Background and Current Trends in Medical Economics Research in the Circulatory Field

— What to Expect in *Circulation Reports* —

Tomoyuki Takura, PhD

Increasing Concerns With Medical Economics

Medical economics is an area of study encompassing medical science and economics that deals with a wide variety of topics and issues related to the medical and healthcare field. The primary objective of medical economics is to analyze diverse phenomena (e.g., technology, management, policy) occurring in relation to medical systems and clinical practice using methodologies of economics, including econometrics, value evaluation, decision making, and behavioral science, as well as medical statistics, to contribute to the advancement of both medical systems and public health and welfare. As part of efforts to achieve these objectives, medical economics research, from the standpoint of a group of personnel involved in the medical field, particularly focuses on discussing approaches to optimizing cost effectiveness and maximizing the happiness (i.e., quality of life) of patients, their families, and the general public as a whole. Separately, from the standpoint of ensuring social equity, medical economics research is expected to present academic concepts and supporting rationales based on discussions of the rational allocation of medical resources (e.g., public expenditure on universal healthcare).[1]

Medical economics is steadily raising concerns among both the general citizenry and medical personnel engaged in clinical practice, and an increasing number of reports, including clinical studies, are emerging from this area of study. In the background of such a move lies the fact that medical costs are growing at substantially high rates globally, because of sharply increasing rates of morbidity, multiple stratification of diseases, and advancements in medical technology. Innovation in medical technology is costly, and effective implementation of innovations depends on larger budgets and infrastructure of research and development (R&D) systems amid the complicating and diversifying effects of discovery (or component) technologies. This in turn indicates the increasing emphasis placed on economic themes among the main issues in the medical and healthcare field.

One example of this increasing concern in medical economics is the year-by-year increase in the number of articles on medical economics in the circulatory field accessed on PubMed, which is operated by the National Center for Biotechnology Information: compared with only 3 reports published in 1985, this number had grown to 90 by 2016. When the number of medical economics articles in the circulatory field is expressed as a ratio of the total number of the articles in the same field, the annual increase in publication in the 2010–2014 and 2015–2017 periods was 4.7- and 6.4-fold the number in the 1985–1989 period, respectively (**Figure 1**).[2]

There are diverse backgrounds to the increase in medical economics articles. Regarding financial burden, annual national health expenditures showed a 1.3-fold increase in the ratio to gross domestic product (GDP) over the 3-year period from 2015 to 2017 compared with the ratio over the 1985–1989 period in both the OECD and G20 countries (**Figure 1**).[3] A comparison of the ratio of national health expenditures with the number of

Department of Healthcare Economics and Health Policy, Graduate School of Medicine, The University of Tokyo, Tokyo, Japan
Mailing address: Tomoyuki Takura, PhD, MEng, Department of Healthcare Economics and Health Policy, Graduate School of Medicine, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8655, Japan. E-mail: ttakura@m.u-tokyo.ac.jp
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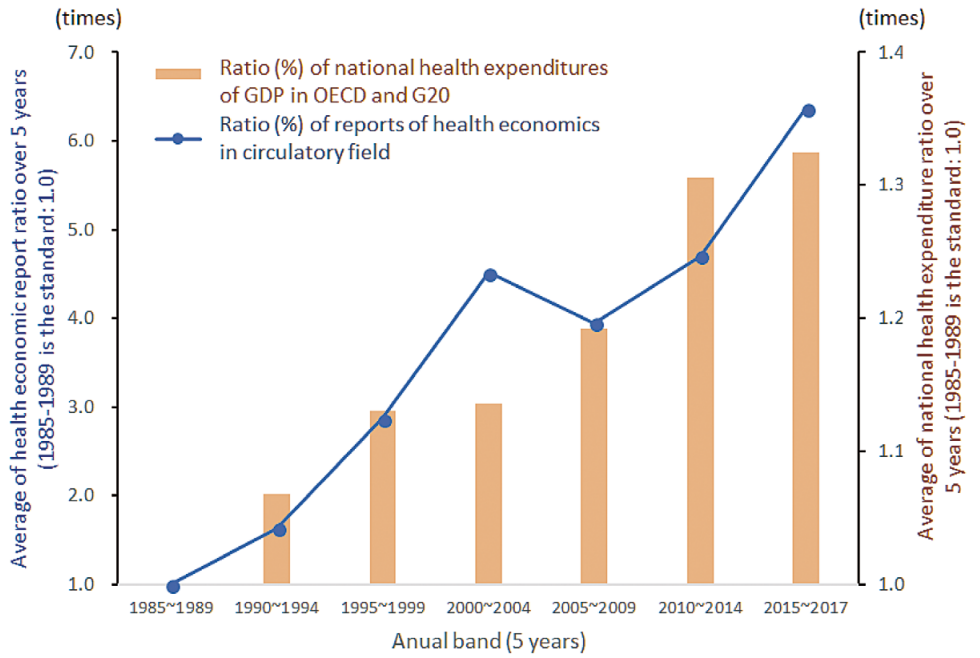

Figure 1. Annual ratio of the number of medical economics articles in the circulatory field to the total number of the articles in the same field and the ratio of the total national health expenditures to gross domestic product (GDP) (OECD and G20 countries: data lacking for some countries in the 1980s). Total national health expenditures were estimated based on "Health Expenditure as a Percent of Gross Domestic Product: OECD statistics from 1985 to 2017". The number of medical economics articles in the circulatory field was estimated based on the database of PubMed (1985–2017). (Search keywords: Circulation AND Health economics [OR: Cost-effectiveness, Medical economics, Economic evaluation, Socioeconomics]).

medical economics articles indicates that the number of articles increased as the ratio of the expenditure increased and vice versa with a slight time lag (Spearman's rank correlation coefficient: r^2=0.964, P<0.01). This trend shows that an increase in financial burden makes medical economics issues apparent, leading to increases in concern about and research into medical economics-related subjects.

Concept of Medical Economics and Recent Subjects of Economic Research

The following is an additional discussion of the concept of medical economics as briefly described above. Medical economics articles in the circulatory field may be roughly classified into macro and micro subjects (**Figure 2**).

Macro subjects include social security-related issues that are concerned with financial resources for medical insurance systems; health policy-related issues covering medical services;[4–6] and, although less frequently studied, medical industry-related issues, including systems for new drug development, systems for medical device supply, and model development of genetic diagnosis.[7,8] Micro subjects include human resources management, which is essential for administration of medical institutions; safety management; and medical economics research, including economic evaluation of team-based care and inter-institutional collaboration.[9] The number of articles is also increasing in the areas of economic evaluation (including cost-effectiveness assessment) of medicines, medical devices, and medical-care information systems.[10] In addition, there are sporadic instances of research in which behavior modifications in patients, their families, and medical personnel are examined from a medical economics viewpoint by taking into account desired forms of decision making and support measures.[11]

In recent years, it has become fairly common for macro subjects to be cross-sectionally discussed with micro subjects, as seen in the education of medical personnel and the health literacy of patients. There are also cases in

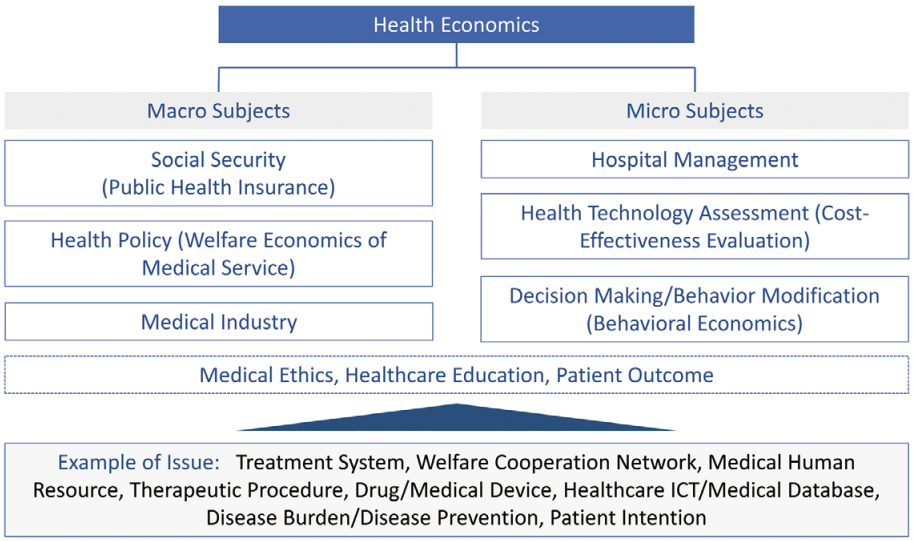

Figure 2. Structure of the main subjects in health economics (medical economics in the broad sense). (Modified with permission from original reported (Figure 2) by Takura T.[1]) ICT, Information and Communication Technology.

which the economic value of aspects of the healthcare system, such as treatment modalities, is analyzed from a new methodological point of view by applying the parameters of not only patient outcomes but also the values to the public. In the not-too-distant future, it will become more common to see, even in the circulatory field, the more active pursuit of socioeconomic research using, for example, practice models of therapy based on new strategies made feasible by progress in medical information and communication technologies, and improvement in other infrastructure environments (**Figure 2**).

Circulatory Field and Medical Economics: Vision and Values of *Circulation Reports*

Circulation Reports will explore the subjects related to the economics of health and medical in the circulatory field in depth, with due consideration of the aforementioned backgrounds. Research topics are anticipated to include the following.

As future research areas, not only adverse economic effects and determinants of morbidity of circulatory diseases but also the social significance of economic investment in health behaviors of therapeutic and preventive interventions are expected to be extensively discussed topics. It is also critical to analyze regional medical systems and welfare systems, which relate to the aforementioned economic effects and significance of economic investment, from the perspective of medical economics. Furthermore, it is highly likely that particular attention will be paid to research on the management of medical institutions that support the healthcare system and to research on behavior modifications (not only of patients but also healthcare providers).

Other highly interesting topics include economic evaluation of innovative medical technologies in the circulatory field through clinical trials and distribution of medical resources based on other cost-effectiveness assessments with modeling estimates. In relation to these topics, it is also important to determine the effectiveness (or restrictions) of medical treatment, including the measurement of therapeutic and preventive efficacy, from broader and deeper perspectives than before. These topics require the development of a range of methodologies for the calculation of utility value of patients and patient-reported outcomes (including patient's quality of life, functional status, and satisfaction with provided medical treatment), which are closely related to the evaluation

of medical economics.

The healthcare system, per se, involves public aspects to a greater or lesser extent in any region of the world, so significant progress in medical treatment in the circulatory field could be achieved through theory development, empirical studies, and associated investigations of welfare economics verifying the validity of health policy. In particular, there is a need for efficacy evaluation of various health policies and medical services, as well as medical economic verification of the quality of medical services, against the background of discussions concerning the supply and demand of medical services.

Lively and in-depth future-oriented discussions of these topics will facilitate the construction of valuable evidence that helps all personnel engaged in medical economics research (including members of the Japanese Circulation Society) in not only gaining new insight into medical economics and but also enhancing their explanatory power in propagating the significance of medical economics in the circulatory field. These approaches will reinforce the foundation of medical economics research by economically supporting the advancement of circulatory science. *Circulation Reports* welcomes and encourages contributions from researchers in the circulatory field who are studying medical economics with new discussion points, theories, and findings.

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Tomoyuki Takura, PhD
Associate Editor
Circulation Reports