In this issue of the Journal, the study by Matsuzawa et al using big data (JROAD-DPC) has a remarkable implication for the Japanese healthcare system. Their chief findings are: (1) patients with acute myocardial infarction (AMI) who live in areas with lower population density had higher in-hospital mortality than those who live in areas of high-population density, (2) patients who live in less densely populated areas tended to be transported for longer distance and to facilities with lower annual numbers of primary percutaneous coronary intervention (PCI) (low-volume hospitals) and (3) patients transported to hospitals with a larger annual number of PCIs (high-volume hospitals) had more favorable outcomes irrespective of population density and distance to the hospital.

Several studies from other countries have reported poorer population health, more limited accessibility to health care, and lower quality of emergency care in rural areas compared with urban areas. However, such research has been sparse in Japan. Furthermore, the findings from other countries are not likely to be applicable to the Japanese population because of differences in healthcare systems, transportation systems, urbanization levels and cultural background. Therefore, evidence from a well-conducted study in Japan is needed. In this context, Masuda et al recently reported that AMI patients in rural areas were less likely to be transported directly to PCI-capable facilities, resulting in longer time from onset to PCI, compared with those in metropolitan areas. The present study conducted by Matsuzawa et al also suggests higher in-hospital mortality rates among AMI patients who live in areas with lower population density than for those who live in high-

Figure. PDCA cycle for creating an efficient and effective healthcare system.
population density areas. Based on these findings, health disparities between rural and urban areas surely exist in Japan, at least for cardiac emergency medicine.

So, “Where does the rural health disparity in emergency medicine in Japan come from?” Matsuzawa et al speculate that less opportunity for rural residents to be transported to high-volume hospitals could have played an important role in the rural health disparity observed in their study. In fact, consistently low in-hospital mortality rates of AMI patients who were transported to high-volume hospitals with annual PCI numbers >100 were observed irrespective of population density. This finding indicates that a minimum annual number of 100 PCIs might be required to maintain high-quality procedures and patient management. Several other studies from the USA have also suggested that an increase in the number of specific procedures is associated with a decrease in adverse events. Consequently, transportation of patients to high-volume hospitals would be a useful strategy to maintain a high standard of care and good clinical outcomes irrespective of the level of urbanization of patient’s place of residence.

The next question is “How do we locate high-volume care facilities in Japan?” It is often reported that the total number of healthcare providers is scarce in contrast to the total number of hospital beds in Japan. Therefore, a key term in the current healthcare policy of Japan is “choice and concentration”. However, the “choice and concentration” strategy could worsen access to health care. Nobody can provide the optimal solution for such a complicated trade-off between accessibility and “choice and concentration”. The present study suggests that distance to healthcare facilities in Japan, which is closer compared with many other countries in the world, could be negligible. Although we should be careful about interpretation of the present findings, because the JROAD-DPC database used in this study involved relatively large-scale hospitals, the “choice and concentration” strategy might be the current priority in Japan.

Today, “evidence-based policy making” is highlighted. In order to perform “evidence-based policy making”, it is essential to conduct health service research using big data such as national databases or hospital administrative data. However, such healthcare research seems to be still insufficient in Japan because of the complexity of access to data and of its content, and a lack of qualified human resources. Because healthcare resources are limited, definite evidence from well-conducted studies using nationwide big data and continuous improvement using the “PDCA” cycle are required for the establishment of an efficient and effective healthcare system in Japan (Figure). In that regard, the study by Matsuzawa et al is a good model case of health service research in Japan.

Disclosures
The authors have no conflicts of interest to be disclosed.

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