

A propensity score approach to comparing costs between hospital districts

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Abstract

In order to enhance the performance of the health care system there is a need for comparative information suitable for benchmarking purposes. One widely used approach in the performance assessment is the disease-based comparison of episodes of care between providers (hospitals or care districts). The basic idea is to produce performance indicators which are adjusted for confounding factors (differences in population characteristics). Costs are obviously an important performance measure, but the adjustment has turned out to be methodologically challenging.

The data consists of the population of 16881 hip fracture patients aged 65 or older in 1998-2001 and includes information about patient characteristics (age, sex, a set of diseases diagnosed before the fracture) to be adjusted as well as the cumulative costs of treatment at one year after the fracture. Patient characteristics vary between hospital districts, which must be taken into account. It has also effect on the costs if a patient has died during the follow up period and this effect should be adjusted. The size of the data is an advantage but on the other hand presents some computational problems.

To make the results easily interpretable we decided to use the propensity score method in comparing the districts with each other. In this method we first take a subdata which contains the observations from the two districts which we wish to compare. Then the propensity score is estimated using a logistic regression model with the hospital district as the dependent variable and the patients characteristics as explanatory variables.

The data is sorted by the propensity score (which are the predicted values from the logistic model estimated) and the costs are smoothed over the propensity score by using local linear regression with kernel weights. This results in smoothed cost-curves over the scale of the propensity score. These cost-curves can be compared with each other or we can integrate the curves over the propensity score to obtain cost estimates for each district.

It turns out that there are clear differences between the cost-levels of various care districts. Thus the cost variation of hip fracture treatments between care districts can not be explained by patients characteristics only,

but is also attributable to different treatment practices. This is an important finding because the identification of good practices can lead to learning from them, and consequently also to savings in treatment costs.

Keywords

Hip fracture, Health care costs, Kernel smoothing, Propensity score.

References:

Rosenbaum, P.R. and D.B. Rubin (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika* 70, 41–55.