, being in a nursing home or having home health support to simply being at home which, we know, is the best outcome. Together, total days in each state added up to 180 days for all patients.

To give you a sense of averaged outcomes, the 180-day mortality rate was just over 20%. Average days in death were 25 while a much more satisfactory 67 days were spent at home.

Our starting point was that larger nursing homes correlate with lower mortality. When we use an instrumental variable with our preferred model, that mortality effect disappears. What we find is that people spend a little more time in an SNF and a little less time at home. How much? Less than a day. If you are a patient in a facility with 20 more beds, you will be there, on average, for 17 hours longer. That is a small effect, balanced by less time at home. The mortality effect is gone.

Overall, when we use an instrumental variable we find, after controlling for endogeneity, the size of the facility is unrelated to mortality. But it does have a small positive effect on time spent in a smaller SNF up to about 50 beds.

Further information

This blog follows from an LSEHSC Formal Seminar on *Skilled Nursing Facility Size and Post-Acute Care Quality* on 4 June 2015.

LSEHSC Formal Seminar - Professor Edward Norton

The presentation was based on a working paper by Momotazur Rahman (Brown University), David C Grabowski (Harvard University) and Edward C. Norton.

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