

100: EVALUATING HOSPITAL PERFORMANCE USING DATA ENVELOPE ANALYSIS (DEA)

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Objective:

This paper discusses the use of Data Envelope Analysis for the purpose of measuring efficiency in production and productive changes in the Operative Units (OU) of a University Hospital and a Dermatological Research Hospital in Rome.

Methods:

Hospital discharge abstract data from 1999-01 were used to calculate DRG weight and clinical severity (APR DRG) for each inpatient. Technical efficiency was calculated for 9 dermatological OU of a Dermatological Research Institute and 34 OU of a University Hospital. Hospital beds, costs for health personnel, and other costs (drugs, medical supply) were used as inputs.

Two output measures were separately employed in the analysis: the number of discharges adjusted by resource consumption (DRG weight) and clinical severity (APR-DRG). A comparison between similar OU of the two institutions were performed. Subsequently also the research activities (impact factor of publications per OU) and teaching/training activities (hours of training implemented by each OU) were included as outputs.

Results:

Technical efficiency for dermatological OU in the observed years range between 0.41 and 1 (maximum efficiency) with DRG as output and between 0.29 and 1 with APR DRG as outputs. The two approaches yielded very similar results. The OU which appeared to be most efficient were those attracting most complex cases.

The mean values for technical efficiency in the University Hospital including clinical severity, impact factor and teaching activity as outputs were respectively 0.70 (range 0.38-1) for 1999, 0.62 (range 0.32-1) for 2000 and 0.71 (range 0.29-1) for 2001. Efficient OU changed over time: maximum efficiency was reached by four OU in 1999: cardiology, general surgery, plastic surgery, internal medicine; by one OU in 2000: geriatric medicine; and by two OU in 2001: cardiology, cardiosurgery.

Conclusions:

The advantage of DEA over other techniques is that each input and output can be measured in its natural physical unit without the need to apply a weighting system to collapse the different units in money or other single unit measure. The instrument is useful to identify differences in efficiency over time and between OU.

Input slacks provide for each unit useful information on costs or bed numbers that would be needed to be modified in order to have an efficiency improvement. Our findings support the conclusion that there is some room for efficiency improvement but the main challenge will be to reorganize the inpatient admission policy in the Dermatological Research Hospital to balance the different Dermatological OU. Simply increasing the hospital volume cannot be interpreted as a gain in technical efficiency. Improving appropriateness of care diverting minor dermatological cases towards outpatient care is a mandatory requirement of any health care system and is even more important in a National Health System. The impact of research and teaching activities on the efficiency of each OU are key issues and have to be included in the efficiency evaluation of a University Hospital. The comparison between OU could be partially utilized for internal incentives by the hospital management where efficiency is an outcome.