Is the allocation of medical and health resources effective? Characteristic facts from regional heterogeneity in China

CURRENT STATUS: UNDER REVISION

International Journal for Equity in Health BMC

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DOI:

10.21203/rs.2.21074/v1

SUBJECT AREAS

Health Policy

KEYWORDS

public medical and health efficiency, spatial heterogeneity, three-stage DEA model, stochastic frontier analysis

Abstract

Background: Over the last decade, the expenditure on public medical and health has increased greatly in China, however, problems as low efficiency and unfairness still exist. How to accurately describe the effectiveness of existing medical and health resources in combination with regional heterogeneity is of great significance to China's medical and health reform.

Methods: Based on provincial panel data for the period of 2005 to 2017, this paper constructs a super-efficiency three-stage SBM-DEA model, combining expected output and unexpected output, to measure and analyze the spatial-temporal heterogeneity characteristics and influencing factors of public medical and health efficiency (PMHE).

Results: After the impacts of random error and external environmental factors are removed, the mean value of overall PMHE is 0.9274, failing to reach DEA efficiency, and PMHE shows a fluctuated downward trend. In addition, apart from eastern regions, the mean values of PMHE in central, western and north-eastern are all underestimated. (2) The adjusted PMHE level shows a prominent spatial imbalance at the stage 3. The average efficiency level is ranked by the east > the western > the central > the northeast region. (3) The increases of GDP per capita and population density are beneficial to the improvement of PMHE, while income level and education level are disadvantageous to PMHE, and the urbanization level, an uncertain effect.

Conclusion: This study innovatively incorporates undesired outputs of health care into the efficiency evaluation framework by constructing the main efficiency evaluation indicators. The results of the robust evaluation conclude that China's existing investment in medical and health resources is generally not effective. Therefore, although China's health care reform has achieved certain results, it is still necessary to expand the investment in health care resources.

Full Text

Due to technical limitations, full-text HTML conversion of this manuscript could not be completed. However, the manuscript can be downloaded and accessed as a PDF.

Figures

Figure 1

Comparison and difference of numbers of provinces (cities) with efficient DEA at stage 1 and stage 3

Figure 2

PMHE temporal change trend at stage 3 in 2005-2017 Note: CI is a confidence interval abbreviation.

Figure 3

Comparison of efficiency mean PMHE for four regions from 2005 to 2017 between stage 1
and stage 3

Figure 4

Annual Mean value change of calculation results of different DEA models by Super-SBM, Non-radial CCR model and bootstrap bias, Malmquist model, and this paper used model

Figure 5

Regional Mean value change of calculation results of different DEA models by Super-SBM, Non-radial CCR model, Malmquist model, and this paper used model Note: SBM model by Tone and Tsutsui, Non-radial CCR model by Chung et al., the bootstrap bias by Simar and Wilson, Malmquist model (DDF) by Cheng and Zervopoulos [45-48]. CI is a confidence interval abbreviation.