

## **CO2 mitigation through the efficiency improvements in the medical sector of Japan**

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The number of diagnostic imaging equipment such as computed tomography (CT) and magnetic resonance imaging (MRI) mainly used in hospitals has increased by 29.6% during the period between 2002 and 2017 in Japan and thus the capital demand for medical services has grown rapidly due to the aging society. On the other hand, the per capita capital demand (i.e., number of CT and MRI installed in the hospitals per capita) largely varied among prefectures in Japan. This paper focuses on not only economically inefficient operations of the capital equipment in hospitals but also lifecycle CO2 emissions embodied in the capital demand in the medical services. We use a comprehensive hospital database including the number of CT and MRI introduced, the expected number of medical examinations using the CT and MRI, the number of radiology technologists, and the number of radiologists, and the actual number of their medical examinations and estimated the relative efficiency of 47 prefectures of Japan through the data envelopment analysis (DEA). We find that there existed a considerable potential of reducing CT and MRI equipment in some inefficient prefectures such as Fukui and Kochi. Finally, we conclude that the capital efficiency improvements with a focus on the inefficient hospitals can contribute to mitigating lifecycle CO2 emissions from the medical sector in Japan.