

Use of cross-efficiency method on the example of primary health care biomedical laboratories in Slovenia

Nejc Lamovšek¹

ABSTRACT

Laboratory medicine is one of the most important contributors to/propartakers in proper, effective, and quality patient care. Laboratories are present in the primary, the secondary, and the tertiary levels of health care and therefore form an integral part of each health institution and, consequently, of the public sector. Determining the efficiency of public biomedical laboratories in the primary level of health care can lead to the optimal utilisation of public resources.

Technical efficiency is defined as the most optimal use of the input sources for achieving the highest possible output. One of the main objectives of this paper is determining the technical efficiency of laboratories with the use of the DEA method and then ranging them with the use of the cross-efficiency method.

We use the data envelopment analysis (DEA), because it is one of the basic methods for determining the efficiency of public institutions. Moreover, it is a benchmark method for determining the efficiency in healthcare. It is nonparametric and it is not necessary to define the production function for its use. In our case, with an input-oriented DEA method, we achieve constant outputs with minimal inputs. The analyzed DEA data processing model is based on CCR by predicting a proportional change in both inputs and outputs. We also use the method of cross-efficiency for the objectification of the weights for the chosen inputs and output. The demonstration model for determining the efficiency of laboratories is shown on the example of sixteen primary health care institutions and their laboratories.

The results of the DEA analysis have shown that three (laboratories 2, 5 and 7) of the sixteen analysed laboratories are on the frontier of the highest efficiency. The rest of analysed laboratories have an efficiency score ranging from 26% to 95%. If cross-efficiency is used, laboratory 7 has the highest efficiency score of 99%, while the efficiency of other laboratories now ranges from 23% to 93%. The highest contribution to the calculation of total average efficiency of the group occurs when input 1 equals 100% and input 2 equals 0%, while output 1 and output 2 variables are in the ratio of 70: 30.

POINTS FOR PRACTITIONERS

The research results have shown the usability of the DEA method for evaluating efficiency of public biomedical laboratories in the primary level of health care. Our paper also suggests measures for improving the efficiency of less efficient laboratories, thereby leading to rational use of public funds.

KEYWORDS

DEA, Efficiency, Laboratory, Primary health care, Slovenia

¹ Researcher - Expert associate, University Medical Centre Ljubljana, Ljubljana, Slovenia.